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Livermore Site Office, Livermore, California 94551

Lawrence Livermore National Laboratory



Lawrence Livermore National Security, LLC, Livermore, California 94551

Remedial Action Completion Report for the Building 850/Pit 7 Complex Operable Unit Lawrence Livermore National Laboratory Site 300

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Environmental Restoration Department

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1. Introduction

This Remedial Action Completion Report (RACR) has been prepared to demonstrate remedial action completion of the Building 850/Pit 7 Complex Operable Unit (OU) of the Lawrence Livermore National Laboratory (LLNL) Site 300. LLNL Site 300 covers 11 square miles and is located in the Altamont Hills west of Tracy, California (Figure 1). The site is a restricted-access experimental testing facility where the United States (U.S.) Department of Energy (DOE) conducts research, development, and testing of high explosives and integrated non-nuclear weapons components. This work includes formulating, processing, machining, assembling, and detonating explosives.

During past Site 300 operations, surface spills and piping leaks, leaching from unlined landfills and pits, high-explosive test detonations, and disposal of waste fluids in lagoons and dry wells (sumps) resulted in contaminant releases to soil, bedrock, surface water, and ground water. Site 300 was placed on the National Priorities List (NPL) in 1990 (U.S. Environmental Protection Agency [EPA] Superfund Site Identification No. CA 2890090002). In June 1992, the U.S. EPA, the California Department of Toxic Substances Control (DTSC) and Regional Water Quality Control Board (RWQCB), and DOE signed a Federal Facility Agreement (FFA) for cleanup of the LLNL Site 300 Experimental Test Facility.

An Interim Site-Wide Record of Decision (ROD) was signed in 2001 that selected interim remedial actions for Operable Units 2 through 8 (U.S. DOE, 2001). The Pit 7 Complex portion of OU 5 was not included in the Interim Site-Wide ROD. An Amendment to the Interim Site Wide ROD (U.S. DOE, 2007) for the Pit 7 Complex was signed in January 2007. A Final Site-Wide ROD was signed in 2008 that selected cleanup standards and finalized the remedial actions for OU 5 (U.S. DOE, 2008). Remediation of the contaminated soil at Building 850 was conducted as a non-time-critical removal action as documented in the Engineering Evaluation/Cost Analysis (EE/CA) for Polychlorinated biphenyl- (PCB-), Dioxin, and Furan-contaminated Soil at the Building 850 Firing Table (Dibley et al., 2008a), and the Action Memorandum for the Removal Action at the Building 850 Firing Table (Dibley et al., 2008b). All remedial actions identified in the Site-Wide RODs and Building 850 Action Memorandum for the Building 850/Pit 7 Complex OU have been implemented as discussed below.

The following sections describe the site (Section 1.1), OU history (Section 1.2), and remedial investigation results (Section 1.3).

1.1. Site Description

Site 300 has been divided into nine OUs based on the nature and extent of contamination to effectively manage site cleanup. The Building 850/Pit 7 Complex OU is the fifth (OU 5) of nine OUs (Figure 2). A description of OUs 1 through 9 is presented in the Site-Wide ROD. OU 5 is divided into two areas: (1) the Building 850 Firing Table area, and (2) the Pit 7 Complex area.

1.1.1. Building 850 Firing Table Area Site Description

The Building 850 Firing Table area covers approximately 1 square mile in the northwestern portion of Site 300 and includes the firing table contaminant release site and areas of associated soil and ground water contamination (Figure 2). Topography, springs, monitor well locations, ground water contamination in excess of cleanup standards, and cultural features in the Building 850 Firing Table area are shown on Figure 3. In addition to the firing table and underlying bunker, two outdoor storage areas (the upper and lower Corporation Yards) existed until 2008. A mound of contaminated sand, designated the Building 850 sand pile, also existed until 2008 immediately northeast of the firing table. This sand pile consisted of material previously used in firing table operations. The Building 850 Firing Table is situated at the bottom of a steep, east-facing topographic depression. Doall Ravine, immediately east of the Building 850 area, is an incised valley that contains an ephemeral stream channel that runs southeast and then trends east-northeast. Further to the east, Doall Ravine joins Elk Ravine, a broad northwest-southeast trending valley.

1.1.2. Pit 7 Complex Area Site Description

The Pit 7 Complex area is located in the northwest portion of Site 300 (Figure 2) and consists of the Pit 3, 4, 5, and 7 Landfills. Topography, springs, monitor well locations, and cultural features in the Pit 7 Complex are shown on Figure 4. The Pit 7 Complex is located within a broad northwest-southeast trending valley. The longitudinal axes of Pits 3, 4, 5, and 7 are parallel to the valley axis. A shallow ephemeral drainage channel occupies the east side of this valley and extends from the Pit 7 Complex to the southeast to a point several hundred feet (ft) east of Building 850. Storm water generally runs off slopes and rapidly infiltrates alluvium and colluvium. Water flows in the channel on the west side of the Pit 7 Complex valley during and after high intensity storms. Otherwise, surface water is not present in the area. Elevation ranges from about 1,700 ft above mean sea level (msl) at the ridge top to the west of the Pit 7 Complex to about 1,300 ft above msl in the valley bottom.

1.2. OU History

A chronology of important events for the OU is shown in Table 1. A detailed construction chronology is presented in Section 4.

1.2.1. Building 850 Firing Table Area Site History

The Building 850 Firing Table was constructed in 1958 and was the first concrete-reinforced bunker at Site 300. The firing table was used to test and develop detonators for prototypical nuclear weapons and armor-piercing projectiles. Diagnostic operations included high-speed photography. No experiments were conducted with fissile materials such as enriched uranium or plutonium. The Building 850 bunker is located directly adjacent to the firing table and the rear of the building abuts the elevated firing table. The front (east side) of Building 850 is at normal ground surface. The firing table and the roof of Building 850 was covered with up to 5 ft of pea gravel used to absorb shot blasts and minimize impact to bunker occupants. The Building 850 Firing Table was routinely rinsed down with 1 to 2 inches of water after each experiment to reduce dust and prevent hazardous material from being re-suspended in the air. From 1962 to

1972, a large volume of sand, the Building 850 sandpile, was stockpiled near Building 850 and was periodically used during large experiments.

Over 95% of the approximately 22,670 curies (Ci) of tritium shipped to Site 300 were used in hydrodynamic experiments at the Building 850 Firing Table (Buddemeier, 1985). The vast majority of tritium was used between 1963 and 1978, primarily in gaseous form (³H₂), although some solid lithium tritide was also used. In addition to tritium, the test assemblies contained high explosives and occasionally depleted uranium. Some of the explosives and test assemblies contained small quantities of barium, beryllium, copper, lead, and vanadium and utilized a variety of materials including wood-frame structures, tent poles, aluminum, plastic, burlap bags, metal cable, 10-ton rebar-reinforced concrete blocks, lead bricks, copper cylinders, and metal silos. Prior to PCBs becoming regulated substances, an estimated 1,000 capacitors were destroyed on the Building 850 Firing Table. The capacitors were used to provide a sudden burst of electrical energy during 10 to 20 experiments (50 to 100 capacitors per experiment) conducted from 1964 to 1967.

From 1959 to 1988, gravel and experimental debris from the Building 850 Firing Table was routinely disposed in the Pit 7 Complex landfills.

Activities at Building 850 and the firing table ceased and the building was closed in 2008.

1.2.2. Pit 7 Complex Area Site History

DOE/LLNL used the Pit 7 Complex landfills to dispose firing table debris and gravel. These pits were constructed by excavating topsoil and alluvial materials to an average depth of 15 to 20 ft (Taffet et al., 1989). The pits were filled incrementally from southeast to northwest with the exception of Pit 5, which was filled from northwest to southeast (Simmons, 1992). The majority of the waste material in the pits came from the firing tables at Buildings 850 and 851, where aboveground detonations were conducted. DOE/LLNL typically removed gravel and experimental debris from the firing tables and deposited them in the pits after the gravels became too compacted to deaden the shock produced during detonations. The shock generated by explosives shots pulverizes the gravel into smaller size fractions. The resulting fine-grained material is denser and more compact than the original gravel and poorly attenuates the vibration caused by the explosives test. The waste placed in the pits included wood, plastic, material and debris from tent structures, pea gravel, and exploded test assemblies, some of which contained tritium and depleted uranium.

The debris disposed in the Pit 7 Complex contains the majority of the tritium residue disposed in Site 300 landfills (Buddemeier, 1985). Metals, including depleted uranium, were also used in explosive tests. Depleted uranium is natural uranium from which most of the uranium-235 isotope has been removed, leaving the less radioactive uranium-238 as the dominant remaining isotope.

In 1992, an engineered cap was constructed over the Pit 7 Landfill (referred to as the Pit 7 Cap) in compliance with Resource Conservation and Recovery Act (RCRA) requirements. The design included interceptor trenches and surface water drainage channels, a top vegetative layer to prevent erosion, a biotic barrier layer to minimize animal burrowing, and a clay layer of very low permeability to prevent infiltration of precipitation and shallow subsurface interflow that could result in leaching of contaminants. The Pit 7 cap also covers 100% of Pit 4 and approximately 25–30% of Pit 3. More complete information on the cap design is presented in

Volume II, Closure and Post-Closure Plans, Landfill Pits 1 and 7 (Rogers/Pacific Corporation, 1990). The original compacted native soil cover on most of Pit 3 and all of Pit 5 remains intact.

1.3. Remedial Investigation Results

1.3.1. Building 850 Firing Table Area Remedial Investigation Results

1.3.1.1. Building 850 Firing Table Area Nature and Extent of Contamination

Details of the nature and extent of contamination in the Building 850 Firing Table area are discussed in Chapter 11, Section 11-4 of the Site-Wide Remedial Investigation report (Webster-Scholten, 1994), Chapter 2 of the Addendum to the Site-Wide Remedial Investigation for the Building 850/Pit 7 Complex (Taffet et al., 1996), the Ground Water Tritium Plume Characterization Summary report (Ziagos and Reber-Cox, 1998), Chapter 1 of the Site-Wide Feasibility Study (Ferry et al., 1999), and the EE/CA for PCB-, Dioxin-, and Furan-Contaminated Soil at the Building 850 Firing Table.

The results of the ground water monitoring and risk and hazard management activities are described in the Semi-annual Site 300 Compliance Monitoring Reports.

1.3.1.2. Building 850 Firing Table Area Contaminants of Concern

Contaminants of concern (COCs) have been identified for impacted environmental media in the Building 850 Firing Table area:

- Surface soil: Polychlorinated biphenyls (PCBs), high melting explosive (HMX), dioxins, furans, depleted uranium, beryllium, cadmium, and copper.
- Subsurface soil: Tritium and uranium.
- Surface water (Well 8 Spring): Tritium.
- Ground water: Tritium, depleted uranium, nitrate, and perchlorate.

1.3.1.3. Building 850 Firing Table Area Summary of Human Health Risks

The baseline risk assessment performed for the Building 850 Firing Table area estimated an excess cancer risk of 5×10^{-4} (five in ten thousand) for onsite workers from inhaling/ingesting resuspended particulates and direct dermal contact with surface soil contaminated with PCBs and an excess cancer risk of 1×10^{-4} (one in ten thousand) was estimated for onsite workers from inhaling/ingesting resuspended particulates and direct dermal contact with surface soil contaminated with chlorinated dibenzo-p-dioxins (CDDs) and dibenzo-furans (CDFs).

The baseline risk assessment also estimated an excess cancer risk of 1×10^{-3} (one in one thousand) for onsite workers from inhaling/ingesting tritium in surface water at Well 8 Spring.

There was no unacceptable risk or hazard identified for offsite residents, associated with tritium and uranium in subsurface soil/rock, or associated with tritium, uranium, nitrate, and perchlorate in ground water in the Building 850 Firing Table area.

1.3.1.4. Building 850 Firing Table Area Summary of Ecological Hazards

The baseline ecological assessment determined a risk from copper, zinc, cadmium and PCBs/CDDs/CDFs existed for ground squirrels, deer and kit fox at Building 850. Individual

adult ground squirrels and individual adult and juvenile deer are at risk from ingestion of cadmium. The combined oral and inhalation pathway Hazard Quotient (HQ) exceeded 1 for these species, which was driven by the oral pathway. Individual ground squirrels, deer and kit fox were determined to be at risk from PCBs/CDDs/CDFs due to the capacity of these contaminants to bioaccumulate in the environment. Kit foxes have never been observed in any ecological surveys at Site 300 or by Site 300 personnel working at the site. Risk for this sensitive species was evaluated due to the presence of potential habitat at Site 300.

No unacceptable hazard to ecological receptors for surface water in Well 8 Spring has been identified.

A preliminary exposure analysis for the Western Burrowing Owl to estimate hazard to cadmium and PCBs was completed in 2004 and reported in the First Semester 2004 Compliance Monitoring Report (Dibley et al., 2004). Results suggest cadmium is unlikely to pose a hazard to burrowing owls nesting in the vicinity of Building 850. However, concentrations of PCBs in the soil at Building 850 may pose a hazard to burrowing owls nesting in the area, as the HQ exceeds 1.

1.3.2. Pit 7 Complex Area Remedial Investigation Results

1.3.2.1. Pit 7 Complex Area Nature and Extent of Contamination

Details of the nature and extent of contamination in the Pit 7 Complex area are discussed in Chapter 11, Section 11-4 of the Site-Wide Remedial Investigation Report, Chapter 2 of the Site-Wide Remedial Investigation Addendum, and the Ground Water Tritium Plume Characterization Summary report. The Building 850 EE/CA and the Remedial Investigation/Feasibility Study for the Pit 7 Complex (Taffet et al., 2008) screened and evaluated remedial alternatives.

The results of the ground water monitoring and risk and hazard management activities will be reported in the Semi-annual Site 300 Compliance Monitoring Reports beginning in the First Semester of 2010.

1.3.2.2. Pit 7 Complex Area Contaminants of Concern

Contaminants of concern (COCs) have been identified for impacted environmental media in the Pit 7 Complex area:

- Surface soil: None.
- Subsurface soil: Tritium and uranium.
- Surface water: None.
- Ground water: Volatile organic compounds (VOCs), tritium, uranium, nitrate, and perchlorate.

1.3.2.3. Pit 7 Complex Area Summary of Human Health Risks

The Pit 7 Complex risk assessment estimated an excess cancer risk of 4 x 10⁻⁶ (four in one million) for onsite workers inhaling tritiated water evaporating from subsurface soil in the vicinity of the Pit 3 Landfill.

In 2007, the risk to onsite workers for inhalation of tritium vapors from the Pit 3 Landfill was recalculated, accounting for tritium decay that occurred between 1992 and 2007, for the Pit 7

Complex Remedial Design Document (Taffet et al., 2008). An excess cancer risk of 8 x 10⁻⁷ was estimated for a worker spending 8 hours a day, 5 days a week for 25 years at the Pit 3 Landfill. There is no longer an unacceptable risk to onsite worker health posed by contaminants in the Pit 7 Complex area. No unacceptable risk was identified for offsite residents.

There was no unacceptable risk or hazard identified for offsite residents, associated with tritium and uranium in subsurface soil/rock, or associated with VOCs, tritium, uranium, nitrate, and perchlorate in ground water in the Pit 7 Complex area.

1.3.2.4. Pit 7 Complex Area Summary of Ecological Hazards

No unacceptable hazard to ecological receptors has been identified.

2. Operable Unit Background

This section summarizes the Remedial Action Objectives (RAOs) applicable to the OU (Section 2.1), the selected remedies (Section 2.2), the OU cleanup standards (Section 2.3), and the remedial design (Section 2.4).

2.1. Remedial Action Objectives

The Remedial Action Objectives (RAOs) applicable to the Building 850/Pit 7 Complex OU were presented in the Final Site-Wide ROD and the Building 850 EE/CA.

2.1.1. Site-Wide ROD RAOs

The Site-Wide ROD RAOs applicable to the Building 850/Pit 7 Complex OU are:

For Human Health Protection:

- Restore ground water at Building 850 and the Pit 7 Complex containing contaminant concentrations above cleanup standards.
- Prevent human ingestion of ground water at Building 850 and the Pit 7 Complex containing contaminant concentrations (single carcinogen) above cleanup standards.
- Prevent human incidental ingestion and direct dermal contact with contaminants in Building 850 surface soil that pose an excess cancer risk greater than 10⁻⁶ or hazard index greater than 1, a cumulative cancer risk (all carcinogens) in excess of 10⁻⁴, or a cumulative hazard index (all noncarcinogens) greater than 1.
- Prevent human inhalation of tritium volatilizing from subsurface soil at the Pit 7 Complex to air that pose an excess cancer risk greater than 10^{-6} or hazard index greater than 1, a cumulative excess cancer risk (all carcinogens) in excess of 10^{-4} , or a cumulative hazard index (all noncarcinogens) greater than 1.
- Prevent human inhalation of tritium volatilizing from surface water at Building 850 (Well 8 Spring) to air that pose an excess cancer risk greater than 10⁻⁶ or hazard index greater than 1, a cumulative excess cancer risk (all carcinogens) in excess of 10⁻⁴, or a cumulative hazard index (all noncarcinogens) greater than 1.
- Prevent human inhalation of contaminants bound to resuspended surface soil particles at Building 850 that pose an excess cancer risk greater than 10^{-6} or hazard index greater

- than 1, a cumulative excess cancer risk (all carcinogens) in excess of 10^{-4} , or a cumulative hazard index (all noncarcinogens) greater than 1.
- Prevent human exposure to contaminants in media of concern at Building 850 and the Pit 7 Complex that pose a cumulative excess cancer risk (all carcinogens) greater than 10⁻⁴ and/or a cumulative hazard index greater than one (all noncarcinogens).

For Environmental Protection:

- Restore water quality at Building 850 and the Pit 7 Complex to ground water cleanup standards within a reasonable timeframe and prevent plume migration to the extent technically practicable. Maintain existing water quality that complies with ground water cleanup standards to the extent technically practicable. This will apply to both individual and multiple constituents that have additive toxicology or carcinogenic effects.
- Ensure ecological receptors important at the individual level of ecological organization (listed threatened or endangered, State of California species of special concern) do not reside in areas at Building 850 where relevant hazard indices exceed 1.
- Ensure existing contaminant conditions at Building 850 and the Pit 7 Complex do not change so as to threaten wildlife populations and vegetation communities.

There is no remedial action objective for human health protection/Applicable or Relevant and Appropriate Requirements (ARARs) compliance for ingestion of surface waters (i.e., water from Site 300 springs) because there is not a complete exposure pathway for ingestion of surface waters for humans at Site 300. Humans do not drink water from Site 300 springs. In addition, the springs in which contaminants are detected do not produce a sufficient quantity of water to be used as a water-supply (greater than 200 gallons per day). Cleanup standards for ground water and surface water in the Building 850/Pit 7 Complex OU 5 are discussed in Section 2.3.

2.1.2. Building 850 EE/CA RAOs

Additional RAOs for the cleanup of PCB, dioxin and furan-contaminated soil at Building 850 as presented in the Building 850 EE/CA are:

- 1. Mitigate risk to onsite workers by remediating Building 850 soil and sandpile materials that contain PCB concentrations in excess of U.S. EPA Region 9 industrial soil Preliminary Remediation Goal (PRG) of 0.74 milligrams per kilogram (mg/kg) and dioxin and furan compounds in excess of the U.S. EPA Region 9 industrial soil PRG of 1.6 x 10⁻⁵ mg/kg for 2,3,7,8-tetrachloro-di-benzodioxin (TCDD).
- 2. Mitigate potential hazard to burrowing owls associated with the PCB-, dioxin-, and furancontaminated soil. The U.S. EPA Region 9 industrial soil PRG soil cleanup levels for PCBs, dioxins, and furans are sufficiently low to protect ecological receptors.

The U.S. EPA Region 9 industrial soil PRGs for PCBs, and for 2,3,7,8-TCDD to represent dioxin and furan compounds, were selected as the cleanup standards for contaminated surface soil at Building 850 in the Interim Site-Wide Record of Decision (DOE, 2001).

2.2. Operable Unit 5 Selected Remedies

2.2.1. Building 850 Firing Table Area Selected Remedy

The implemented remedies for the Building 850 Firing Table area were selected in the Interim Site-Wide ROD, Final Site-Wide ROD, and the Action Memorandum for the Removal Action at the Building 850 Firing Table.

These remedies include:

- No Further Action for HMX, beryllium, cadmium, copper, and uranium in surface soil (selected in the Interim Site-Wide ROD).
- No Further Action for tritium and depleted uranium in subsurface soil/rock (selected in the Interim Site-Wide ROD).
- Monitored Natural Attenuation (MNA) to reduce tritium activities in ground water and surface water to cleanup standards (selected in the Interim and Final Site-Wide RODs).
- Monitoring ground water and surface water to evaluate the effectiveness of the remedy in achieving cleanup standards (selected in the Interim and Final Site-Wide RODs).
- Institutional/land use controls to prevent human exposure to contamination and to protect the integrity of the remedy (selected in the Interim and Final Site-Wide RODs and Building 850 Action Memorandum).
- Excavation, and onsite solidification and consolidation of contaminated soil and sandpile (selected in the Building 850 Action Memorandum).

Active remediation measures for tritium, uranium and nitrate in ground water were not included in the remedy because:

- The source of tritium in the vadose zone was rapidly decreasing in mass, and tritium in ground water will naturally attenuate to meet the cleanup standard in a reasonable timeframe time without migrating offsite.
- Uranium activities in ground water were below the cleanup standard and its extent is limited.
- Data do not indicate the presence of a significant source of nitrate in the Building 850 Firing Table area, and the extent of nitrate with concentrations exceeding the cleanup standard is limited and does not pose a threat to human health or the environment.

Based on the recent identification of perchlorate in ground water, DOE will conduct an *in situ* bioremediation treatability study for perchlorate in ground water and discuss possible remedial measures with the regulatory agencies. Public input will be solicited prior to the selection of any remedial action for perchlorate in ground water. The selected remedy will be documented in an Amendment to the Site–Wide ROD.

The only Building 850 Firing Table area remedy component that required construction was the excavation and onsite solidification and consolidation of contaminated soil and the sandpile. The implementation of this remedy is described in Section 3.1.

2.2.2. Pit 7 Complex Area Selected Remedy

The implemented remedies for the Pit 7 Complex area were selected in the Amendment to the Amendment to the Interim Site-Wide ROD for the Pit 7 Complex and the 2008 Site-Wide ROD.

These remedies include:

- Monitoring ground water and surface water to determine if the cleanup is adequately
 protecting human health and the environment and to evaluate the effectiveness of the
 remedy in achieving cleanup standards.
- Risk and hazard management, including institutional/land use controls, to prevent human exposure to contamination and to protect the integrity of the remedy.
- MNA to reduce tritium activities in ground water and surface water to cleanup standards.
- Extracting and treating ground water to reduce uranium, perchlorate, nitrate, and VOC concentrations in ground water to meet cleanup standards.
- Installing an engineered drainage diversion system to hydraulically isolate the contaminant sources in the landfills and underlying bedrock from subsurface water, thereby preventing infiltration of rainwater runoff that can result in ground water rising into Pits 3, 4, 5, and 7 and releasing contaminants.
- Inspecting the Pit 3, 4, 5, and 7 Landfill covers periodically for damage that could compromise integrity and repair any damage found.

Active remediation measures for tritium in ground water were not included in the remedy because tritium in ground water will naturally attenuate to meet the cleanup standard in a reasonable timeframe time without migrating offsite.

Two Pit 7 Complex area remedy components required construction: 1) extraction and treatment of ground water and 2) installation of a drainage diversion system. Implementation of these remedial actions is described in Sections 3.2.1 and 3.2.2.

2.3. Cleanup Standards

The cleanup standards selected in the Site-Wide Final ROD (DOE, 2008) for ground water and surface water at OU 5 are Federal Maximum Contaminant Levels (MCLs) unless California State MCLs are more stringent. The cleanup standards for the Building 850 Firing Table area soil were selected in the 2001 Interim ROD and presented in the Building 850 Action Memorandum. The cleanup standards for OU 5 COCs are presented in Table 2.

As presented in the Site-Wide ROD, DOE will prepare a technical and economic feasibility analysis as part of the Five-Year Review after ground water contaminant concentrations have been reduced to MCLs. This analysis will be used to determine the technical and economic feasibility of continuing remediation to further reduce contaminant concentrations below MCLs, in accordance with State Water Resources Control Board Resolution 92-49. A range of values will be considered down to water quality numeric limits or background. The technical and economic feasibility analyses will be reviewed and approved by the RWQCB, DTSC, and EPA. If DOE and the regulatory agencies then agree that it is technically and economically feasible, remediation would continue. If it is reasonable to conduct the feasibility analysis sooner than at

the Five-Year Review (e.g., contaminant concentrations are reduced below MCLs soon after a Five-Year Review has been completed), DOE will discuss accelerating the feasibility analysis with the regulatory agencies. Any changes to ground water cleanup standards will be proposed to the community and take effect through a ROD amendment.

2.4. Remedial Design

2.4.1. Building 850 Firing Table Area Remedial Design

The wellfield to monitor tritium, uranium, and nitrate in Building 850 area ground water was in place and approved by the regulatory agencies prior to the Remedial Design. Ground water monitoring wellfields are described and updated in the Site-Wide Compliance Monitoring Reports.

Excavation of PCB-, dioxin-, and furan-contaminated soils to meet U.S. EPA Region 9 industrial soil PRGs soil cleanup levels and offsite disposal was selected in the 2001 Interim ROD. A Remedial Design was completed in 2004 for the excavation and offsite disposal of contaminated soil in the OU. In 2001, the estimated cost to excavate and dispose of the contaminated soil and sandpile was approximately \$1.4 million (M). By the time the Interim Remedial Design Report for Building 850 was prepared, the estimated volume of contaminated soil increased as well as the cost of excavation, transportation, and disposal, increasing the total cost estimate to \$4.8 M. DOE scheduled the activity to be completed in fiscal year (FY) 2006. As the planning for the FY 2006 activity proceeded, the cost estimates for the excavation, transportation, and disposal of contaminated soil increased to over \$8M. As a result, the interim remedy identified for the contaminated soil at the Building 850 Firing Table in 2001 was no longer considered economically practicable. In addition, more cost-effective technologies were identified that were capable of addressing the PCBs, dioxins, and furans in an equally protective manner.

In 2006, DOE, the U.S. EPA, DTSC, and the RWQCB agreed to conduct remediation of PCB-, dioxin-, and furan-contaminated soil at the Building 850 Firing Table as a Non-Time Critical Removal Action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Additional sampling and analysis of the sandpile was performed in 2006 showed that the current maximum tritium activities were not a threat to ground water. However, PCBs were detected in the sandpile at concentrations of up to 50.4 milligrams per kilogram (mg/kg). Based on these data, DOE requested that the sandpile be included in this removal action. The three regulatory agencies agreed. A Final EE/CA was submitted in February 2008.

A public meeting was held on March 6, 2008 and the Building 850 Action Memorandum was submitted in April 2008. The Building 850 Removal Action design was approved by the regulatory agencies in May 2008. The design included the excavation of contaminated soil, verification sampling and analysis, soil solidification, and consolidation in a Corrective Action Management Unit, drainage system enhancements and slope stability analysis, slope restoration, and ongoing inspection and maintenance.

The specific design details of the Building 850 Soil Removal Action were presented in the Building 850 EE/CA and the construction subcontractor's 100% design submittal (SCS Engineers, 2009). Variances from the original design are presented in Appendix A.

2.4.2. Pit 7 Complex Area Remedial Design

The wellfield to monitor tritium, uranium, nitrate, VOCs, and perchlorate in Pit 7 Complex area ground water was in place and approved by the regulatory agencies prior to the Remedial Design. Ground water monitoring wellfields are described and updated in the Site-Wide Compliance Monitoring Reports.

The Remedial Design Document for the Pit 7 Complex was completed in 2008 and presented the design for the Pit 7 Hydraulic Drainage Diversion System and the Pit 7-Source ground water extraction and treatment system.

The Drainage Diversion System was designed to prevent further releases of COCs from the pits and underlying bedrock to ground water. When the rainfall increased to above normal levels, such as during El Niño years, the pit waste and underlying bedrock were often inundated and residual contamination came into contact with shallow subsurface ground water. This system was designed to divert a significant volume of water during intense, El Niño-type rainfall events. The water from the western hillslope is diverted and discharged to the watershed north of the Pit 7 watershed and will not recharge the hydrostratigraphic units (HSUs) in the Pit 7 watershed, which is hydraulically isolated from the watershed to the north. The water diverted from the eastern hillslope stays within the watershed but is discharged south of the landfills at a distance of about 270 ft south of Pit 5 and about 450 ft southeast of Pit 7. Because the alluvial channel fill and weathered bedrock HSU (Qal/WBR) is highly permeable compared to the underlying bedrock, this infiltrating water will quickly recharge the Qal/WBR HSU and flow downgradient (south). Any short-term water table rises would occur further downgradient at distances that will not affect the landfills or underlying contaminated bedrock. Because water is diverted prior to entering the pits, it is devoid of contaminants and therefore will not adversely impact the water quality for downstream users, springs, or wetlands. The diversion system was also designed to minimize the creation of wetlands, by discharging to areas where infiltration is fairly rapid, and does not significantly alter the regional recharge conditions in the Pit 7 Complex or the overall ground water basins. There are four components that comprise the drainage diversion system (Figure 4):

- 1. A subsurface drainage network on the western hillslope.
- 2. Upgraded riprap at the end of the existing north-flowing concrete channel for the Pit 7 landfill cap.
- 3. A vegetated surface water diversion swale along the base of the eastern hillslope along the paved road (Route 4), including several culverts under Route 4 and dirt fire trails.
- 4. An upgraded surface water-settling basin at the south end of the existing south-flowing concrete channel for the Pit 7 landfill cap.

The Pit 7-Source extraction and treatment system was designed to remove uranium, VOCs, perchlorate, and nitrate from ground water in the vicinity of the Pit 7 Complex (see Figure 4). The wellfield configuration was designed to target the highest depleted uranium concentrations in the Qal/WBR HSU and capture ground water containing uranium, perchlorate, and VOCs in excess of cleanup standards in both the Qal/WBR and Neroly bedrock (Tnbs₀) HSUs. Currently, local nitrate concentrations proximal to the landfills are below the cleanup standard. However, nitrate is removed from extracted ground water as part of the treatment process. Aqueous-phase granular activated carbon (GAC) is used to remove VOCs present in extracted ground water, and

ion-exchange resins are used to remove uranium, nitrate, and perchlorate. The treatment facility effluent is monitored for compliance with effluent discharge limits and then discharged to an infiltration trench. Because there is currently no viable technology available to treat tritiated ground water, the treated water containing only tritium is reintroduced to the subsurface through the infiltration trench.

The design details of the Pit 7 Drainage Diversion System and Pit 7-Source ground water extraction and treatment system were presented in the Remedial Design Document for the Pit 7 Complex (Taffet et al., 2008) and the Drainage Diversion System construction subcontractor's 100% design submittal (SCS Engineers, 2009). Variances from the original design for the Pit 7-Source ground water extraction and treatment system and the Pit 7 Drainage Diversion System are presented in Appendices G and I, respectively.

3. Construction Activities

This section provides a description of the remedial action implementation and construction activities for the Building 850 Firing Table Soil Removal Action, the Pit 7-Source ground water extraction and treatment system, and the Pit 7 Complex Drainage Diversion System.

3.1. Building 850 Firing Table Removal Action Implementation

The Building 850 Removal Action field implementation began in May 2009. Before beginning full-scale activities, a soil solidification test fill demonstration was conducted from May 11 through 14, 2009 to verify the performance of the soil-cement mix design and lift thickness in meeting or exceeding parameters for unconfined compressive strength, density, mixing, cement application, and compaction. A report summarizing the test fill demonstration process, test results, and recommendations was submitted to the regulatory agencies (Appendix D). Design changes resulting from the test fill demonstration included reducing lift thickness from 18 to 12 inches and eliminating volume increase (swell) testing (Appendix A, Table A-1). The regulatory agencies concurred with these test fill demonstration report recommendations.

On June 8, 2009, soil excavation commenced in the Upper Corporation Yard (Phase 1) within the footprint of the area where the excavated soil would be solidified and consolidated to create the CAMU (Figure 3). Phase 1 also included some adjacent areas outside the CAMU footprint. Following verification that contaminated soil with concentrations exceeding soil cleanup standards had been excavated in this area, the underlying non-engineered clean fill was excavated to a maximum depth of 25 feet (ft). The excavated clean fill was staged in the Lower Corporation Yard for use in constructing the outer shell of the CAMU. At the conclusion of fill excavation, a several foot thick layer of engineered clean fill was compacted to provide a competent base for the CAMU. Excavation of contaminated soil on the hillslopes commenced and proceeded until contaminated soil had been excavated from the Phase 2-7 hillslope areas to meet soil cleanup standards. As the soil was excavated, it was placed in staging areas within the areas of contamination prior to solidification.

To construct the CAMU, the contaminated soil was laid down in 12-inch lifts within the subgrade excavation in the Upper Corporation Yard, mixed with 5% Portland cement and water, and compacted. Once the original grade was reached, lay down and solidification of 12-inch

thick lifts of soil continued with the outer 5 ft of soil being mixed with 10% Portland cement. The edges of the CAMU slopes generally consist of a minimum 3 ft thickness of clean fill containing 10% cement. Several layers were a minimum 1 ft thickness of clean soil. The top of the CAMU consists of a 5 ft thickness of soil mixed with 10% Portland cement and is composed of at least 1 ft of clean fill, underlain by 4 ft of contaminated soil.

In total, 27,592 cubic yards (yd³) of PCB-, dioxin-, and furan-contaminated soil were excavated from the Building 850 Upper Corporation Yard and hillslopes surrounding the Building 850 firing table. The EE/CA report estimated that 15,544 yd³ of contaminated soil would be removed. However, additional contamination was discovered both vertically and laterally during verification sampling and analysis. Soil samples were collected for PCB and dioxin/furan analysis following soil excavations in accordance with the approved Sampling and Analysis Plan. Some modifications to the original Sampling and Analysis Plan were needed due to the additional volume and extent of contaminated soil encountered during excavation and occurrence of bedrock at the bases of excavations. These modifications were discussed with and approved by the regulatory agencies. All sampling locations and the lateral and vertical extents of all excavations were located using a Global Positioning System (GPS), and final excavation depths were verified by GPS and field measurements.

Two Verification Sampling and Analysis Reports (VSARs) for the excavation Phase 1 and Phase 2-7 were submitted to the U.S. EPA, the California DTSC, and the RWQCB on June 25, 2009 and January 20, 2010, respectively (Appendix D). EPA, DTSC, and the RWQCB concurred that soil excavation to meet PCB, dioxin, and furan cleanup standards had been achieved as specified in the 2001 Interim ROD and the Building 850 Action Memorandum (DOE, 2008). The VSARs, which describe soil excavation activities and sampling and analysis activities and results in more detail, are provided in Appendix D.

As soil excavation was completed in each excavation phase area, slope restoration measures were implemented to limit erosion and control sediment runoff from the hillslopes, such as hydroseeding to promote the re-establishment of vegetation and the placement of fiber rolls to reduce sediment transport. Drainage features were also enhanced and/or constructed on and around the CAMU that provide for erosion control and reduce sediment discharge.

As stated above, at project completion in January 2010, 27,592 yd³ of soil were solidified and compacted (in-place) in the CAMU. Of this total, 21,007 yd³ of soil (all contaminated) were solidified with 5% Portland cement and 6,586 yd³ (contaminated and clean) were solidified with 10% Portland cement. The difference in soil volume excavated and solidified and the volume of solidified soil in-place is due to compaction (20-25%). Approximately 4,000 yd³ of excess clean fill remaining in the Lower Corporation Yard were compacted, stabilized, and hydroseeded to prevent erosion.

The solidified soil and engineered fill met or exceeded performance criteria for unconfined compressive strength, density, mixing, cement application, and compaction. Variances from the original design are presented in Appendix A. The Engineering Test Data and Construction Quality Assurance (CQA) Field Sheets are presented in Appendix B. As-Built drawings for the Building 850 CAMU are presented in Appendix C. The excavation verification sampling and analysis reports are presented in Appendix D. The Building 850 Removal Action Material and Product Description Sheets are presented in Appendix E.

The timeline for the remedy implementation is presented in Table 3.

3.2. Pit 7 Complex Remedial Action Implementation

3.2.1. Ground Water Extraction and Treatment Remedial Action Implementation

Construction of the Pit 7-Source ground water extraction and treatment system was initiated October 1, 2007. However, due to conflicts and delays with the Pit 7 Complex Drainage Diversion System construction that was occurring simultaneously, the construction of the treatment system was stopped.

Construction of the extraction and treatment system resumed in April 2008, following completion of the Drainage Diversion System. Testing and verification of the Pit 7-Source system was conducted in January 2009 to ensure that all mechanical, electronic/electrical, and chemical components of the facility and wellfield were operating to meet remediation and monitoring requirements. However, the testing and verification process was stopped prior to completion due to failure of the compressor and the data acquisition system. Evaluation of the data collected during testing and verification and subsequent data indicated additional issues.

A facility assessment was planned to evaluate system performance to address the issues identified during the testing and verification process and to meet remediation and monitoring requirements. However, the facility assessment and design modifications were delayed due to a significant diversion of resources required to meet the LLNL Livermore Site treatment system restart deliverables. This delay was reported to and the higher prioritization of the Livermore Site work was concurred with by the regulatory agencies. The Pit 7-Source system assessment was initiated in October 2009 following restart of the Livermore Site facilities. The results of this assessment were used to design modifications to the system to meet remediation and monitoring requirements.

Issues identified during the initial facility testing and verification, the subsequent facility assessment, and the solutions/system modifications designed to address these issues are described in Appendix F.

Three existing monitor wells, NC7-25, NC7-63, and NC7-64, were converted to extraction wells and three wells were drilled to serve as extraction wells (W-PIT7-2305, W-PIT7-2306, and W-PIT7-2307). Existing monitor well W-PIT7-1918 was planned to be converted to an extraction well as part of the original wellfield design. However, the well was later found to be unsuitable for use as an extraction well because did not yield sufficient water, and the small (2-inch) well casing would not allow for the deployment of the required extraction and monitoring equipment. This well will continue to be for ground water monitoring.

Six wells were connected to the treatment facility to extract uranium, VOCs, nitrate, and perchlorate from ground water in the Pit 7 Complex area. Five of the extraction wells are completed in the Quaternary alluvium/Weathered bedrock (Qal/WBR) HSU (NC7-63, NC7-64, W-PIT7-2305, W-PIT7-2306, and W-PIT7-2307) and one extraction well (NC7-25) is completed in the Tnbs₀ bedrock HSU. The Tnbs₀ HSU well NC7-25 will only be pumped when ground water elevations in the overlying Qal/WBR HSU are sufficiently low to avoid pulling depleted uranium and other contaminants in the Qal/WBR HSU into the Tnbs₀ HSU. These conditions are most likely to occur in late summer/early fall towards the end of the dry season. In order to be able to continue monitor contaminant concentrations in well NC7-25 until pumping from this

well begins, the pump in this well will not be deployed until the hydrologic conditions previously discussed are met.

As discussed in the Remedial Design for the Pit 7 Complex, ground water extraction and treatment is being conducted using a phased approach because the Pit 7 Complex Drainage Diversion System affects the local hydrologic conditions by reducing ground water recharge in the vicinity of the Pit 7 Complex. As a result, the extent of saturation and volume of ground water available for pumping will likely be reduced in the area of ground water extraction. Once the effects of the drainage diversion system on hydrologic conditions and the capture zones for the existing extraction wells have been evaluated, it is currently planned to install three additional extraction wells.

Extracted ground water is filtered to remove suspended particulates prior to entering the treatment media. Water from the extraction wells is piped to a batch tank in the treatment facility enclosure.

The treatment facility influent from the batch tank is piped to three ion-exchange resin canisters for the removal of uranium. The water is then piped through three ion-exchange canisters containing Sybron SR-7TM, a nitrate-selective resin ion-exchange resin that is also effective in removing perchlorate. Ground water that has been treated to remove uranium, nitrate, and perchlorate is then piped through three aqueous-phase GAC canisters to remove VOCs.

Water between the GAC, uranium ion-exchange, and nitrate/perchlorate ion exchange resins will be monitored for breakthrough to prevent the discharge of water above the facility effluent limitations. The facility effluent will also be monitored to ensure effluent discharge limitations specified in the Site-Wide ROD (DOE, 2008) are met prior to discharge to the infiltration trench.

An infiltration trench was constructed southeast of the landfills by which the treated water is discharged into the unsaturated part of the shallow Qal/WBR HSU. During construction, the length of the infiltration trench was increased from 80 ft to 100 ft long. This modification will increase its capacity and allow for more flexibility if additional extraction wells are needed to optimize cleanup in the future. An aboveground pipeline was constructed to connect the treatment facility to the infiltration trench.

A horizontal pipe with 0.5-in diameter holes every 2 inches was placed along the entire length of the trench to convey water into the trench. The trench was backfilled with a 7 ft thickness of drain rock. A layer of high-density polyethylene (HDPE) was placed above the drain rock to: (1) prevent overlying native fill soil from entering the drain rock, (2) reduce the potential for tritium-bearing water vapor to evaporate to ambient air at ground surface, and (3) prevent surface runoff from entering the infiltration trench. The upper 3 feet of the trench above the HDPE layer was backfilled with compacted native soil to grade. Two piezometers (W-PIT7-2419 and W-PIT7-2420) were installed in the trench and equipped with dedicated pressure transducers to record water levels within the trench to ensure that overfilling of the trench does not occur that could create an upward water pressure resulting in a potential breach in the integrity of the HDPE membrane.

Construction/modification of the Pit 7-Source system was completed in March 2010. The ground water extraction and treatment system started operating on March 16, 2010. Startup compliance sampling of the system effluent was conducted on March 18 and samples were

submitted to the analytical laboratory for VOC, uranium, nitrate, and perchlorate analyses. VOC, nitrate, and perchlorate concentrations in the samples were below the method detection limit and effluent limitations, and uranium activities were below the effluent limitation.

Appendix F summarizes the Pit 7-Source ground water extraction and treatment system configuration and presents variances from the original design. As-Built drawing for the Pit 7-Source ground water extraction and treatment system are presented in Appendix G.

The timeline for the remedy implementation is presented in Table 4.

3.2.2. Pit 7 Complex Drainage Diversion System Remedial Action Implementation

Due to an extended CERCLA document pathway and the need to complete portions of the construction prior to the beginning of the rainy season, construction of the Pit 7 Complex Drainage Diversion System occurred concurrently with the Remedial Design. The regulatory agencies agreed to review the Drainage Diversion System 65% design and upon comment resolution, approve the construction to begin prior to the submittal of the final Remedial Design document. In September 2007, the U.S. EPA, the California DTSC, and the RWQCB approved the Drainage Diversion System design, and approved the start of construction. Construction of the Pit 7 Drainage Diversion System began in October 2007.

Because most rain water infiltration occurs on the hillslope west of the landfills due to the presence of colluvium and weathered bedrock, a surface and subsurface drainage network was constructed on the western hillslope to collect and divert shallow ground water and surface water. As shown in Figure 3 and as-built Sheet C-1 in Appendix H, the drainage diversion trench system on the western hillslope includes of an upper and lower trench network. The upper and lower trench networks were installed approximately 80 to 150 ft apart and roughly parallel to the slope contours to capture surface water and shallow subsurface water on this hillslope. Because this upper trench is located directly downhill of the bedrock-colluvium contact, it was designed to primarily capture surface water flow that predominates at this location on the hillslope. The upper trench network was installed to a depth of approximately 3 ft and the sides and bottom were lined with an impermeable geofabric (As-Built Sheet C-4, Appendix H).

Because the lower trench network is located where colluvium is present on the hillslope, it was designed to capture both surface water flow and shallow subsurface water flow in the colluvium. The lower trench network was installed to a depth of up to 8 feet. A portion of the uphill side of these trenches was lined with a permeable geofabric to capture subsurface colluvial flow. The bottom and downhill side was lined with an impermeable geofabric. A perforated HDPE pipe was installed approximately 1-inch above the base of all the trenches and surrounded by drain rock to the top of each trench. Bedding was placed below the pipe to ensure the pipe is not damaged during settling. The trenches were filled to the top with drain rock. The upslope side of each trench has a 3-ft wide, 6- to 12-inch thick apron of drain rock underlain by impermeable fabric to convey surface water into the trench. There is a 1.5-ft high mound on the downslope side of each trench to impede any surface flow that is not captured by the trench. The lower trench network As-Built drawings are shown in sheet C-4 in Appendix H.

Four trenches containing solid pipe were installed perpendicular to the slope contours to convey the captured water to the pre-existing concrete drainage channel at the western perimeter of the Pit 7 Landfill cap (As-Built Sheet C-1 in Appendix H). This drainage channel collects and

directs surface water runoff to the north where it discharges to riprap that dissipates water energy/velocity, preventing erosion. The riprap was rebuilt to provide additional protection against erosion and to facilitate maintenance (As-Built Sheet C-5, Appendix H.)

Because the hillslope east of the Pit 7 Complex mainly consists of unweathered bedrock with minimal infiltration capacity, rainwater tends to move downslope as surface runoff/sheet flow. Therefore, a surface water diversion swale was installed along the paved road that runs at the base of the eastern hillslope to collect and convey surface water runoff from the slope before it enters valley fill alluvium and underlying weathered bedrock (Figure 3 and As-Built sheet C-2, Appendix H). The base of the diversion swale was lined with impermeable geofabric and filled with a perforated pipe surrounded by drain rock. The fabric was lapped and buried to reduce deterioration by the elements and to convey upslope surface water. Compacted native soil was installed within the swale and covered with a grass-blend hydroseed and erosion control blankets. As shown in As-Built sheet C-7 (Appendix H), the swale is trapezoidal in crosssection in some reaches and a V-ditch in cross-section in other reaches of the channel. Four corrugated metal pipe culverts were installed to convey the water in the swale beneath dirt fire trails (As-Built Sheets C-3 and C-6, Appendix H), and one culvert was installed to accommodate a pipeline from the Pit 7-Source ground water treatment system (As-Built Sheet C-7, Appendix H.). Water is routed through a corrugated metal pipe culvert under Route 4 to the new settling basin located at the southern end of the pre-existing south-flowing concrete-lined drainage channel (As-Built Sheet C-6, Appendix H.)

Prior to construction of the drainage diversion system, riprap was present at the southern end of Pit 7 to dissipate energy of water from the pre-existing concrete drainage channel installed as part of the Pit 7 Landfill engineered cap design. A new settling basin was constructed and the pre-existing riprap was rebuilt to dissipate water energy, prevent erosion damage, reduce sedimentation, and enable rapid infiltration to prevent wetland formation (As-Built Sheets C-8 and S-3, Appendix H.)

Thirteen monitoring wells (K7-01, K7-06, NC7-16, NC7-17, NC7-21, NC7-22, NC7-24, NC7-34, NC7-48, NC7-51, NC7-53, W-PIT7-1718, and W-PIT7-1724) were equipped with dedicated pressure transducer to monitor water levels. Water level data from these wells will be used to monitor responses of the piezometric surface to rainfall recharge, and evaluate the effectiveness of the Drainage Diversion System in preventing water level rises into the pit waste.

Restoration measures were implemented in areas impacted by construction of the Drainage Diversion System to limit erosion and control sediment runoff, such as hydroseeding to promote the re-establishment of vegetation, and the placement of fiber rolls to reduce sediment transport.

Construction of the Pit 7 Drainage Diversion System began in October 2007 and was completed in March 2008. As-built drawings for the Pit 7 Complex Drainage Diversion System are presented in Appendix H. Appendix I presents variances from the original design.

The timeline for the remedy implementation is presented in Table 5.

4. Performance Standards and Construction Quality Control

As described in Section 3, the Building 850 Removal Action solidified soil and engineered fill met or exceeded performance criteria for unconfined compressive strength, density, mixing, cement application, and compaction. The results of the field and laboratory performance tests performed for the Building 850 Soil Removal Action Construction are presented in Appendix B (Engineering Test Data and Construction Quality Assurance (CQA) Field Sheets). The excavation verification sampling and analysis reports are presented in Appendix D. The Building 850 Soil Removal Action was designed and constructed to meet the RAOs for the selected soil remedy for Building 850.

The Pit 7-Source ground water extraction and treatment system and Pit 7 Complex Drainage Diversion System were designed and constructed to meet the RAOs for the selected remedy for the Pit 7 Complex.

Photographic evidence of Remedial/Removal Action completion is presented in Appendix J. Appendix J includes photographs of the completed Building 850 Removal Action/CAMU, Pit 7 Drainage Diversion System, and Pit 7-Source ground water extraction and treatment system.

5. Ongoing Activities

The ongoing activities in the Building 850 Firing Table/Pit 7 Complex OU include:

- Monitoring ground water and surface water to determine if the cleanup is adequately protecting human health and the environment and to evaluate the effectiveness of the remedy in achieving cleanup standards.
- Risk and hazard management, including institutional/land use controls, to prevent human exposure to contamination and to protect the integrity of the remedy.
- Inspection and maintenance of the Building 850 CAMU and associated drainage features.
- Operation and maintenance of the Pit 7-Source ground water extraction and treatment system until cleanup standards are met.
- Inspection and maintenance of the drainage diversion system at the Pit 7 Complex.
- Inspection and maintenance of the Pit 3, 4, 5, and 7 Landfill covers.
- Five-Year Review reporting.

These activities are discussed in the sections below.

5.1. Monitoring

Ground water and surface water samples will continue to be collected from monitor wells and springs in the OU and analyzed for chemical and radiological contaminants of concern and ground water elevations will continue to be measured per the Site-Wide Compliance Monitoring Plan (CMP) requirements (Dibley et al., 2009). The results of the CMP monitoring will be reported in the semiannual Compliance Monitoring Reports.

Monitoring will continue two years after cleanup standards have been met.

5.2. Risk and Hazard Management

The goals of risk management, including institutional/land use controls, are to prevent or limit exposure to contaminants, protect the integrity of the remedy, and ensure future property use is consistent with the current industrial land use.

The following institutional/land use controls that were identified in the 2008 Site-Wide ROD for OU 5 will continue after remedy implementation:

- Prevent water-supply use/consumption of contaminated groundwater until ground water cleanup standards are met.
- Maintain land use restriction in the vicinity of Well 8 Spring until annual risk reevaluation indicates that the risk is less than 10⁻⁶.
- Prohibit transfer of lands with unmitigated contamination that could cause potential harm under residential or unrestricted land use.
- Maintain the integrity of the Pit 7 Complex landfill covers, the drainage diversion system, and the Building 850 CAMU as long as the waste remains in place.
- Control construction and other ground-breaking activities on the Building 850 CAMU and Pit 7 Complex landfills to prevent cap/cover damage and/or inadvertent exposure to waste as long as the waste remains in place.
- Maintain access restrictions to prevent inadvertent exposure of onsite workers to the pit waste as long as the waste in the Pit 7 Complex Landfills remain in place.

It is assumed that Site 300 will remain under the control of DOE and that the access restrictions to the site (fencing, security patrols) currently in place will continue. All remedies would be re-evaluated if transfer of ownership or change in land use is anticipated. DOE will meet its commitments in the Site 300 FFA, Sections 28 (Transfer of Real Property) and 37 (Facility Closure), regarding its cleanup obligations if property ownership and/or land use changes in the future.

To ensure that human health is protected, access to Site 300 will continue to be restricted and all personnel working onsite will be briefed on areas of contamination and possible hazards. Site 300 is enclosed within a security fence, posted with signs noting the restricted access, and manned by a full-time security force to prevent unauthorized intrusion.

No excavation shall occur within areas of contamination or at landfills except for approved remedial actions. Activities in landfill areas will be restricted to those that will not expose landfill material or compromise the integrity and protectiveness of landfill caps. No activity inconsistent with this use restriction may commence without the prior written concurrence of the FFA signatories. Risk and hazard monitoring results conducted during the year will be submitted to the U.S. EPA and State regulatory agencies in the Annual Site 300 Site-Wide Compliance Monitoring Reports.

5.3. Inspection/Operations and Maintenance

Inspections and maintenance (I&M) and operations and maintenance (O&M) programs have been implemented for the Building 850 CAMU, Pit 7 Drainage Diversion System, Pit 7 Complex landfill caps, and the Pit 7-Source ground water extraction and treatment system. The

Building 850 and Pit 7 Drainage Diversion System I&M Plans and the Pit 7-Source ground water extraction and treatment system O&M Plan will be periodically reviewed and updated to reflect any needed changes to the programs.

5.3.1. Building 850 CAMU I&M

The Building 850 CAMU I&M Plan was prepared by the Building 850 Removal Action construction subcontractor and reviewed by the regulatory agencies in March 2010 (SCS Engineers, 2010). The Building 850 CAMU is inspected and maintained per the requirements of the Plan. The results of the inspections and maintenance performed will be included in the Annual Compliance Monitoring Reports.

5.3.2. Pit 7-Source Ground Water Extraction and Treatment System O&M

The Pit 7-Source ground water extraction and treatment system O&M Plan was included in the Pit 7-Complex RD. The Pit 7-Source system is operated and maintained per the requirements of the O&M Plan. Maintenance performed at the Pit 7-Source system will be included in the Annual Compliance Monitoring Reports.

5.3.3. Pit 7 Drainage Diversion System I&M

The Pit 7 Drainage Diversion System I&M Plan was prepared by the Pit 7 Drainage Diversion System construction subcontractor and included in the Pit 7 Complex RD. The Pit 7 Drainage Diversion System is inspected and maintained per the requirements of the I&M Plan. The results of the inspections and maintenance performed will be reported in the Annual Compliance Monitoring Reports.

5.3.4. Pit 7 Complex Landfill Cap I&M

The Pit 7 Complex landfill cap I&M procedures are included in the Site-Wide CMP. The results of the inspections and maintenance performed will be reported in the Annual Compliance Monitoring Reports.

5.4. Five-Year Reviews

The completion of this RACR is the trigger for the Five-Year Review process. Therefore, the first draft Five-Year Review for OU 5 will be submitted in June 2015 per the schedule presented in Table 6.

6. Project Costs

Estimated and actual project costs for construction of the Building 850 Soil Removal Action, Pit 7-Source ground water extraction and treatment system, and the Pit 7 Complex Drainage Diversion System are summarized in Table 7.

7. Acronyms

ARARs Applicable or Relevant and Appropriate Requirements

CAMU Corrective Action Management Unit

CDDs Chlorinated dibenzo-p-dioxins
CDFs Chlorinated dibenzofurans

CERCLA Comprehensive Environmental Response, Compensation and Liability Act

Ci Curies

CMP Compliance Monitoring Plan COCs Contaminants of Concern DOE Department of Energy

DTSC (California) Department of Toxic Substances Control

EE/CA Engineering Evaluation/Cost Analysis EPA Environmental Protection Agency

FFA Federal Facility Agreement

ft Feet

ft² Square feet FY Fiscal year

GAC Granular activated carbon

gpd Gallons per day

HMX High Melting Explosive

HQ Hazard quotient

HSU Hydrostratigraphic unit

I&M Inspections and Maintenance

LLNL Lawrence Livermore National Laboratory

MCL Maximum Contaminant Level

mg/kg Milligrams per kilogram mg/L Milligrams per liter

MNA Monitored natural attenuation

msl Mean sea level

NCP National Contingency Plan

NEPA National Environmental Policy Act

NFA No further Action

NPL National Priorities List

O&M Operations and Maintenance

OU Operable Unit

PCBs Polychlorinated biphenyls

pCi/L PicoCuries per liter

PRG Preliminary Remediation Goal (EPA)

Qal/WBR Quaternary alluvium and weathered bedrock

RACR Remedial Action Completion Report

RAOs Remedial Action Objectives

RCRA Resource Conservation and Recovery Act

RD Remedial Design ROD Record of Decision

RWQCB (California) Regional Water Quality Control Board

TCE Trichloroethylene

TCDD 2,3,7,8-tetrachloro-di-benzodioxin
 Tnbs₀ Tertiary Neroly Silty Sandstone
 VOCs Volatile organic compounds

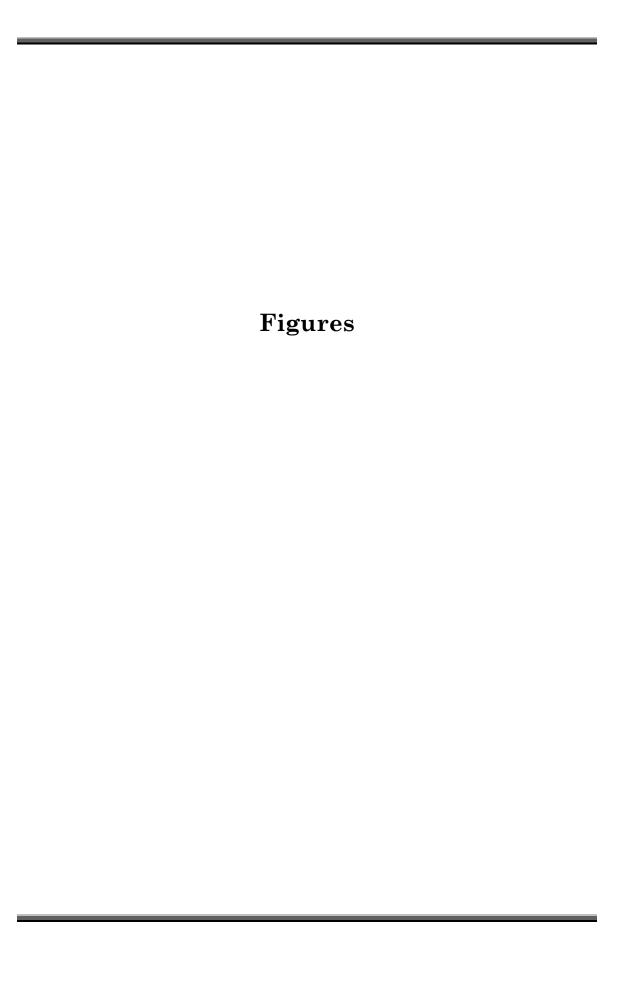
U.S. United States yd³ Cubic yards

μg/L micrograms per liter

8. References

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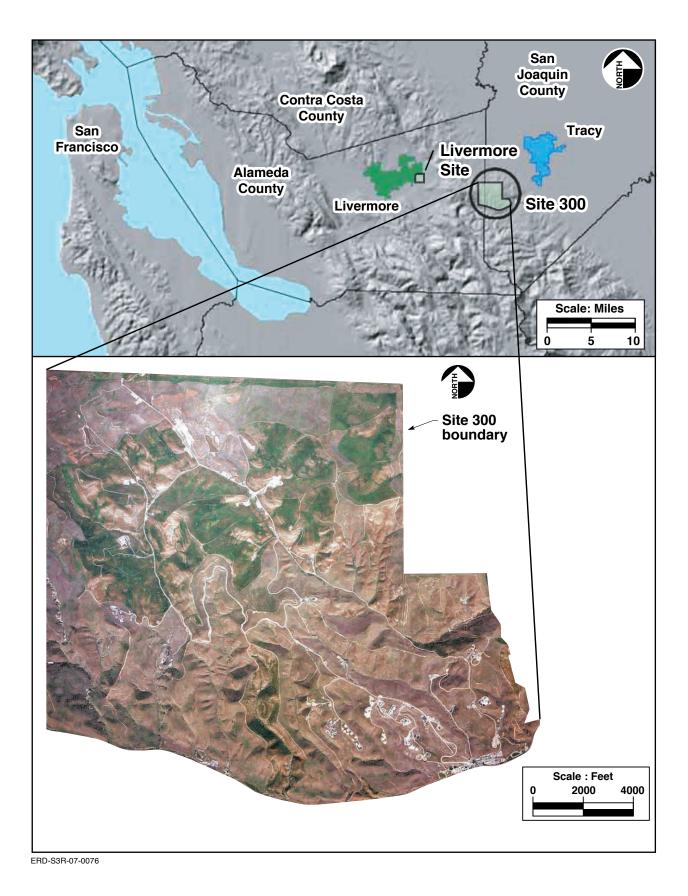


Figure 1. Location of LLNL Site 300.

ERD-S3R-08-0043

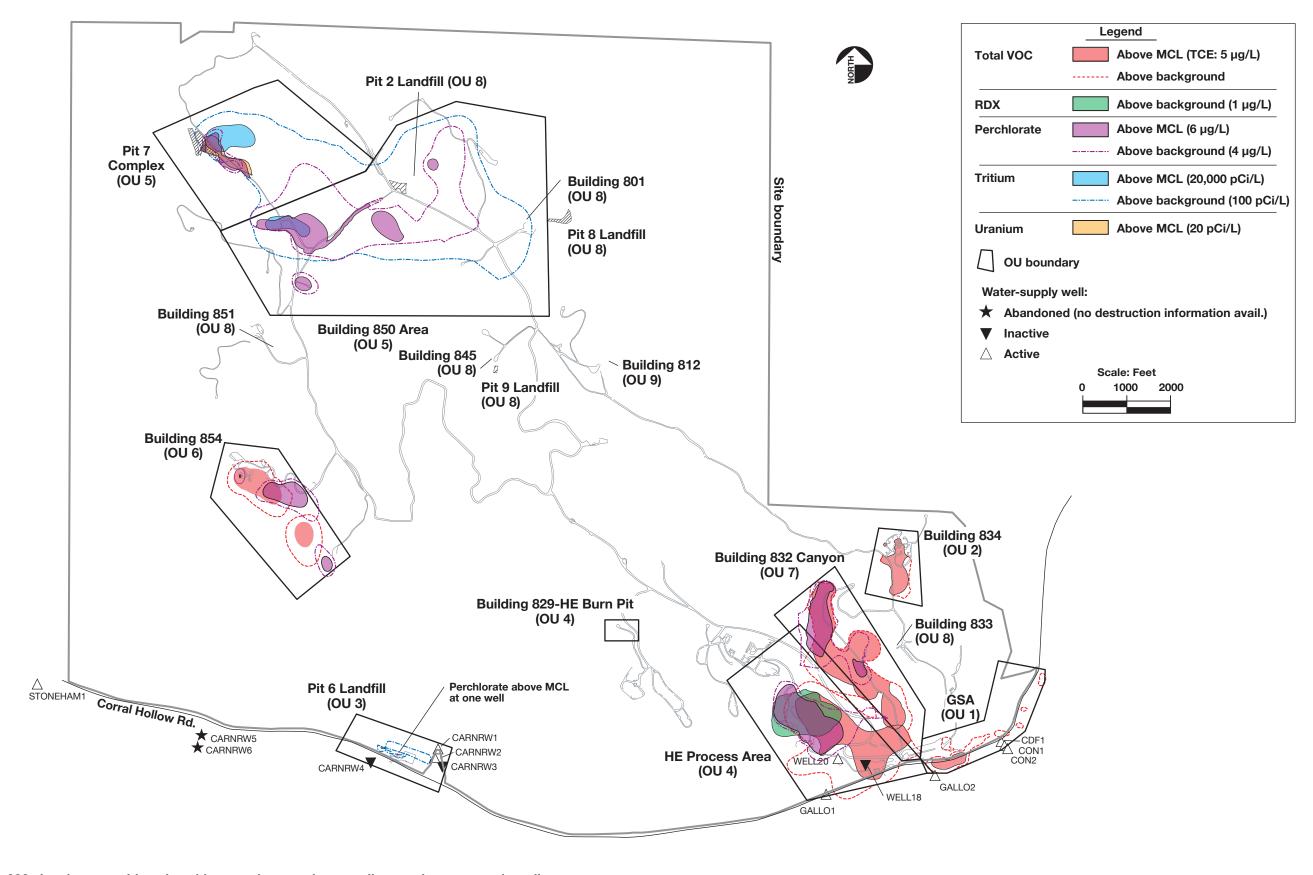


Figure 2. Map of Site 300 showing operable units with ground water plume outlines and water-supply wells.

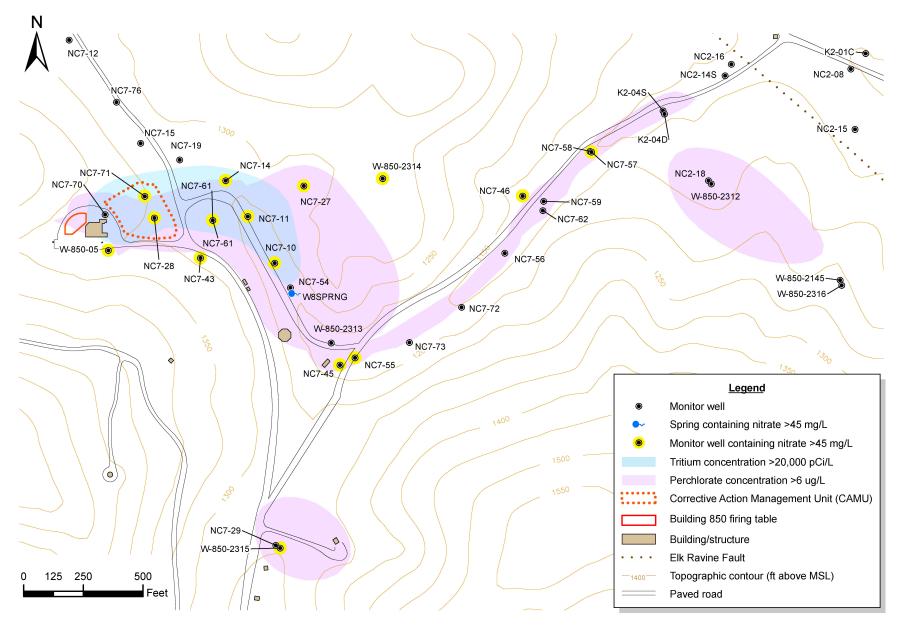


Figure 3. Map of the Building 850 area of OU5 showing cultural features, topography, monitor wells, springs, and contaminants of concern in ground water above cleanup standards.

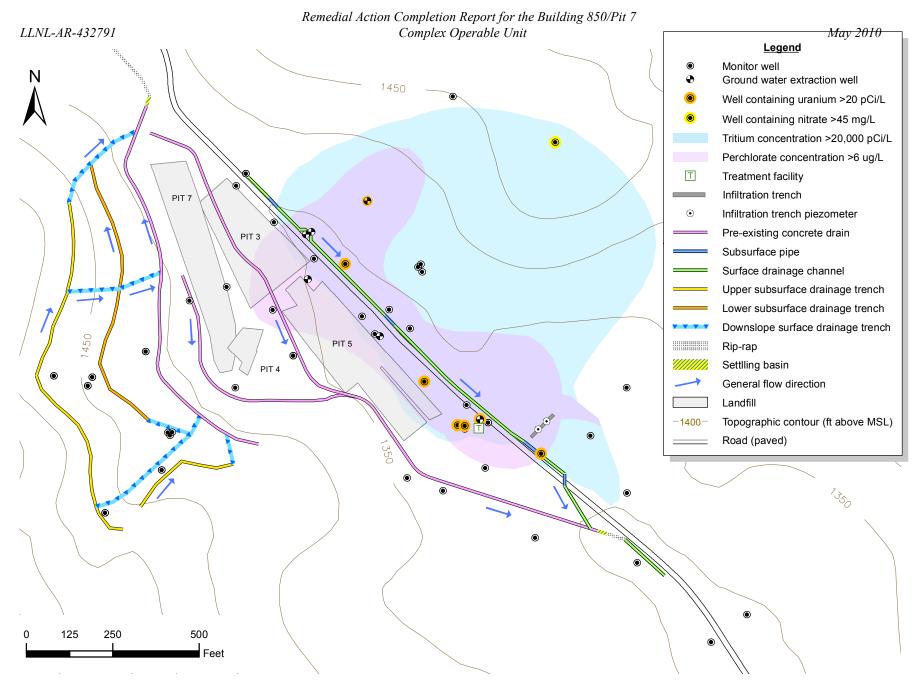


Figure 4. Map of the Pit 7 Complex of OU5 showing cultural features, topography, monitor and extraction wells, drainage diversion system, ground water treatment system, and contaminants of concern in ground water above cleanup standards.

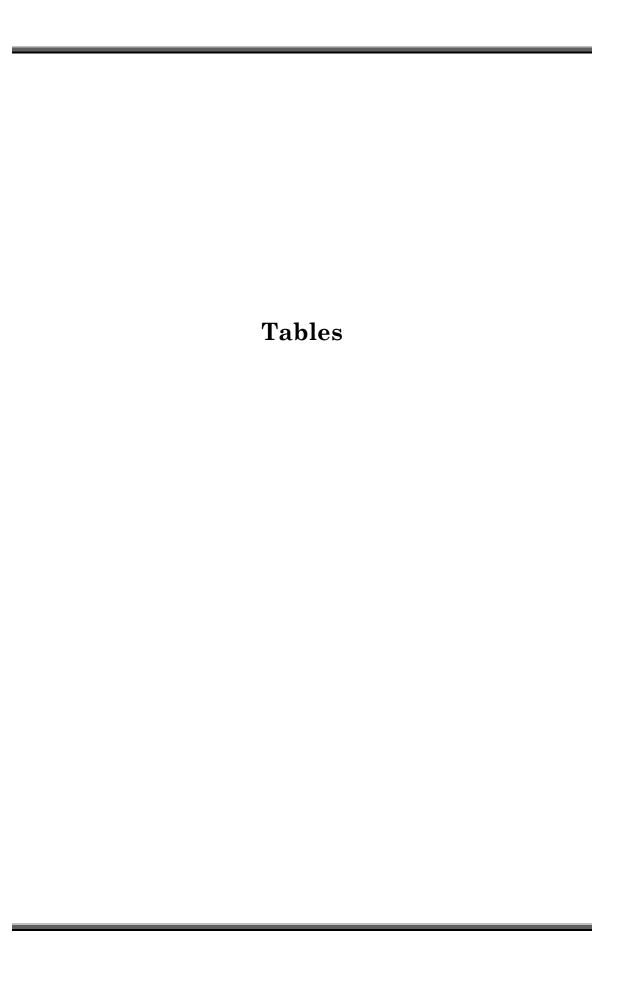


Table 1. The Building 850/Pit 7 Complex OU chronology.

Date	Activity
1958	Building 850 was constructed and hydrodynamic experiments began on the overlying firing table.
1958-1967	Pit 3 Landfill received firing table debris.
1962-1972	A large volume of sand, termed the "sandpile," was stockpiled near Building 850 and was periodically used during large experiments.
1964-1967	An estimated 1,000 polychlorinated biphenyl- (PCB) bearing capacitors were destroyed on the Building 850 Firing Table.
1968-1974	Pit 4 Landfill received firing table debris.
1968-1979	Pit 5 Landfill received firing table debris.
1978-1988	Pit 7 Landfill received firing table debris.
1981	Trichloroethylene was detected in an onsite water-supply well and remedial investigations began at Site 300. First monitor wells installed in Operable Unit (OU) 5.
1988-1994	Five former water-supply wells were sealed and abandoned in the Building 850/ Pit 7/East Firing Area.
1990	Site 300 placed on the U.S. Environmental Protection Agency's National Priority List.
1992	Site 300 Federal Facility Agreement signed by the U.S. Department of Energy (DOE) and regulatory agencies.
1992	Capping and closure of the unlined Pit 4 and 7 Landfills.
1994	The Site-Wide Remedial Investigation report (Webster-Scholten et al., 1994) for Site 300 was issued.
1996	An addendum to the Site-Wide Remedial Investigation report (Taffet et al., 1996) for Site 300 was issued for the Building 850 Firing Table/Pit 7 Complex OU.
1997	Submitted the Building 850/Pits 3 and 5 OU Engineering Evaluation/Cost Assessment (Taffet et al., 1997).
1998	PCB-contaminated firing table debris removed at Building 850.

Table 1. The Building 850/Pit 7 Complex OU chronology (continued.)

Date	Activity
1999	Regulatory agencies required evaluations of perchlorate and nitrate in ground water. Subsequently added as contaminants of concern at Site 300.
2001	Site 300 Interim Site-Wide Record of Decision (U.S. DOE, 2001) was signed.
2003	Installed permeable reactive barrier downgradient of the Pit 7 Complex as part of an <i>in situ</i> treatability study.
2004	The Interim Remedial Design (Taffet et al., 2004) document for the Building 850 Firing Table area was issued.
2005	Submitted Final Remedial Investigation/Feasibility Study (Taffet et al., 2005) for the Pit 7 Complex.
2007	Final Amendment to the Interim Site-Wide Record of Decision (U.S. DOE, 2007) for the Pit 7 Complex was signed.
2008	The Engineering Evaluation/Cost Analysis for PCB-, Dioxin-, and Furan-contaminated Soil at the Building 850 Firing Table (Dibley et al., 2008a) was issued.
2008	The Interim Remedial Design document for the Pit 7 Complex (Taffet et al., 2008) was issued.
2008	Completed construction of the Pit 7 Complex Drainage Diversion System.
2008	Completed the Building 850 PCB-contaminated soil Action Memorandum (Dibley et al., 2008b).
2008	Site-Wide Final Record of Decision was signed.
2009-2010	Excavated PCB- and dioxin/furan-contaminated soil and constructed the Building 850 Corrective Action Management Unit.
2010	Startup of Pit 7-Source ground water extraction and treatment system.

DOE = U.S. Department of Energy.

OU = Operable Unit.

PCB = Polychlorinated biphenyl.

Table 2. Cleanup standards for Building 850/Pit 7 Complex Operable Unit 5 ground and surface water contaminants of concern.

Contaminants of concern	Cleanup standard
Volatile Organic Compound (Pit 7 Complex only):	
1,1-Dichloroethylene	6 μg/L ^a
Trichloroethylene	5 μg/L ^b
Radionuclides:	
Tritium	20,000 pCi/L ^b
Uranium	20 pCi/L ^a
Other:	
Nitrate (as NO ₃)	45 mg/L ^b
Perchlorate	6 μg/L ^a

mg/L = Milligrams per liter.

pCi/L = PicoCuries per liter.

 μ g/L = Micrograms per liter.

a State MCL.

b State and Federal MCL.

Table 3. Building 850 Soil Removal Action Implementation Timeline.

Activity	Completion Date
Submitted Final Building 850 Soil Removal Action Engineering Evaluation/ Cost Analysis (EE/CA.)	February 20, 2008
Held Public Workshop for the EE/CA.	March 6, 2008
Submitted Building 850 Soil Removal Action Memo.	April 30, 2008
Submitted 65% Design for the Building 850 Soil Removal Action.	January 30, 2009
Submitted 95% Design for the Building 850 Soil Removal Action.	February 24, 2009
Received the Biological Opinion from the U.S. Fish and Wildlife Service.	April 9, 2009
The U.S. Department of Energy (DOE) signed the National Environmental Policy Act Supplemental Analysis for Cleanup of Contaminated Soil at the Building 850 Firing Table.	April 16, 2009
Held a telephone conference call with the regulatory agencies to discuss DOE/Lawrence Livermore National Laboratory (LLNL) responses to regulatory comments on the 95% design. During this call, the regulatory agencies agreed that DOE/LLNL could proceed with the Building 850 Soil Removal Action construction.	April 23, 2009
Regulatory agencies concurred with 100% Design for the Building 850 Soil Removal Action. The U.S. Environmental Protection Agency concurred with the designation of a Corrective Action Management Unit for the Building 850 Soil Removal Action.	April 24, 2009
Performed test fill demonstration of the soil solidification and consolidation process.	May 11-14, 2009
The Department of Toxic Substances Control Remedial Project Manager and a representative for the U.S. Environmental Protection Agency observed the test fill demonstration.	May 14, 2009
Began excavation of contaminated soil.	June 8, 2009
Submittal of Verification Sampling and Analysis Report for the Phase 1 excavation area.	June 25, 2009
Submittal of Test Fill Demonstration Report to the regulatory agencies.	July 8, 2009

Table 3. Building 850 Soil Removal Action Implementation Timeline (continued.)

Activity	Completion Date	
Regulatory tour of construction site.	October 1, 2009	
Completed construction of the Corrective Action Management Unit (CAMU) drainage control features within the navigable waterway.	October 12, 2009	
Completed construction of the remaining CAMU drainage control features.	November 16, 2009	
Completed excavation and solidification of contaminated soil and CAMU construction.	December 4, 2009	
Completed slope restoration.	December 17, 2009	
Submitted of Verification Sampling and Analysis Report for the Phase 2 through 7 excavation areas.	January 20, 2010	
Construction Completion.	January 28, 2010	

CAMU = Corrective Action Management Unit.

DOE/LLNL = U.S. Department of Energy/Lawrence Livermore National Laboratory.

EE/CA = Engineering Evaluation/Cost Analysis.

Table 4. Pit 7-Source (Complex) Ground Water Extraction and Treatment Remedial Action Implementation Timeline.

Activity	Completion Date
Submitted Final Amendment to the Interim Record of Decision.	January 26, 2007
Received the Biological Opinion from the U.S. Fish and Wildlife Service.	July 12, 2007
Following an Environmental Assessment, the U.S. Department of Energy (DOE) signed the National Environmental Policy Act Finding of No Significant Action for Environmental Remediation at the Pit 7 Complex at Lawrence Livermore National Laboratory (LLNL) Site 300.	January 29, 2007
Held a telephone conference call with the regulatory agencies to discuss the written responses to regulatory comments on the design capacity of the ion-exchange resins for uranium treatment. During this call, the regulatory agencies agreed that DOE/LLNL could proceed with construction of the ground water extraction and treatment system.	September 4, 2007
Submitted Draft Remedial Design (RD) for the Pit 7 Complex.	September 24, 2007
Initiated construction of the Pit 7-Source ground water extraction and treatment system.	October 1, 2007
Treatment system construction halted due to conflicts with Pit 7 Complex Drainage Diversion System construction.	December, 2007
Submitted Final RD for the Pit 7 Complex.	April 10, 2008
Construction of Pit 7-Source ground water extraction and treatment system reinitiated following completion of Pit 7 Complex Drainage Diversion System.	April 2008
Conducted Testing and Verification of Pit 7-Source extraction and treatment system to ensure that all mechanical, electronic/electrical, and chemical components of the facility and wellfield were operating to meet remediation and monitoring requirements. Identified issues and need for further assessment and possible facility modifications ^a .	January 2009
Conducted assessment and design modifications of the Pit 7-Source ground water extraction and treatment system.	October 1, 2009 – January 15, 2010
Initiated modification construction for the Pit 7-Source ground water extraction and treatment system.	January 18, 2010
Startup and commenced Testing and Verification of Pit 7-Source extraction and treatment system.	March 16, 2010
Construction Completion.	March, 2010

Notes appear on the following page:

Table 4. Pit 7-Source (Complex) Ground Water Extraction and Treatment Remedial Action Implementation Timeline (continued.)

Notes:

DOE = U.S. Department of Energy.

LLNL = Lawrence Livermore National Laboratory.

RD = Remedial Design.

With regulatory concurrence, the facility assessment and design modifications were delayed due to a significant diversion of resources required to meet the LLNL Livermore Site treatment system restart deliverables.

Table 5. Pit 7 Complex Drainage Diversion System Remedial Action Implementation Timeline.

Activity	Completion Date
Submitted Final Amendment to the Interim Record of Decision.	January 26, 2007
Received the Biological Opinion from the U.S. Fish and Wildlife Service.	July 12, 2007
Regulatory agencies agreed that the construction of the Drainage Diversion System could proceed prior to completion of the Remedial Design, if the Department of Energy/Lawrence Livermore National Laboratory (DOE/LLNL) submits the Title II design for regulatory review and comment.	July 26, 2007
Following an Environmental Assessment, the U.S. Department of Energy signed the National Environmental Policy Act Finding of No Significant Action for Environmental Remediation at the Pit 7 Complex at LLNL Site 300.	January 29, 2007
DOE/LLNL submitted Title II 65% design to the regulatory agencies.	August 3, 2007
In a telephone conference call with the regulatory agencies, the DOE/LLNL responses to regulatory comments on Title II design were discussed.	August 29, 2007
In a telephone conference call, the regulatory agencies agreed that DOE/LLNL could proceed with construction of the drainage diversion.	September 4, 2007
Submitted Draft Remedial Design.	September 24, 2007
Initiated construction of the Pit 7 Complex Drainage Diversion System.	October 1, 2007
Power poles were moved on the east side of the Pit 7 Complex.	December 15, 2007
Construction of the Pit 7 Drainage Diversion System and site restoration was completed.	March 14, 2008
DOE/LLNL submitted Final Remedial Design to the regulatory agencies.	April 10, 2008
The final walkthrough of the Pit 7 Drainage Diversion System by the construction contractor and LLNL staff to verify construction completion was conducted.	April 16, 2008

DOE/LLNL = U.S. Department of Energy/Lawrence Livermore National Laboratory.

Table 6. Operable Unit (OU) 5 Five-Year Review Schedule.

Document	Submittal Date
Draft OU 5 Five-Year Review	June 26, 2015
Draft Final OU 5 Five-Year Review	November 13, 2015
Final OU 5 Five-Year Review	December 14, 2015

Table 7. Operable Unit 5 Remedial Action Estimated and Actual Construction Costs.

Remedial Action	Construction Cost Estimate (in thousands)	Construction Cost Actual (in thousands)	
Building 850 Soil Removal Action	\$2,042ª	\$4,876 ^b	
Pit 7-Source Ground Water Extraction and Treatment System	\$505°	\$735 ^d	
Pit 7 Complex Drainage Diversion System	\$1,441°	\$1,496	

- ^a Estimated cost for the Building 850 Removal Action construction was presented in the Action Memorandum.
- Cost increase due to: (1) additional regulatory requirement to submit 95% and 100% design for review and written comment responses for the 65% and 95% design, (2) the discovery and remediation of an additional 12K yd³ of contaminated soil (original estimated 16K yd³ vs. actual 28K yd³ of soil excavated and remediated), (3) additional excavation of clean fill under the footprint of the Corrective Action Management Unit, and (4) the subsequent schedule extension into the rainy season resulting in rain and shot delay costs.
- Estimated costs for the Pit 7-Source and Drainage Diversion System were presented in the Pit 7 Complex Remedial Design.
- Cost increase due to facility assessment/modifications made to address issues identified during initial system testing and verification and subsequent monitoring.

Appendix A

Building 850 Soil Removal Action As-Built Variations from Design Specifications

Table A-1. Building 850 Removal Action As-Built Variations from Design Specifications.

Justification	
Because the Upper Corporation Yard was excavated to a maximum depth of 25 ft below ground surface (bgs), despite the increase in soil excavation volume from 15,544 yd³ (planned) to 27,592 yd³ (actual), the CAMU did not reach the design elevation and concurrent width.	
Because of concerns that additional capacity might be required, the regulatory agencies agreed at the August 20, 2009 Remedial Project Manager's meeting that the outer 3 ft of the CAMU composed of clean fill solidified with 10% Portland cement could be reduced so that only the outer 1 ft of the CAMU would need to be composed of clean fill. In actuality, only a few lifts were constructed with an outer layer of only 1 ft of clean fill.	
During the design phase of the project, the borrow area for clean fill had not yet been determined. Once excavation began, the need to excavate up to 25 ft of the non-engineered fill was identified. The fill was stockpiled in the Lower Corporation Yard and the unused clean fill remaining was stabilized where it was stockpiled.	
Because non-engineered fill extended to a maximum depth of 25 ft, excavation extended to this depth. A portion of this clean fill was re-compacted to provide a stable platform upon which the contaminated soil was solidified and consolidated.	
Verification sampling and analytical results indicated that additional soil required excavation to achieve cleanup standards.	

Table A-1. Building 850 Removal Action As-Built Variations from Design Specifications (continued.)

Description of Change	Justification
The drainage channel on the north side of the Well Access Road on the CAMU was lined with rock (100% design Sheet 15 and as-built drawing Sheet 15).	The channel was lined with rock to better constrain the flow of runoff and reduce the potential for erosion.
The soil solidification lift thickness was reduced from a maximum 18 inches, originally specified in Section 2230, Part 3.2, Item 12 of the 100% design specifications, to a maximum 12 inches.	The test fill demonstration revealed that the 90% compaction design specification could not be achieved at the bottom of the 18-inch thick lifts but this compaction was always met or exceeded at a 12-inch depth.
Eliminated volume-increase testing during full-scale solidification. This "swell testing" was originally specified in Section 2230, Part 3.3, Item F of the 100% design specifications.	Test fill demonstration results indicate that none of the soil-cement samples increased in volume (swelled).

Appendix B

Building 850 Soil Removal Action Engineering Test Data and Construction Quality Assurance Field Sheets "Partners in Quality"

May 28, 2009

Mr. Steve Ellis Lawrence Livermore National Laboratory P.O. Box 808; L-651 Livermore, California 94551-0808

Subject:

LLNL B-850 Soil Remediation

B850-S300 Livermore, CA

CEL Project #10-01251-LAW & 10-01252-LAW

EARTHWORK AND LABORATORY TESTING SUMMARY May 5, 2009 thru May 21, 2009

CEL representatives observed site operations and/or performed nuclear gauge moisture and density determinations on compacted soils at the above project from May 5, 2009 thru May 21, 2009. Laboratory testing was performed on soil samples from the site. Enclosed are the results of the field and laboratory testing.

We note that some low density tests were measured as presented by these test results. We recommend that we confirm with the Project Engineer, SCS Engineers, to resolve the low density results observed in these tests. It is the responsibility of SCS to review and approve these test results.

Eric J. Swenson, PE, GE

Principal Geotechnical Engineer

Respectfully submitted,

Michal H Wisan K

CONSOLIDATED ENGINEERING LABORATORIES

Michael Wissink

Project Manager

Enclosures: Daily Field Reports

Moisture/Density Curves
Sand Cone Testing

Moisture Content Summary

Break Log Summary

Distribution:

1 to Addressee

MW/EJS: pmf

R:\Geotech Projects by Number\LLNL\LLNL Bldg 850 Excavation and Remediation Plan - 95% Submittal\May Summary (Steve Ellis).doc

Geosphere Con ants, Ind. JAILY FIELD REPORT AN ETS COMPANY Geotechnical Engineering - Engineering Geology Environmental Management - Water Resources Report #: Project Number: 2 Ald 125 Project Name: 13 - 850 Project Manager: Field Rep: Scope of Work: Hours Charged: ☐ Full Time ☐ Part Time Mass Grading Pavement Utility Trench Other **□** Sunny ☐ Mild Contractor: CEAU. ☐ Windy ☐ Hot : Conditions 🔲 Rain ☐ Cold ☐ Fog Contractor Representatives Cloudy Туре Type: They Line 7440 Equipment Number ☑ - Nuclear **Density Testing** ☐ Tube Compaction Equipment Moving Sand Cone Water ∠⊠, Native Fill Source Support ☐ Import Fill Location: Engineer Date Plan Civil Structural CCS Geotech Required Compaction Required Moisture Description Max Density Opt. Moisture Curve # **☑** 90% 130.0 ☐ Opt. + 2% **5**95% 102 Opt. + 2% to 5% Other: Other: Wet Density Moisture . Dry Density Percent Pass/ Elevation Curve# Test # Location (pcf) (pcf) Content Compaction 71 56 50 IN PLACE DENSITY TEST ON UNDISTURBED SOIL W/ SAND CONE TEST

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those copinions to our dient. The presence and activities of our field representatives do not eight on those copinions to our client. The presence and activities of our field representatives on our findings and opinions. The contractural requirements. No one except our client may redy on our findings and opinions. The contractor relain sole responsibility for site safety and the methods, operations, and sequences of construction.

This DFR is Final - A final report is an instrument of professional solely as evidence that field observation was performed. Observations and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

Field Representative:

Date:

This DFR is Final - A final report is an instrument of professional service. Any conclusions dawn from this report should be discussed with and or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

Particularly a preliminary report is provided observations and/or recommendations conveyed in the final report is an instrument of professional service. Any conclusions dawn from this report should be discussed with and or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

Date:

Comment/Sketch: SES NEEDED COMP. TEST ON TEST PADS PRIORE
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NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives tho not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site salety and the methods, operations, and sequences of construction.

This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

This DFR is Final - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

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3 -12°01 SAND HILL PAD -12"56 108.0 7,9 100.0 76 F	1262	5 723	1178		70	P
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Geosphere Cont ants, Inc. **∠AILY FIELD REPORT** AN ETS COMPANY Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources Report #: Date: 54 / 3.09 Project Name: 8-850 Soin REMEDIATION Project Number: 2Au 135 / Project Manager: Field Rep: 但 Full Time ☐ Part Time Mass Grading Utility Trench Other Hours Charged: Pavement Scope of Work: ☑ Hot Contractor: ☐ Windy ☐ Mild Sunny Conditions: Contractor Representative: Cloudy ☐ Rain ☐ Cold ☐ Fog Opt. Moisture | Required Compaction Max Density Required Moisture Curve # Description 50600 90% - 🗷 ۽ ☐ Opt. + 2% 1512-09-01 FINE 1 131,5 10.70 95% D Opt. + 2% to 5% 118.5 Other: Other: Moisture Dry Density **Wet Density** Percent Pass/ Elevation Curve # Test# Location Content (pcf) Compaction Fail SAND HILL TEST BED -12" CUT W/5% CEMENT-125K 1189 D 1149 75 P B P D Û

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and admitties often field presentative do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site salety and the methods, operations, and sequences of construction.

This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

This DFR is Final - A final report is an instrument of professional solely as evidence that field observation was performed. Observations and/or service. Any conclusions drawn from this report should be discussed with and sort contractural requirements. No one except our client may rely on our final report in an instrument of professional solely as evidence that field observation was performed. Observations and/or recommendations conveyed in the final report in any vary from and shall take precedence over those indicated in a preliminary report.

Field Representative:

Date:

Reviewed By:

Date:

JAILY FIELD REPORT

	Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	Report #:				Date:	3 mg/ hapt	Con Series
Project Name	R-850 Said Promiser	Project Nur	mber: ¸	LAW 12	5/	Page	of	<u> </u>
Field Rep:	TONY Phillips	Project Mai	nager:			<u> </u>		
Scope of Work:	Mass Grading Pavement Utility Trench	Other .	Hours C	harged:	Full Time	☐ Par	t Time	
Contractor:	CERNODO	Conditions:	įĢŽ′Si	inny	□ .Windy	Д н	ot 🗖 1	Mild
Contractor Re	presentative: SOS/GAIFFIN	CONTRIBUTE	□ с	loudy	Rain	□с	old 🔲 I	og
Equipment	Туре	Numb	er .		Nuclear Nuclear	Туре:	7/20	666
Compaction	PEX		3	Density Testing Equipment	☐ Tube			
Moving	SHEADER	1		100 mg	- Sand Cor	ne		
Water	WATER TRUEK	/		Fill Source	/ Native			
Support	IMIXER				☐ Import			
Plan ()	Engineer	Date		Fill Location:	PREN	4192	1723	572
Civil			. :	The state of	77-0-12	~~		
Structural Geotech								
Curve#	Description	Ma	x Density	Opt. Moistur	Required Comp	action :	Required Mois	sture .
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	Plos 10% cc.		117	10 15	95%		Opt. + 2%	to 5%
					Other:		Other:	
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Test#	Location	Elevation V	Vet Densil (pcf)	y Moisture Content	Dry Density (pcf)	Curve#	Percent Compaction	Pass/ Fail
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Comment/ Sketch:	-000-1 - 00N	.~.		<u> </u>	, .			
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Mary Comment							 	
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rom its obligation to meet conf	tractural requirements. No one except our client may rely on our conclusions and/o contractor retains sole responsibility for site safety and the methods, from and shall take a	nat field observation was or recommendations conve precedence over those ind	eyed in the fir	nal report may vary	evaluated by the profession		report attoutu ne tist	Jeu witti diiti
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Field Representati	ve: Date:	4199 Rev	iewed By:			Date	:	

nts, Inc.

AILY FIELD REPORT

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Project Name			EMEDIA TW	Proje	ct Number:	2A4112	151	Page _	of	
Field Rep:	Torg	PRICE	195	Proje	ct Manager:		T			
Scope of Work:	Mass Grading	Pavement	Utility Trench	Othe	r Hours Cl	arged:	Full Time	□ P	art Time	
Contractor:	CERM	DO 5.	EBU		⊠∽su	nny	□ Windy	2 /	Hot 🔲]	Mild
Contractor Re	epresentative:	4004	PEIL	Condit	ions:	oudy	☐ Rain		Cold 🔲 1	Fog
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Test#		Location		Elevation	Wet Density (pcf)	Moisture Content	Dry Density (pcf)	Curve#	Percent Compaction	Pass/ Fail
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Geosphere Contants, Inc. AN ETS COMPANY Geotechnical Engineering Engineering Geology

∠AILY FIELD REPORT

	Geotechnical Eng Environmental N	gineering • Engineering Ge lanagement • Water Reso	eology urces	Report	#:			*	Da	te:	5-210-	-09
Project Name	B-850	SOIL DEMEL	MATION	Project	t Nur	nber: 🏄	16/12	51		ge	of	
Field Rep:	Tons)	0h111195		Project	t Mar	nager:						
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Contractor:	CEAR	WO SEK	7.61			Sunn	y	□ Windy	د د	2 /H	ot 🗖 l	Mild
Contractor Re		ANDY DE		Conditio	ons:	□ Cloud	dy	☐ Rain		□с	old 🗖 I	⁷ og
Curve #		Description			Ma	x Density	Opt. Moistu	re Required (ompactio	n i	Required Mois	ture
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.Test#		Location		Elevation	W	et Density (pcf)	Moisture Content	Dry Density (pcf)	Cur	ve#	Percent Compaction	Pass/ Fail
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Field Representati	ive•		Date:		Ravi	ewed By:				Date:		-
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REVISED 02/98

PROJECTNAME: LLNL Site 300 BLDG 850 PROJECTNO.: LAW 1252 BORING NO.: _____BY:____ CLASSIFICATION: DIEUE Gron Course Sand #050509-02 SOIL TYPE NO .: Sand pile / on site = 129.0 MAXIMUM DRY DENSITY OPTIMUM WATER CONTENT = 10.6 SOIL(WET) + MOLD, lb. MOLD, Ib. SOIL(WET), lb. WET DENSITY, pcf 145 WET SOIL, gm. DRY SOIL, am. LOSS, gm. % MOISTURE DRY DENSITY, pcf 140 AASHTO T-99 . ASTM D 1557 MOIST / DRY ☐ MOIST / DRY ☐ A: PASS#4 SIEVE, 4" MOLD A: PASS #4 SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25 LAYERS: 5, BLOWS/LAYER: 25 B: PASS 3/8" SIEVE, 4" MOLD TB: PASS 3/8" SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25 LAYERS: 5, BLOWS/LAYER: 25 C: PASS 3/4" SIEVE, 6" MOLD C: PASS 3/4" SIEVE, 6" MOLD LAYERS: 3, BLOWS/LAYER: 56 LAYERS: 5, BLOWS/LAYER: 56 130 (OVERSIZE CORRECTION) CALCULATIONS: Specific Gravity = 2,60 Specific Gravity = 2.70 Specific Gravity = 2.80 125 CORR. WET DENSITY, pcf CORR. DRY DENSITY, pcf CORR.WATER CONTENT,% 120 115 WATER CONTENT (% of DRY WEIGHT)

EMPORATORY OURSE MOTION

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			WE .	A: PASS #4	SIEVE, 4" MOLD	A	: PASS #4 SIEVE	, 4" MOLD
135		+			BLOWS/LAYER: SIEVE, 4" MOL		AYERS: 3, BLOV : PASS 3/8" SIEV	
PCF					BLOWS/LAYER:		AYER8: 3, BLOV :: PASS 3/4" SIE\	
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CLASSIFICATION: Fire to correct School	DATE	TESTE	D:		١		B	(:	[ATE C	HECK	ED : _				BY	:
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150 OPTIMUM WATER CONTENT		1 g	•	50	and	Pil	ر آرج MAXI	t bed IMUM DF	Cí N <mark>ad</mark> Ys	/ C	emen	<u>t</u> .	i 3	51.5)	pcf	
MOLD, Ib. SOIL(WET), Ib. WET DENSITY, pof WET SOIL, gm. DRY DENSITY, pof MOIST / DRY A PASS #4 SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25 B. PASS 395 SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25 B. PASS 395 SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25 B. PASS 395 SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25 DE PASS 395 SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER:	150	J801					OPTI	MUM W	ATER C	ONTE	NT _{,y} ,	: -			•.	_%	
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ASTM D 1557	145						WET DE	NSITY, p IL, gm.	cf								
ASTM D 1557	, . , .],	% MOIS	TURE	~f								
LAYERS: 5, BLOWS/LAYER: 25 Bis PASS 36" SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 6" MOLD LAYERS: 5, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 6" MOLD LAYERS: 5, BLOWS/LAYER: 56 C: PASS 36" SIEVE, 6" MOLD LAYERS: 5, BLOWS/LAYER: 56 C: PASS 36" SIEVE, 6" MOLD LAYERS: 3, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 6" MOLD LAYERS: 3, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 6" MOLD LAYERS: 3, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 6" MOLD LAYERS: 3, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 6" MOLD LAYERS: 3, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 6" MOLD LAYERS: 3, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 6" MOLD LAYERS: 3, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 6" MOLD LAYERS: 3, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25 C: PASS 36" SIEVE, 4" MOLD C: PASS 36" SI	140							· · · · ·	MOIST	/ [0 1557 DRY □			MOIS	T /	DRY	
Specific Gravity = 2.50								LAY B: F LAY	'ERS: 5, I 'ASS 3/8" 'ERS: 5, I 'ASS 3/4"	BLOWS/L SIEVE, 4 BLOWS/L SIEVE, 6	AYER: 25 " MOLD AYER: 25 " MOLD		LA` B: I LA`	YERS: 3, PASS 3/6 YER8: 3, PASS 3/4	BLOWS SIEVE BLOWS	S/LAYE! , 4" MC S/LAYE! , 6" MC	R: 25 OLD R: 25 OLD
Specific Gravity = 2.70	Y DENSIT			,			ZE		• []	T						CTIO	<u>N)</u>
120 CORR. DRY DENSITY, per CORR.WATER CONTENT,% 115 110	125							Spe	cific Grav	ty = 2.70		•	•		NSITY.	e	% %
110	120											CĊ	RR. D	RY DE	VSITY,	pcf	***************************************
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	113																
	110	0		5		10		15	77	20	25	5		30		35	

PROJE	EC T!	MAN	E:	L	NL	S	ite	300	B	UR	8	50			P	ROJ	EC7	r NC). : <u>آ</u>	AW	1252
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DATE	TEST	ED:	_	5/1	3/0	<u> ጎ</u> .		BY:	RI	1	_ D.	ATE (CHE	CKE	ĒD:					BY	:
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1							DRY	SOIL,				7: :		·					<u> </u>		
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135					1/				LA	YERS:	5, BI	_ows/L	AYER:	25	1				SLOWS		
F)					$\frac{1}{1}$	\Box						SIEVE, 4 LOWS/L					YER	8:3, E	BLOWS	/LAYE	R: 25
Ë		-			+	1	1					SIEVE, 6 LOWS/L							SIEVE, SLOWS		
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125						-			J GP	· · · · · · · · · · · · · · · · · · ·		avity =			•	•	=		=		%
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DATE: _5	ر 2 - ^ر	-09 INS	PECTOR:	Tong Phillips
PROJECT #:	K	<i>iAud 1252</i> PRO	DJECT NAME:	8-50 B-850 Soil 1
COMPACTION SPI		· · · · · · · · · · · · · · · · · · ·	ST LOCATION:	1'207
MOISTURE SPEC:		1-4		
		SAND CO	NE TESTING	,
		• • • • • • • • • • • • • • • • • • •	1010	·
	Α	WT of cone, jar, sand - Before	6529	
	В	WT of cone, jar, sand - After	3248	
-	С	WT of sand in cone	1580	
•	D	WT of sand used	3280.6	
	E	WT of sand in hole	1700.6	g D-C
	F	Density of sand	90.5	pcf
	G	Volume of hole	0.041	of E÷F
	Н	Gross WT of excavated soil + TAR	E	lbs
		WT of TARE		lbs
•	J	Net WT of soil	1570 0	3.462 lbs H-1
	ĸ	WT Density	83.6	pcf J÷G
	L	Soil + TARE (Wet)	1020,9	lbs
÷	М	TARE	367.2	Ibs Azn C
	N	Soil + TARE (Dry)	wy 963.3	lbs
,	Ö	WT of Water	113.3 57.6	lbs L-N
	P	WT of Soil	540.4 596.1	lbs N-M
	Q	Moisture Content	(-096	9.6 % O + P (x100)
		Optimum Moisture Content	12.0	<u> </u>
	R	Dry Density	76.3	pcf K ÷ (I + Q)
	S	Lab Maximum	122.5	pcf :
		(Lab No. 050509-03)	
	Т	Percent Compaction	62%	% R÷S
Weight = W7 Cubic Feet =		Pounds = lbs Grams = G	Pounds per Cubic F Conversion Grams	



DATE:		inspec		ong Phillips
PROJECT#:	LF	94) 1850 PROJEC		50 SOIL PEME
COMPACTION SPE	EC:		CATION: SA	VD HILL
MOISTURE SPEC:				
		SAND CONE	TESTING	
	A	WT of cone, jar, sand - Before	6877.5	g
	В	WT of cone, jar, sand - After	4133.2	g .
	C	WT of sand in cone	1580	
	D	WT of sand used	2744.3	g A-B
	Ε	WT of sand in hole	1164.3	g D-C
•	F	Density of sand	40.5	pcf
-	G	Volume of hole	2,07.83	cf E÷F
	Н	Gross WT of excavated soil + TARE	19000 pz. 30	<u>s</u> lbs
	1	WT of TARE	N/A	lbs
	J	Net WT of soil	1500g / 3.30t	<u> </u>
	ĸ	WT Density	116.9	pcf J÷G
	L	Soil + TARE (Wet)	1176.1	lbs
:	М	TARE	364.8	lbs Pan B
	N	Soil + TARE (Dry)	1167.2	lbs
	0	WT of Water	8.9	lbs L - N
	Р	WT of Soil	802.4	lbs N - M
	Q	Moisture Content		% O÷P
		Optimum Moisture Content	10.0	%
. ·	R	Dry Density	115.6	pcf K ÷ (I + Q)
	S	Lab Maximum	129.0	pcf
	3	(Lab No. 050509-02		po
	T	Percent Compaction	90%	% R÷S
Weight = WT		Pounds = lbs Grams = G	Pounds per Cubic Feet = ;	pcf

Cubic Feet = cf

Conversion Grams \div 453.6 = lbs.



DATE:	5-5-			52
PROJECT #:	33	25 L/	94 18	251
COMPACTION	SPEC:		202	ρ

PROJECT NAME: TEST LOCATION:

INSPECTOR:

TONY PHILIPS B-850 SOIL PEMEDA UPPER COURT YARD

MOISTURE SPEC:

1704

SAND CONE TESTING

Λ.	WT of cone, jar, sand - Before	69873	g
Α.		4198.9	g
: B	WT of cone, jar, sand - After	1580	
C	WT of sand in cone	2788.4	9 ~ ^ B
D	WT of sand used	- 1 1	g A-B
E	WT of sand in hole		
F	Density of sand	90.5	pcf
. G	Volume of hole	136181812 0.0294	cf E÷F
, Н	Gross WT of excavated soil + TARE	El B	lbs
1.	WT of TARE		lbs
: . J	Net WT of soil	1491.3/3.287	lbs H-!
к	WT Density	111.8	pcf J÷G
L	Soil + TARE (Wet)	1376,7	lbs
M	TARE	366.2	lbs Pan A
Ν	Soil + TARE (Dry)	1234.5	lbs
. 0	WT of Water	142,2	lbs L - N
: : P	WT of Soil	643 868,3	lbs N - M
Q	Moisture Content	16.4	% O÷P
	Optimum Moisture Content	10.5	. %
R	Dry Density	96-0	pcf K ÷ (I + Q)
S	Lab Maximum	130.0	pcf
	(Lab No. 05059-01		
T	Percent Compaction		% R÷S
- : cf	Pounds = lbs Grams = G	Pounds per Cubic Feet = pcf Conversion Grams ÷ 453.6 = lbs	

Weight = WT Cubic Feet = c



DATE: 5	-16	109	INSPECTOR	₹:	Ton;	Philles
PROJECT#: _	1/2	s	PROJECT N	IAME:	B-65	0
COMPACTION SPE	 EC:	90%	TEST LOCA	TION:	SANO) H/// 18
MOISTURE SPEC:		1-4 toll.		TEST BEL)	. Och
		SAND	CONE TI	ESTING	Maria, a Paradada I. M. 1999 - Na Pa. a Maria I. a Maria Anta Anta Anta Anta Anta Anta Anta Ant	
	A	WT of cone, jar, sand - Before		6980	.4	g
	В	WT of cone, jar, sand - After	_	4220.8		g
•	C	WT of sand in cone		1.580		g
	D.	WT of sand used		7759,6		g A-B
	E	WT of sand in hole		1179.6		g D-C
		Density of sand	_	89,	6	pcf
	F G	Volume of hole		0290		cf E÷F
	Н	Gross WT of excavated soil + 1	TARE			lbs
	1.	WT of TARE				lbs
,	J	Net WT of soil	_	1679.89	3.70	lbs H-I
	K	WT Density	_	127.6		pcf J÷G
	L	Soil + TARE (Wet)		1378.0		lbs
	М	TARE	_	341.8		lbs
	N	Soil + TARE (Dry)	_	1308.2		lbs
	0	WT of Water	-	69.8		Ibs L-N
	P.	WT of Soil		943.4		lbs N-M
	Q.	Moisture Content	_	7.4		% O÷P
	_	Optimum Moisture Content		10.0		%
	R	Dry Density		118.8		pcf K÷(I+Q)
	S	Lab Maximum	_	131.5		pcf
		(Lab No. <u>051209 - 0</u>				
	Т	Percent Compaction	 -	90		% R÷S
Weight = W7		Pounds = lbs Grams	= G	Pounds per Cubic Fe Conversion Grams ÷		



DATE:	5-1	3-09	INSPECTOR:	: <u> </u>	<u> </u>	
PROJECT#:			PROJECT NA	AME:		
COMPACTION SP	EC:		TEST LOCAT	TION:	SAND 1	41/ 52
MOISTURE SPEC				TEST	BED.	CEM
		OALIO	CONE TE	CTIME		
		SANL	CONE TE	. <u>51,114G</u>		
	. ,	WT of cone, jar, sand - Befor	·e	6990	2.6	9
·	A B	WT of cone, jar, sand - After		3930,8		g
: · · · · · · · · · · · · · · · · · · ·	С	WT of sand in cone	· 	1580		g
•	D	WT of sand used		3759.8		g A-B
	. E	WT of sand in hole		1479.8		g D-C
	F	Density of sand		89.6		pcf
`.	G	Volume of hole	<u> </u>			cf E÷F
•	G	Volume of riole				
	Н	Gross WT of excavated soil	+ TARE			lbs.
	1	WT of TARE				lbs
	J	Net WT of soil		2062.8	4.547	lbs H-I
	ĸ	WT Density		124.9		pcf J÷G
•				608.Z		Ibs
	L	Soil + TARE (Wet)		138.7		lbs
	M	TARE	· —	568.4		lbs
	N	Soil + TARE (Dry)	1	<u> </u>		lbs L-N
	0	WT of Water		479.7		lbs N-M
	P	WT of Soil		9.2	· · · · · · · · · · · · · · · · · · ·	% O÷P
	Q	Moisture Content				%
		Optimum Moisture Content		10.0	<u> </u>	
	R	Dry Density	_	114.3		pcf $K \div (I + Q)$
	S	Lab Maximum		131.5		pcf
		(Lab No. <u>051209</u> -	-01)	·	•	
				& <u>`</u>		
	Т	Percent Compaction	· —	87		% R÷S
Weight = V Cubic Fee		Pounds = Ibs Gran		Pounds per Cubic f Conversion Grams		



DATE: S	~/	3-09 IN	ISPECTOR:	· · · · · · · · · · · · · · · · · · ·
PROJECT #:		PI	ROJECT NAME:	
COMPACTION SP	EC:		EST LOCATION: 1607	5%
MOISTURE SPEC			TEST BED	CEMEN
		CAND	ONE TESTING	and the same of the control of the same of
		SANDU	ONE TESTING	
	A	WT of cone, jar, sand - Before	7691,5	g
A Section 1	В	WT of cone, jar, sand - After	4242.2	g
	C	WT of sand in cone	1580	·ġ ···································
	D	WT of sand used	2849.3	g A-B
	E	WT of sand in hole	1269.3	g D-C
	F	Density of sand	89.6	pcf
	' G	Volume of hole	14.166 / 0.0312	cf E÷F
•	0	Volame of flore		
	Н	Gross WT of excavated soil + TA	ARE	lbs
	1.	WT of TARE		ibs
	J	Net WT of soil	1658.3/3.65	Sibs H-I
			117.1	pcf J÷G
,	K	WT Density	111	pcf J÷G
•	L	Soil + TARE (Wet)	497.2	Ibs
	М	TARE	109.3	lbs
	Ν	Soil + TARE (Dry)	451.0	lbs
	0	WT of Water	46.2	lbs L-N
	P	WT of Soil	341.7	lbs N-M
	Q	Moisture Content	13.5	% O÷P
	_	Optimum Moisture Content	14.5	%
		Opaman melosar 2 2 sa	/22.2	
	R	Dry Density	103.2	pcf K ÷ (I + Q)
	S	Lab Maximum	118.5	pcf
	J	(Lab No. 051309 -01		•
		(Lab 140		
	T	Percent Compaction	87/	% R ÷ S
Weight = W	Т	Pounds = lbs Grams =		
Cubic Feet	= cf	•	Conversion Grams ÷ 453.6 = lbs.	• •



DATE:	5-20	-09	INSPECTO	DR:	Torry	1/1/1/05	
PROJECT#: LAW 1252		1252	PROJECT NAME:			8-850	
COMPACTION S	SPEC:		TEST LOC	CATION:	SECTOR	A-2	
MOISTURE SPE	:C:	-					
		CAND	CONE	TESTING			
•		SAND	PROJECT NAME:				
	А	WT of cone, jar, sand - Before		6989	6	g	
	В	WT of cone, jar, sand - After	•	3730.8	3	g	
	C	WT of sand in cone		1580		g	
	D	WT of sand used		3258.8		g A-B	
	E	WT of sand in hole	•			g D-C	
	F	Density of sand	·			pcf	
	G	Volume of hole		.0413		cf E÷F	
					•		
	Н	Gross WT of excavated soil +	TARE			-	
	1.7	WT of TARE			/	-	
	j	Net WT of soil		962.8	12,123	lbs H-I	
	K	WT Density		51.4		pcf J÷G	
	L	Soil + TARE (Wet)		1099.9		lbs	
	М	TARE		137.2		- Ibs	
	N	Soil + TARE (Dry)			4.3	ibs	
· ·	O N	WT of Water	٠			- Ibs L-N	
	P	WT of Soil				- Ibs N - M	
•	Q Q	Moisture Content		<u> </u>	0.0	-	
	Q	Optimum Moisture Content	•			-	
		Optimum Moisture Comoni				-	
	Ŕ	Dry Density		4	9.0	_ pcf K ÷ (I + Q)	
	S	Lab Maximum		122.5		_ pcf	
		(Lab No. <u>-# 050509</u> -	-03) ′			
	Т	Percent Compaction		40%		_ % R÷S	
			*	insitu te	esting	only	
Weight =		Pounds = Ibs Grams		Pounds per Cubic I	eet = pcf	(

Date	Location	Tare	Wet soil + tare	Dry soil + tare	Wt. of water	Wt. of soil	Moisture Content
5/11/2009	hand mix sand pile pad	139.00	715.0o	693.00	22.00	554.0o	4.00%
5/11/2009	hand mix upper court yard pad	110.40	406.1o	373.0o	33.10	262.60	12.60%
5/11/2009	hand mix 1' cut pad	137.0o	708.0o	653.00	55.0o	516.0o	10.70%
0,1112000							
5/12/2009	for nuke gauge - sand pile @ 10% SG	138.40	804.50	756.40	48.1o	618.0o	7.80%
5/12/2009	for nuke gauge - sand pile @ 10% 6"	137.1o	633.1o	599.2o	33.90	462.1o	7.30%
5/12/2009	for nuke gauge - sand pile @ 10% 12"	110.6o	839.1o	785.9o	53.20	675.3o	7.90%
5/13/2009	for nuke gauge - 1' cut @ 5% SG	367.40	913.60	846.2o	67.40	478.8o	14.10%
5/13/2009	for nuke gauge - 1' cut @ 5% 6"	365.1o	890.20	823.3o	66.90	458.2o	14.60%
5/13/2009	for nuke gauge - 1' cut @ 5% 12"	368.90	937.20	865.30	71.9o	496.40	14.50%
5/13/2009	for nuke gauge - 1' cut @ 10% SG	366.20	977.6o	902.60	75.0o	536.40	14.00%
5/13/2009	for nuke gauge - 1' cut @ 10% 6"	110.8o	633.20	573.40	59.80	462.60	12.90%
5/13/2009	for nuke gauge - 1' cut @ 10% 12"	- 137.50	721.7o	642.7o	79.0o	505.2o	15.60%
5/13/2009	for nuke gauge - sand pile @ 5% SG	138.2o	546.8o	510.2o	36.60	372.0o	9.80%
5/13/2009	for nuke gauge - sand pile @ 5% 6"	138.40	542.70	512.7o	30.0o	374.3o	8.00%
5/13/2009	for nuke gauge - sand pile @ 5% 12"	137.30	431.60	410.2o	21.40	272.9o	7.80%
5/13/2009	sand pile @ 5%	367.90	819.2o	778.3o	4 0.9o	410.40	10.00%
5/14/2009	for nuke gauge - upper court @ 10% SG	136.60	538.00	491.40	46.60	354.80	13.10%
5/14/2009	for nuke gauge - upper court @ 10% 6"	137.10	478.40	435.80	42.60	298.7o	14.30%
5/14/2009	for nuke gauge - upper court @ 10% 12"	138.70	500.0o	452.6o	47.40	313.9o	15.10%
5/14/2009	for nuke gauge - upper court @ 15% SG	138.50	579.90	519.50	60.40	381.0o	15.90%
5/14/2009	for nuke gauge - upper court @ 15% 6"	138.10	479.3o	436.7o	42.60	298.60	14.30%
5/14/2009	for nuke gauge - upper court @ 15% 12"	138.00	585.7o	518.7o	67.0o	380.7o	17.60%
5/20/2009	for nuke gauge - area A2 insitu test #1	110.7o	628.80	599.1o	29.80	488.40	6.00%
<u> </u>	<u>l</u>						
	·					-	
-							
 							
			L				



"Partners in Quality"

July 9, 2009

Mr. Steve Ellis Lawrence Livermore National Laboratory P.O. Box 808; L-651 Livermore, California 94551-0808

Subject:

LLNL B-850 Soil Remediation

B850-S300

Livermore, California

CEL Project #10-01251-LAW & 10-01252-LAW (May 2009) CEL Project #10-01256-LAW & 10-01257-LAW (June 2009)

EARTHWORK AND LABORATORY TESTING SUMMARY May 26, 2009 thru June 30, 2009

CEL representatives observed site operations and/or performed nuclear gauge moisture and density determinations on compacted soils at the above project from May 26, 2009 thru June 30, 2009. Laboratory testing was performed on soil samples from the site. Enclosed are the results of the field and laboratory testing.

We note that some low density tests were measured as presented by these test results. We refer these results to the Project Engineer with SCS Engineers, to resolve the low density results observed in these tests. It is the responsibility of LLNL to review and after consulting with SCS Engineers, approve these test results.

Eric J. Swenson, PE, GE

Principal Geotechnical Engineer

Respectfully submitted,

CONSOLIDATED ENGINEERING LABORATORIES

Michael Wissink Project Manager

Daily Field Reports

Moisture/Density Curves

Sand Cone Testing Moisture Content Summary

Break Log Summary

Distribution:

Enclosures:

1 to Addressee

MW/EJS: pmf

R:\Geotech Projects by Number\LLNL\LLNL Bidg 850 Excavation and Remediation Plan - 95% Submittal\Monthly Summary Reports\June Summary (Steve Ellis).doc

			Phillips.		
Consolidated E 534 23rd Avenu Oakland, CA 94			RRATIVE REPORT	Bulding Permil	#
Job Name & Address R. 850 General Contractor:	Soil REMED	14 TION	Dale: 5-26-09	Time: 0 700	Cel No. 1251
	ERAVDO		Work Approved	Do not proc	eed with work
Subcontractor:	SI GAITI	EN .	☐ Work in Violation	☐ Make neces	ssary corrections
TYPE OF INSPECTION	N: ROUGH	☐ PARTIAL	COMPLETE		
BUILDING	☐ STRUCTURAL	☐ CONCRETE	STEEL DECK	☐ FORMWORK	"O.
UNDERGROUND	☐ FOOTING	☐ MASONRY	☐ BOLT INSP.	□ FIREPROOFIN	G 🗆
ELECTRICAL	☐ FOUNDATION	☐ COLUMNS	☐ WELD INSP [□ WATERPROOF	ING 🗆
□ PLUMBING	☐ FRAMING	STEEL	☐ REIN. STEEL (<u> </u>	
☐ MECHANICAL	☐ REFRIG.	☐ DRYWALL	□ ROOFING [<u> </u>	
☐ HEAT VENT.	GAS PIPING	O SEWER C	DE GRADING	<u> </u>	_ 0
COMMENTS:		5-26-0	9		
SES	= STARYE	DEXCAVA	TION HOT	spors.	DNE
181	(21'x 3'	HOLE EXE	AVATES @	ON S	LOCATION
2/00	2 BEHIN	B-850	, FOUND	444	"SECTION
OFA	OCK/SE.	DROCK -	2' ERADE		
CORN	ER OF B	XCAVATIO.	v.		
<u>C</u> K	EW DEM	10. TES	ST BENS	IN SI	ECTOR A-X
		5-27-	04		
CEL	= Took	6 INSI	TU TEST	USIN	6 TROXLER
of s	AND CON	E IN SE	ECTOR A	- 3. 5	TEST
LOCAT	TION TAK	EN FROM C	ENSTRUETO	my AREI	95 & SUDVEY
POINTS	DRAWING	's FROM S	CS ENGINE	Eds G	PS PONTÉ
			TO DEMO		
SECTE	AAX.	CREW ALSO	O EXCAUAT	ED HO	75P075
@ S.	ECTOR A-	4 CPS A	10C. 4000	4 400	01 3074
HOT S	SP075 .2.	0 x 20 x	1' IN 1'C	UT AN	EA. ALSO
_ @ SE	cton A-	X SAND	PILT GAS	LOC.	1004 200
20'x	9' 4@ s	ECTOR B	-a GPS X	OC. 400	03 20'x20
3 A	REAS.				
· .		5-28-0	9		
SCS:	CONTINU	ies to Do	mo TEST	BENS	IN SECTOR
A-X, &	DEMO + X	EMOVE S.	AND PILE	DOWN.	TO CLAY
SUB GA	PADE. CA	EW ALSO	CHIPPED OC	17/00	mo core
BASE	-Roma AROC	enon mon	TORING WE	11/5	U850-2417
W850-	2416, N	07-28, A	167-09.	ERD OF	V SITE FOR
mock i	P/DAESS	Lown w/	MAZMATE	Equip	
	•	1		•	

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Consolidated Engineering Laborat 534 23rd Avenue Oakland, CA 94606-5307	tories PROJECT NARRA	TIVE REPORT	: Building Permil	Ħ
Job Name & Address:		Dale: 6-8-09	Time:	Cel No.
B-850 SOIL NEMEX	DIATION	6-11-09	0700	2A4 1256
General Contractor: CEARUDO S	ERV.	Work Approved	☐ Do nol proc	
Subcontractor:		☐ Work in Violation	☐ Make neces	ssary corrections
TYPE OF INSPECTION: OROUGH	☐ PARTIAL	COMPLETE		
☐ BUILDING ☐ STRUCTURAL	☐ CONCRETE ☐ S	TEEL DECK	FORMWORK	0 .
UNDERGROUND DFOOTING	☐ MASONRY ☐ B	OLT INSP.	TIREPROOFIN	G []
☐ ELECTRICAL ☐ FOUNDATION	☐ COLUMNS ☐ W	ELD INSP.	G WATERPROOF	FING
☐ PLUMBING ☐ FRAMING	STEEL	EIN. STEEL	D	· □
☐ MECHANICAL ☐ REFRIG.	DRYWALL B	OOFING .		
☐ HEAT VENT. ☐ GAS PIPING	□ SEWER Ø	MADING		
COMMENTS:	6-8-0			
SES = CONTIN		, , , , , , , , , , , , , , , , , , , ,	עיי עיג יא א	1 0-1-1
A-X, & LOCATE				
SECTOR A-X			-	_
CAEW STOCK	PILE SPOKS	IN SOC	700 C	-/.
	6-4-0	Z		
CAEW CONTIN		-		COTIN
and the second s	ALEX W/SC	S USE.	1 GD	FOR
COT DEDTH VA	WIFICATION	& LOCI	4710N	of PAG
4 HOST EXCA	UATION OF	2'00;	TINS	GCTOR A
	6-10	-09 (-	SEE ATT.	ACHED SHEET
SCS CONTINU	TES EXCAVATI	en er o	2'007	IN SECTOR
A-X & STOCK	PILE SPOIL	S IN SEC	TOR C	?-1. CAEW
ALSO ALSO LO	CATED IAK	HIGH VO	LTAGE	line ±2"
BELOW GRASE	RUNNING	ETO W.		
	6-11-6	99		·
SCS CONTIN	WES EXEAU	ATION O.	F d'c	CTIN
STETOR A-X Y				
	(ENVIRONZA			
TOOK 13 COM				<u> </u>
Soil SAMPLES				
SAMPLES IN				
OF Soil SAM				
July 34111	TOUVER OF	4 01/11/1	_ <u></u>	942
		·		

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DEDTH VARIFICATION CHART

SECTOR		•	PRE	Post	CUT
206	GPS 1	200.	ELEV.	ELEV	DEPTH
ax-depthverfy-1	426522.7	1695975	1297.031	1294.902 post	2.129
ax-depthverfy-2	426543.6	1695984	1296.294	1294.151 post	2.143
ax-depthverfy-3	426563.7	1695973	1297.866	1294.481 post	3.385
ax-depthverfy-4	426585.4	1695960	1299.5	1296.083 post	3.417
ax-depthverfy-5	426612.1	1695942	1300.021	1295.08 post	4.941
ax-depthverfy-6	426629.4	1695929	1300.179	1298.607 post	1.572 sandstone
ax-depthverfy-7	426640.9	1695950	1295.991	1294.634 post	1.357 sandstone
ax-depthverfy-8	426642.8	1695967	1292.069	1290.989 post	1.08 sandstone
ax-depthverfy-9	426621	1695979	1289.527	1287.807 post	1.72 sandstone
ax-depthverfy-10	426597.8	1695995	1289.152	1286.552 post	2.6
ax-depthverfy-11	426564.5	1696007	1291.051	1287.877 post	3.174
ax-depthverfy-12	426539.1	1696029	1287.605	1285.17 post	2.435
ax-depthverfy-13	426526.1	1696055	1281.341	1280.231 post	1.11 sandstone
ax-depthverfy-14	426547.6	1696051	1277.694	1276.262 post	1.432 sandstone
ax-depthverfy-15	426575.3	1696047	1274.697	1273.373 post	1.324 sandstone
ax-depthverfy-16	426603.8	1696035	1276.687	1274.528 post	2.159

534 23rd Avenue Oakland, CA 946			IARRA	TIVE REPORT	Building Perr	nil#
Job Name & Address:				Dale: 6-15-09	Time:	Cel No.
General Contractor:	so soih Rému	EDIATION		6-18-09	0700	LAW 1256
	CERRUDO			☐ Work Approved		oceed with work
Subcontractor:	Ses EN	vo.		☐ Work in Violation	☐ Make ned	cessary corrections
TYPE OF INSPECTIO	N: AROUGH	☐ PARTI	AŁ	COMPLETE		
BUILDING	STRUCTURAL .	☐ CONCRETE	□ S	STEEL DECK	☐ FORMWOR	·
UNDERGROUND	☐ FOOTING	☐ MASONRY	: □ B	OLT INSP.	□ FIREPROOF	ING []
☐ ELECTRICAL	☐ FOUNDATION	□ COLUMNS	□ W	VELD INSP.	☐ WATERPRO	OFING
□ PLUMBING	☐ FRAMING	☐ STEEL	. 🗆 R	IEIN. STEEL	0	
☐ MECHANICAL	REFRIG.	☐ DRYWALL	R	OOFING .	<u> </u>	
☐ HEAT VENT.	☐ GAS PIPING	SEWER	Z.M	ALL BAADING	<u> </u>	
COMMENTS:		6-15-	09			
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•				of 1'ec	•	
A-2 0	N SOUTH	111/ 5100		+ STOCK F.	160 SH	20,15
STETAL						
		6-16-0				
STETAL	C-1.		09	egva 7= 1	·eV7	IN SECTOR
STETAL	C-1.	V53 To	09 Exe	_		IN SECTOR
Stetal Ses A-R.	C-1. = CONTIN	UES TO FOUND IN	09 Exe V 350	ctol A-A	@ Tor	OF HIL/SIDE
SECTOR SES A-A. BETWEE	C-1. = CONTIN UDANIUM. EN 1047	V53 TO FOUND IT 4 1048 1	09 Exe 13E	CTOR A-B	e Tor	1116 (CONSTAUET
SESTAL SES A-R. BETWEE 9 SUVÜ	C-1. = CONTINI USANIUM EN 1047 Y POINTS	VES TO FOUND IN 4 1048 1	09 5xe 135 100. 6Ps	CTOR A-R ON PLAN LOC. TO	e Tor DAAW Comt	ING (CONSTAUCT ON LATER
SECTOR SES A-R. BOTWE 9 SUNO ROPORT	C-1. = CONTINI URANIUM EN 1047 4 POINTS	VES TO POUND IT 4 1048 1 TRUG SURVIED	09 EXE V 3E V 00. BPS	CTOR A-A ON PLAN LOC. TO FLAGGED	E Tor DRAW Const LOCATION	ING (CONSTAUCT ON LATER
SECTAN SES A-R. BOTWOO 9 SUNO ROPORT	C-1. = CONTINI USANIUM EN 1047 Y POINTS	VES TO POUND IT 4 1048 1 TRUE SURVIED DEATIONS	09 EXE N 3E N 0C. EPS 4)	CTOR A-R ON PLAN LOC. TO FLAGGED OR ERD:	E Tor DRAW Const LOCATION	ING (CONSTAUCT ON LATER
SECTOR SES A-R. BOTWEE 9 SUNO REPORT SOIL PO	C-1. = CONTINI UDANIUM EN 1047 4 POINTS CREW B TEST	POUND IN 4 1048 1 TRUG SURVIED DEATIONS	09 EXE N 3E N 0C. BPS 4 J	CTOR A-R ON PLAM LOC. TO FLAGGED OR ERD: 96-17-0	ETOP DAHW COME LOCATION TEAM.	OF HILSIDE ING (CONSTAULT ON HATER WE TOR
SESTAR SES A-R. BETWEE 9 SUVE PEPORT SOIL PO	C-1. = CONTINI USANIUM EN 1047 (4 POINTS) (CREW (B TEST L	VES TO FOUND IN 4 1048 1 TRUE SURVIED DEATIONS 6-16	09 5x6 186. 6PS 4) 50	CTOR A-R ON PLAN LOC. TO FLAGGED OR ERD: 9 6-17-C	COME COME LOCATION CEAM.	OF HILSIDE ING (LONS JAVET ON LATER WS FOR
SESTANDES A-A. BETWEE 9 SUNE PEPORT SOIL PO	C-1. = CONTINI UDANIUM EN 1047 GY POINTS CREW B TEST L STARTED CTOR A-3,	VES TO FOUND IN 4 10 48 1 TRUE SURVIED DEATIONS 6-16 4 START	5 9 5 x 6 1 3 E 6 1 D 5 1 D 6 1 CAV	CTOR A-R ON PLAN LOC. TO FLAGGED RERD: GE-17-C MITION ON OVER EXC	ETOP DRAW COME LOCATION EAM. P NARTA	OF HILSIDE ING (LOWS JAVET ON LATER INS FOR I HILSIDE SLOP WIN SECTOR
SESTANDES A-A. BETWEE 9 SUVE PEPORT SOIL PO	C-1. = CONTINI UDANIUM EN 1047 GY POINTS CREW B TEST L STARTED CTOR A-3,	VES TO POUND IN 4 10 48 1 TRUE SURVIED DEATIONS 6-16 4 START T @ PC	29 25 x c 100. 603 4) 50 (CAV.	CTOR A-R ON PLAN LOC. TO FLAGGED RERD: GE-17-C MITION ON OVER EXC	ETOP DRAW COME LOCATION EAM. P NARTA	OF HILSIDE ING (LONS JAVET ON LATER WS FOR
SESTANDES A-R. BETWEE 9 SUNE PEPORT SOIL PO SES= IN SE A-X	C-1. = CONTINI UDANIUM EN 1047 Y POINTS CREW B TEST L STANTED CTOR A-3, TO 3'CU	POUND IN FOUND IN FOUND IN FOUND IN FOUND SURVIED DEATIONS FOUND	09 8xe 136. 6ps 4 ps 60 60 60 60 78-60	CTOR A-R ON PLAN LOC. TO LAGGED RERD: GENTION ON SUER EXC	ETOP DRAW COME LOCATION TEAM. 19 NORTH QUATION WATION	OF HILSIDE ING (CONSTAULT ON HATER NS FOR I HILSIDE SLOP VIN SECTOR #51,65,6446
SESTANDES A-R. BETWEE 9 SUNE 9 SUNE 9 SUNE SOIL PO SUSE IN SE A-X SUSE	C-1. = CONTINI UDANIUM EN 1047 Y POINTS CREW B TEST L STANTED CONTINUES	VES TO POUND IT 4 1048 1 TRUE SURVIED DEATIONS 6-16 4 START 7 @ PC 6-1	29 25 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20	CTOR A-R ON PLAM LOC. TO LAGGED RERD: GENTON ATION ON SUER EXC	Cont Cont Cont LOCATION CEAM. PARTIN QUATION WATION	NO CONSTAULT ON HATER NS FOR 111/5, DE SLOP VIN SECTOR V SECTOR
SESTADES A-A. BETWEE 9 SUVE PEPORT SOIL PO SES= IN SE A-X SES= A-X I	C-1. = CONTINI USANIUM EN 1047 Y POINTS CREW B TEST L STANTED CONTINUES N V-DITCH	POUND IN # 1048 1 TRUE SURVIED DEATIONS DEATIONS 4 START TE PE 6-1 5 1'48 ON SOUT	29 25 20 100. 603 4 1 50 (CAV. 50 0 18-0 18-0 18-0	CTOR A-R ON PLAN LOC. TO LAGGED RERD: GENTON ATION ON OVER EXC	CONTE CONTE CONTE CONTEAM. PANATION NORTH AVATION TION IN	NE (LONS JAVET ON HATER NE FOR 11/1/5, DE Short NIN SECTOR N SECTOR N SECTOR N SECTOR
SECTION SES A-B. BETWEE 9 SUVE PEPORT SOIL PO SCS= IN SE A-X SCS= A-X SECTO	C-1. = CONTINI UNANIUM EN 1047 EN 1047 EN 1047 EN ENEW B TEST L STANTED ECTOR A-3, TO 3'CU CONTINUES N V-DITCH	POUND IN FOUND IN FOUND IN FOUND IN FOUND IN FOUND IN SURVIED DEATIONS FOUND	29 2500. 600. 600. 600. 600. 600. 600. 600.	CTOR A-R ON PLAN LOC. TO FLAGGED OR ERD: GENTON ON OVER EXCAPA TEXCAPA TEXCAPA OLE SAMP	CONTENDADA CONTEN	POF HILSIDE ING (CONSTAUCT ON LATER NS FOR IHILSIDE SLOP N IN SECTOR TS1,65,6446 N SECTOR A-X 4 AT
SECTION SES A-R. BETWEE 9 SUVE REPORT SOIL PO SCS= IN SE A-X SCS= A-X ERD	C-1. = CONTINI UDANIUM EN 1047 Y POINTS CREW B TEST L STANTED CONTINUES N V-DITCH A 12NL EN	POUND IN FOUND IN FOUND IN FOUND IN FOUND IN FOUND IN DEATIONS FOUND FO	29 25 20	CTOR A-R ON PLAN LOC. TO LOC. TO LAGGED RERD: GENTON ON DUER EXCH TEST SAMP TEXCAVA THE SAMP SITE TO	COLLE	POF HI/SIDE ING (CONSTAUCT ON HATER WE FOR I HI/SIDE SLOP WIN SECTOR #51,65,6446 V SECTOR A-X 4 AT THOM #57
SECTION SES A-A. BUTWEE 9 SUNU REPORT SOIL PO SES= IN SE A-X SESTOR ERD SOIL S.	C-1. = CONTINI UNANIUM EN 1047 (4 POINTS) (CAEW (B) TEST L STANTED (CTOR A-3, TO 3'CU CONTINUES N V-DITCH (OR A-1 A) ELLNL ER AMPLES (1)	POUND IN # 1048 1 TRUG SURVIED DEATIONS DEATIONS 1'EUT EX # START TO PO SOUND ADUND MA TEAM 3=TOT.) F.	29 5x6 186. 6ps 4 1 60 60 18-	CTOR A-R ON PLAM LOC. TO LAGGED PREAD: GENER END: GENER EXC GENER EXC TEST SAM TEXCAVA TOLE SAMP SITE TO	CONTERNO PORTION CONTERNO PORTION NORTH OF OF LE LOCH COLLE OF A-D	POF HI/SIDE ING (LOWSTAVET ON HATER WE FOR I HI/SIDE SLOP WIN SECTOR #51,65,6446 W SECTOR A-X & AT I HONI #57 CT PCB
SECTION SES A-R. BETWEE 9 SUND REPORT SOIL PO SCS= IN SE A-X SCS= A-X ERD SOIL S. ERD SOIL S.	C-1. - CONTINI UNANIUM EN 1047 (4 POINTS) (CAEW B TEST L STANTED (CONTINUES N V-DITCH (ANDLES (13 AMDLES (13 4, 43, 44	POUND IN # 1048 1 TRUG SURVIED DEATIONS LOCATIONS # 57ART TO PO ADUND MA DOUND MA TEAM 3=TOT.) F.	29 5x6 186. 6PS 4 1 60 60 18-	CHOR A-R ON PLAN LOC. TO LOC. TO LABBED RERD: GENTON ON DUER EXCH TEXCAVA LAST SAMP OLE SAMP SECTOR OCATED D	CONTENDADO IN DE DE LOCALE LO LATION NORTH AVATION LE LOCH COLLE A A- D VE TO	POF HI/SIDE ING (LOWS JAVET ON LATER WE FOR I HI/SIDE SLOP WIN SECTOR #51,65,6446 W SECTOR A-X & AT I HON #57 CT PCB SOIL SAMPLES SAND STONE &
SECTAN SES A-A. BETWEE 9 SUVE PEPORT SOIL PO SCS= IN SE A-X SCS= A-X ERD SOIL S. ERD SOIL S. ERD SOIL S. ERD SOIL S. AOCK,	C-1. = CONTINI USANIUM EN 1047 GY POINTS CREW B TEST L STANTED CONTINUES N V-DITCH AMPLES (1: AMPLES (1: 5, 42, 43, 44 IN SECTOR	POUND IN FOUND IN FOUND IN FOUND IN FOUND IN FOUND F	29 25 20 200. 2	CTOR A-R ON PLAN LOR. TO LOR. TO LABBED RERD: RERD: ROVER EXCAVA SITE TO SECTOR OCATED DE CARD TO	COLLE	POF HI/SIDE ING (LOWSTAVET ON HATER WE FOR I HI/SIDE SLOP WIN SECTOR #51,65,6446 W SECTOR A-X & AT I HONI #57 CT PCB

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CEL FRUUT KEY U	lips	
Consolidated Engineering Laboratories 534 23rd Avenue PROJECT NARRA Oakland, CA 94606-5307	TVE REPORT Building Permil #	:
Job Name & Address: R-850 Soil REMEDIA Tron	Date: 6-22-09 Time: Cel No.	6
General Contractor:	ØWork Approved □ Do not proceed with work	-
Subcontractor: SCS ENGINEERING	☐ Work in Violation ☐ Make necessary corrections	:
TYPE OF INSPECTION: AROUGH I PARTIAL	☐ COMPLETE	
☐ BUILDING ☐ STRUCTURAL ☐ CONCRETE ☐ S	TEEL DECK	
☐ UNDERGROUND ☐ FOOTING ☐ MASONRY ☐ E	DLT INSP. FIREPROOFING	
ELECTRICAL FOUNDATION COLUMNS	ELD INSP. WATERPROOFING	
☐ PLUMBING ☐ FRAMING ☐ STEEL ☐ F	EIN. STEEL	
☐ MECHANICAL ☐ REFRIG. ☐ DRYWALL ☐ R	DOFING	
□ HEAT VENT. □ GAS PIPING □ SEWER □	1438 6RADING	
COMMENTS: 6-22-0°	7	·
SCS= CONTINUES TO OVE	REXCAVATO 1'42'CU	7
IN SECTOR A-X, 4HS	MATED I'CUT ON S.	
FAILISIDE OF SECTOR A-	3 A	
6-23-6	9	
LINL ERD TEAM= FOUND I	Y PEB TEST SAMPLES	
ARE BAD, CHAVE HIGHER CO	UNTE OF PEB'S THAN	
ALOWED, MEDER SPEC.	IN SECTOR A-2.	
SES= CONTINUES 1'CO	IT EXCAVATION IN SECT	100
AN ON S, HILLSIDE & C	HECKED DEPTH OF CO	27
W/ GPS UNIT. CAEW FO	•	
BETWEEN SECTOR A		
1'CUT AREA @ TOP OF		
DEPLITED URANIUM THAT	DAN + 60,000 ON 7	415
METER & + 4 ON THE	an, mother w/ K	ō()
PAINT.		
6-84-		
SES = CONTINUES 1'CUT	EXCAVATION IN SEC.	tere
A-3 4 A-4, CAGAS AL		
CANATION IN SECTOR A-1		
RD TO 3-850, & UNEAN	THEO 2" TRANSITE A	2/1/2
1= DIRECT BURIAL ELE		
CONDUIT PIPE, ± 2'38	LOW ORIGIONAL GRADO	5
CREW ALSO BUSTED A		71
I'XI CONC. DUETRANK, A	1 & COMMUNICATION	
VAULT.		

	(C r ()	1- Phillip	25		
Consolidated Er 534 23rd Avenue Oakland, CA 946		ories	RATIVE REPORT	· Building Permit	# 2 p = Q
Job Name & Address:	O Soil AG	MENUA TION	Date: 63.5-09	Time: 0700	Cel No. 1256
General Contractor:		PEUDO	Work Approved		_ .
Subcontractor:	SCS	2000	☐ Work in Violatio		sary corrections
TYPE OF INSPECTION	N: BROUGH	☐ PARTIAL	· [] COMPLETE		· · · · · · · · · · · · · · · · · · ·
BUILDING	STRUCTURAL	☐ CONCRETE	STEEL DECK	☐ FORMWORK	"
UNDERGROUND	☐ FOOTING	☐ MASONRY	☐ BOLT INSP.	FIREPROOFIN	G 🖸
ELECTRICAL	☐ FOUNDATION	☐ COLUMNS	☐ WELD INSP.	☐ WATERPROOF	NG 🗆
□ PLUMBING	☐ FRAMING	☐ STEEL	☐ REIN. STEEL.	O	
☐ MECHANICAL	REFRIG.	☐ DRYWALL	ROOFING		
☐ HEAT VENT.	☐ GAS PIPING	SEWER	MASS GAN	DEING	
COMMENTS:		6-2	5-09		······································
	END TEA	N TOEK	t	ih SAM	101-0
FOR			compos		ESTING
jes :	SECTOA.	4-7	<u> </u>		- STING
15	18 = CC	MINUES	1'007	EXCA	2/4-100
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Geosphere Coni	
AN ETS COMP	a'N Y
Geotechnical Engineering • Engin Environmental Management • W	eering Geology ater Resources

AILY FIELD REPORT

Field Rep:	Sociating Pavement Parties Plant Control Contr		Project Other Condition	Hours (Charged: uniny Cloudy Density Testing	. 4	Page 	t Time	Aild
Field Rep: Scope of Work: AM M. Contractor: AM M. Contractor Representing Compaction Moving Water Support Plan	Sociating Pavement Parties Plant Control Contr	int Utility Trench	Project Other Condition	t Manager: Hours (Loons: One of the control of t	Charged: unny Iloudy	Full Time Windy Rain	Par □ Par □ C	tTime ot	og
Contractor: Contractor Represen Equipment Compaction Moving Water Support	TAUSO tative: SPG	ENGA.	Conditi	ions: D c	unny Noudý	□ Windy □ Rain	Д Д∕н □ С	ot	og
Contractor Represen Equipment Compaction Moving Water Support	tative: See E	Seta Mila Company		ions:	lloudý	□ Rain	∴ □ c	old 🗖 F	og
Equipment Compaction Moving Water Support Plan	ation de aast d	Seta Mila Company				1	34 May 18 40 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	The Mark State of the State of	
Compaction Moving Water Support	N/A	/pe. - 9		Number	Density Testing	. Nuclear	Туре:	THORE	تى سند ا
Moving Water Support Plan	N/A	, 9	-		Density Testing				مناه سن
Water Support			ı		Equipment	☐ Tube			·
Support Plan						Sand Co	ne		
Plan.					Fill Source	ô Native			
Section 20 Sections of the Indian Control of					1 m Jource	☐ Import			
Civil	Eng	ineer		. Date	Fill Location:	ECTER	A-3		
							•		
Structural Geotech	•								
Curve#	D	escription		Max Density	Opt. Moistu	re Required Com	paction	Required Mois	ture .
	Den John Store	40N MM	TEM.	4-7	epopular Berger A. Safford A. Siller	□ 90%		Opt. + 2%	
50509-03	1'07	DAK BRI	4/			□ 95%			
		OY LEAN C	1	122.	5 12.0	Other:			
			/	• • • • • • • • • • • • • • • • • • • •			1 66 27 4	SCORPE	27/
			Sept Salation			THE RESIDENCE OF THE PROPERTY OF THE	COURTE MOIST	Change of the design of the second	Active St. Dayson P
Test#	Location	1	Elevation	Wet Densi (pcf)	ty Moisture Content	Dry Density (pcf)	-€CUTIVE#	Percent Compaction	Pass/ Fail
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d) (5020	1	76.0	12.1	68.3	6.7	71.7	59
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2/	11	1033		94.	16.5	10 4	7.3	91.0	74
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	Geotechnical Engineering • E Environmental Management		Report #:	/3 C) **C			Date:		
roject Name	e: B-850 Sort	AEMFNIATO.	Project Nur	mber: را الم	44112	3565	Page _	of _	
ield Rep:	Tonks Phille	25	Project Mai	nager:					
cope of Work:	(⊠/Mass Grading	ment Utility Trench	Other	Hours Charg	ed:	Full Time	П	Part Time	
Contractor:	CEARUDE	>		☑ Sunny	h 1	☑ · Windy		Hot : 🔟	Mild
Contractor Re	epresentative: AND	43011	Conditions	☐ Cloud	ly	☐ Rain :		Cold : 🗖	Fog
Equipment		Type	Numbe	er		∠ ✓ Nuclear	Туре	: 150 ax	يتسمع لمح
Compaction	NA				nsity Testing quipment	☐ Tube			
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1	72003307					انسا			
1	726698,2	1695918	1316.57	68.3	2.4	66.6	1		- {
<u>/</u> 2 3	426698.2		1316.57	68.3 73.2	316	70.6	THE PARTY OF	- HUNGA	-affin - Temanipus
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1 3 4	476698,2	16959.72	225.21	73.2			A Comment of Contract of Contr		

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form epinions about the adequacy of those operations, and to report these opinions to our client. The presence and activities of our field representatives on the reflect reports allowed as evidence that field observation was performed. Observations and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

This DFR is Preliminary - A preliminary report is provided oblevation was performed. Observations and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

This DFR is Preliminary - A preliminary report is provided oblevation was performed. Observations and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

Field Representative:

Date:

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Date:

Date:

A	Geosphere Co	ni ints, Inc.	R	1930	55	AILY F	IELD REPORT	.
	Geotechnical Engineering Environmental Manageme	• Engineering Geology ent • Water Resources	Report #:				Date: 6-11-0	09
Project Nam	e:13-850 50,1		Project N	umber: پر	14/12.	56	Page of	
Field Rep:	Tory Philli	45	Project M	anager:				
Scope of Work:	■ Alass Grading	vement Utility Trench	Other	Hours Char	ged:	☑-Full Time	☐ Part Time	
Contractor:	CEARUR	0	Conditions:	☐ Sunr	y	Windy - II	□ Hot 🔼 1	Mild
Contractor R	epresentative: ANO	14 BE11	Conditions	Clou	dy	🔲 Rain 🔑		og
Equipment		Туре	Num			A Nuclear	Type: Tho Ko	LETE
Compaction	NIA				ensity Testing Equipment	☐ Tube	· .	
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Curve#		Description .		Max Density	Opt. Moistur	e Required Compa	ction Required Mois	sture
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2	426477.8	1695936	1998.60	121.0	11.1	1008		
3	426531.4	1695898	12.98.55	104.0	17.1	9.3-0		
4	426519.9	1695984	1296.79	12016	10,0	109.6		
5	426594.4	169 5992	1290.33	86.2	2.8	83,8		
6	426571.4	1696050	1274.15	89.8	5.1	85.4		
7	4126505.3	1696039	1190,58	91.9	2.6	89.5		
8	436456.9	1696001	1296,20	92.7	5.4	87.9		
9	426412. 3	1696060	1193.12	115.4	9,8	105.1		
10	426405.9	169.5930	1292.40	104.8	4.1	100.6		
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tractor identified, to form opin ions to our client. The present from its obligation to meet co	nions about the adequacy of those operations, a ce and activities of our field representatives do n intractural requirements. No one except our c e contractor retains sole responsibility for site s	and to report those opin- not relieve any contractor solely as evid dient may rely on our or conclusion	S DFR is Preliminary dence that field observation was and/or recommendations co	as performed. Obs nveyed in the final r	ervations and/ eport may vary		nal – A final report is an instrument awn from this report should be disc al involved.	
operations, and sequences of	construction.	from and sha	II take precedence over those i	ndicated in a prelim	inary report.	<u> </u>		
Field Representa	tive) Jun 1 Mal	Date: 6	R	eviewed By:	<u> </u>	· · · · · · · · · · · · · · · · · · ·	Date:	
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Convenience Representage Engineering Engineering Control		Geosphere Co	OMPANY	8-	583005	AILY	FIELD REPORT	
per North Project Manager: Project Manager: Pr		Geotechnical Engineering Environmental Manageme	· Engineering Geology ent · Water Resources				Date: 6-3-09	
The part was a proper with the part the	Project Nam	e: B-830 Soil	REMEDIATA	Project N	umber: [Au]]	256	Page of	
Conditions: ENANDO Conditions Suriny Elix El Mild Fog Contractor Representative: ANDY SE! Conditions Cloudy Rain Cloid Fog Compaction N. S. T. I. I. I. P. A. I. Elix Cloudy Rain Cloid Fog Compaction N. S. T. I. I. I. P. A. I. Elix Cloudy	Field Rep:	Tony M	1,11.05	Project M	anager:			-
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Cloudy Rain Cold Fog	Contractor:	CERRURO	1			Windy	Hot Z. Mild	
Objection 14, \$170 111 3241	Contractor R	epresentative: ANC	NY BEIL	Conditions		. □ Rain	Cold D Fog	
Coverage Competent Compe	Equipment		Type	Num	hber	☐ Nuclear	Type: TROX LEK	2
Plan Engineer Date	Compaction	1N.SITO	MINILAC	ر المان				
Import	Moving	de.				✓ Sand Co	one	
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MOISTURE SAMPLES TAKEN	F2776570002C		Description		Max Density Opt. Mo	isture Required Com	paction Required Moisture	
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oject Name: B-930 Soul DEME DIATIO	_	mber: LAW 1	d 5%	Page	
eld Rep: Tony Phillips	Project Mar		Committee Spirit	rage	_ of
pe of Work: De Mass Grading Pavement Utility Trench	Other	Hours Charged:	图 Full Time	☐ Part Time	
entractor: CEMAUDO		☑ Sunny	€ Windy	☐ Hot.	酒 Mild
entractor Representative: AMAY BEIL	Conditions:	Cloudy	☐ Rain	☐ Cold	- □ Fog
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Geotechnical Engineering · Engineering Geology Environmental Management · Water Resources	Report #:			Date: 5/26-28/07		
Project Name: (LA)L Site 300 B-850 Soil R. Field Rep: Robert Llv. D-	Project Nur Project Mar	nber: $Ca/$	Dicker	Page of		
Scope of Work: Mass Grading Pavement Utility Trench	Other		☑ Full Time	☐ Part Time		
Contractor: (esuso		Sunny :	☐ Windy	☐ Hot ☐ Mild		
Contractor Representative: Andy Bell	Conditions:	☐ Gloudy	Rain	Cold Fog		
Comment/Sketch: 5/26/09 Tue Break 5 handmix upper c handmix sandpil handmix 1 C	out you le @ ut@	100% 8:3. 5% 9 An	110 9	51-P9=5		
- 55/15 WAR - office ward 5/27/09 wed				97° F Sunny		
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Sope of Next. Described promote Delify Speed Conference Generation Generati	Project Name: LLNL Site 300 8850 5511K	Project Nur			Page	of
Contractor Censules Contractor Representative Awar Ball Sindices Good Supplementative Awar Ball Sindices Good Supplementative Awar Ball Sindices Good Supplementative Awar Ball Sindices Good Supplementation Good Supplem	Field Rep: Robert Wilde	Project Mai	nager: Coll I	Dickery	1Cin	
Comment's Representative Andry Ball Conditions Good Rais God R		Other	Hours Charged:	☑ Full Time	☐ Part Time	
Comment Sketch: Still 1/99 Man	Contractor: Cervido	o ana	Sunny	□ Windy	☐ Hot	□. Mild∷
- Nuke tests in Ay - 9 physist court - Sand cone over cost 72° F 6/2/9/ True - Nuke tests in Ax - Moist Cont - Sand cone summy 77.5° F 6/3/9/ Wed - Nuke tests in B, - Moist Cont - Sand cone summy 77.5° F 6/3/9/ Wed - Nuke tests in B, - Moist Cont - Sand cone some Partly Cloudy 79.5° F 6/4/9/ Thus - Moist Cont - Sand cone - Partly Cloudy 79.5° F 5/4/9/ Thus - Moist Cont - Sand cone - Partly Cloudy 79.5° F	Contractor Representative: Andy Ball	Conditions:	Cloudy	🗖 Rain	□ Cold	□ Fog
- Nuke tests in Ay - 9 minst cont - 5 and cone - 2 wer cost 72° f - 5 and cone - Nuke tests in Ax - Moist Cont - Sand cone - Sa	16/1/09/Mon					
b/2/99 Twe - Nuke tends in Ax - Moist Cont Sand Cone Sunny 77.5° F 6/3/99 Wed - Nuke tests in B, - Moist Cont Sund Cone Partly Cloudy 79.5° F 6/4/99 Thu Rosist Cont - Sand Cone Partly Cloudy 79.5° F 5/4/99 Thu Rosist Cont - Sand Cone Partly Cloudy 79.5° F 5/4/99 Thu Rosist Cont - Sand Cone Partly Cloudy 79.5° F Sunny 71° F	- Nuke tes		Ay			a mo nema mel s
Moist Cont Sunny 77.5° F Loly 199 Wed S Note that the state of the			JVe	v cast	72°F	
Sunny 77.5° F Sand Cone Sunny 77.5° F Sand Cone Sunny 77.5° F District Cont Sunny 77.5° F District Cont Sunny 77.5° F Sunny 77.5° F Sund Cone Sunny 77.5° F Sunny 77						
Sand Core Surry 77.5° F Sand Core Surry politicists in regressed as set only to down operation of the core was closed. Repeated and activitied on the Representation of the Rep			~ Ax			
Notice the first specialization are represented in the sole to the total post characteristic forms and course Partly Cloudy 79,5°F BOTHS to First Specialization and course Standard Course Standard Course Partly Cloudy 79,5°F BOTHS to First Specialization and course Standard Course Standard Course Partly Cloudy 79,5°F Standard Course Standard Course Standard Course Standard Course Standard Course Partly Cloudy 79,5°F This DFR is Preliminary - A preliminary report is provided solely as a condition of one fewer presentation of the course of						·
NOTICE: Our firm's professionals an represented on lite soley to observe operations of the concernit interface to be firm's professionals an represented on lite soley to observe operations of the concernit interface to be majoritise about the subgroups of finance operations, and in approximate more professional and an approximate of the concernition of the concern	- Sand con	e	5/	unny	77.5°F	•
NOTICE: Our ferm's professionals are represented on site voley to observe operations of the concrete interface, to the majoritans about the defense of the congression, and to report the construction described, to the majoritans about the defense of these operations, and to report the construction of the configuration of th	56/3/09 Wed - Nuke test	ks in	В,			
NOTICE: Our firm's professionals are represented on site soley to observe operations of the control destified, to firm opinions about the adequacy of those operations, and or report thase opinions to war first. The profession is to war form opinions about the adequacy of those operations, and or report thase opinions to war form. The presence and activities of our field representations of our field representations and or report thase opinions to war form. The presentations are controlled activities of our field representations are representations of our field representations of our field representations of our field representations and or report that field observation was performed. Observations and/or or conditions and/or recommendations conveyed in the final report may any or or conditions and/or recommendations conveyed in the final report may are service. Any conditions drawn from this report should be discussed with an or conditions and/or recommendations conveyed in the final report may are service. Any conditions drawn from this report should be discussed with an or conditions and/or recommendations conveyed in the final report may are service. Any conditions drawn from this report should be discussed with an or conditions and/or recommendations conveyed in the final report may are yearly and shall take precedence over those indicated in a preliminary report.	L					
MOTICE: Our firm's professionals are represented on site toky to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report this or opinion to unificant. The presence and achillation from its obligation to meet contactural requirements. No one except our client may rely on our or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those inclicated in a preliminary report.	- sand core		Pa	intly C	loudy ?	79,5°F
NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from it to oligitation to meet contractural requirements. No one except our dient may rely on our findings and opinions. The contracture relations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report. This DFR is Final - A final report is an instrument of profession soriely as evidence that field observations and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.						
NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions: about the adequacy of those operations, and to report these opinions to our client. The presence and activities of our field representatives do not relevant contractor from it obligation to meet contractoral requirements. No one except our dient may rely on our findings and opinions. The contractor retains one responsibility for site salety and the methods, operations, and sequences of construction. This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.	- Sand cone					
NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report tisse opinions to unditent. The presence and activities of our field repeatables do not relieve any contractor from its obligation to meet cincinities our dient freeling and opinions. The contractor retains sole responsibility for site salety and the methods, operations, and sequences of construction. This DFR is Final - A final report is an instrument of profession solely as evidence that field observation was performed. Observations and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report. This DFR is Final - A final report is an instrument of profession solely as evidence that field observation was performed. Observations and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.	- reports			و رس ت	0 (
This DFR is Final - A final report is an instrument of profession from opinions about the adequacy of those operations, and to report these opinions to under the presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site salety and the methods, operations, and sequences of construction. This DFR is Final - A final report is an instrument of professional solely as evidence that field observations and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report. This DFR is Final - A final report is an instrument of professional solely as evidence that field observations and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.			5unv	iy ti		erik inti ia
operations, and sequences or construction.	ions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to merci contractoral requirements. No one except our client may rely on our findings and opinions. The contractor retains olse responsibility for site safety and the methods, from and shall take one of the contractor retains only or recommendation.	nt field observation was recommendations conve	performed. Observations and/ yed in the final report may vary	service. Any conclusions	drawn from this report sho	instrument of professional uld be discussed with and
	operations, and sequence of constitution.	1/00	· · · · · · · · · · · · · · · · · · ·		Date:	

ions to our dient. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.	solely as evidence that field observation conclusions and/or recommendation from and shall take precedence over the	ns conveyed in the final report may vary	service. Any conclusions drawn fro evaluated by the professional involve	m this report should be discussed with a ed.
Field Representative:	Date: 1/11/09	Reviewed By:		Date:
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This DFR is Preliminary - A preliminary report is provided

A S	Geosph	ere Con	nts, l	nc
		N ETS CO		
	Geotechnica Environment	l Engineering • E al Management	ingineering Geolog • Water Resource	y s
Project Name	. 1 1 NV	5:102)	7 RRS	Ċ.

JAILY FIELD REPORT

Geotechnical Engineering - Engineering Geology Environmental Management - Water Resources	Report#- 13-5830)5	Date: 6/29,	30-7/1/
Project Name: LLNL 51+03) 3850 Sill 8				of
Field Rep:	Project Manager: Cal	Dickarmo	1v	
Scope of Work: Mass Grading Pavement Dutility Trench	Other Hours Charged:	Full Time	☐ Part Time	
Contractor: Cerendo	Conditions:	☐ Windy	□ Hot	☐ Mild
Contractor Representative: MNA Bell	Cloudy.	Rain	□ Cold	☐ Fög.
6 moi	e tests in a		-2	
		renny	100° F	
[6/30/29/ The	# LAW 1257		1	
Complet Suil Sa	e cover + m. uple for con			
	54.	any 9	0° +	
27/1/09 wed	#LAW 1261			
Report S				
	Sunny	90° f		
ns to our client. The presence and activities of our field representatives do not relieve any contractor mits obligation to meet contractural requirements. No one except our client may rely on our or conclusions and	FR is Preliminary - A preliminary report is provided that field observation was performed. Observations and/lor recommendations conveyed in the final report may vary a precedence over those indicated in a preliminary report.	This DFR is Fin service. Any conclusions dr evaluated by the professiona		
Field Representative: Date:	///09 Reviewed By:		Date:	
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	Jeosphere Con: Ints, Inc.			•	AILY ر	FIELD I	RĘPORT	Γ
	Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	Report	#:			Date:	5 27 3	7
Project Name	:LLNL 5He 30 8-8505011	Project	Number:	CAW 12	252	Page	of _	2
Field Rep:	Robert Uribe	1	Manager:	Mike		ink		
Scope of Work:	Mass Grading Delayement Utility Trench	Other	Hours C	harged:	☐ Full Time	☐ Part	Time 0	NEN
Contractor:	Cerrudo		įv <mark>i⊠</mark> 5si	inny 1940 (iv D rah	(D)	Mild
Contractor Re	presentative: And Bell	Condition	IS*	loudy	Rain	: 🗀 c	ola 🗀 :	Fog
Equipment	Type	Nı	ımber		☐ Nuclear	Туре:	entra de la companya	A. 18. 19. A. 19. 19. 19. 19. 19. 19. 19. 19. 19. 19
Compaction	instru			Density Testing Equipment	☐ Tube			
Moving				Lyupment	Sand Co	one	-	i
Water				Fill Source	Native	on si	te	
Support		200 25E0122	Sacretina de		☐ Import			<u> </u>
Plan	Engineer ç		Date .	Fill Location:	n-sitn	Are	a A:	3
Civil Structural			 .					
Geotech								
Curve#	Description 6		Max Density	Öpt. Moistur	e Required Com	ipaction	Required Moi	sture .
250529-03	I'cut DK Bin savdy leav	CL	122.5	12.0	□ 90%		Opt. + 2%).
00000,00					□ 95%		Opt. + 2%	
	alikakalishka di katika di ar				☐ Other:	. 0	Other:	
Test#	Location	Elevation .	Wet Densit (pcf)	ty Moisture Content	Dry Density (pcf)	Curve#	Percent Compaction	Pass/ Fail
l	Test#1 asea 5	G,	87.5	RCLLC REPRESENTATION DESCRIPTION	- A Management and A country)50509-3	69	
				789 4		*		
				7 1 1	-		· · · · · ·	
		*		45.0	Special			
				0 30	2 /	-		
			<u>.</u>					
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		<u> </u>		31.	47	<u> </u>		
Comment/ Sketch:		<u> </u>	<u> </u>					1
Comment Skettill	Test taken nea	N	uke.	treat s	ite #	1		<i>a</i> *
	1 1 1 1 1 1		lic					
	Musical Wither		× 1					
		1		67	/.			
					4R-4	58 <i>3</i> 0	05	
NOTICE: Our firm's profession tractor identified to form enlain	onals are represented on site soley to observe operations of the con-	is Preliminar	ry – A preliminarv	report is provided	This DFR is	Final - A final rep	oort is an instrumen	t of professiona
ions to our client. The presence from its obligation to meet con	and activities of our field representatives do not relieve any contractor softly as evidence that contractor retains sole responsibility for site safety and the methods,	it field observations recommendations	n was performed. conveved in the fi	Observations and/ nal report may vary	service. Any conclusion evaluated by the profess	ns drawn from this r	eport should be dis	cussed with and
Field Representati	1/1/1/2 6/2	7/29	Reviewed By:			Date:		
i iciu nepresentati	Vale.		nerieweu by.	·		LDate.		



Pg 2 of 2

DATE:	5	27/09	INSPECTO	R:	K. U	ribe.	
PROJECT#:	1 .7	AWY 1252	PROJECT N	NAME:	LLNL S	He 300B-850	5
COMPACTION SF	PEC:		TEST LOCA	ATION:	Test +	Fl area	_
MOISTURE SPEC			in	-situ un	dist-m/mpd	501	
		CAND	CONE T	FSTING			
		SAND	CONL	LOTINO			
	А	WT of cone, jar, sand - Before	;	6828.1	· · · · · · · · · · · · · · · · · · ·	g	
	В	WT of cone, jar, sand - After) -	4175,4		g	
	С	WT of sand in cone	_	1580		9	
	D	WT of sand used		2652.7		g A-B	
	Е	WT of sand in hole	·	1072.7		g D-C	
	F	Density of sand		89.6		pcf	
	G	Volume of hole	· _	0835	0.0264	cf E÷F	
	Н	Gross WT of excavated soil +	TARE _			Ibs	
	1.	WT of TARE				Ibs	
ı	J	Net WT of soil	-	1048.	4/2.311	lbs H-I	
	K	WT Density	· · -	87.5		pcf J÷G	
	L	Soil + TARE (Wet)	-	810.7		lbs	
	М	TARE		139.1		lbs	
	. N	Soil + TARE (Dry)	_	789.6		lbs	
	0	WT of Water	_	21.1		lbs L-N	
	Р	WT of Soil	_	650,5	<u> </u>	lbs N-M	
	Q	Moisture Content		3.2,	<u> </u>	% O÷P	
	·	Optimum Moisture Content		12.0		%	
	R	Dry Density	-	84.8		pcf K÷(I+Q)	
	S	Lab Maximum		122.5	/	pcf	
	_	(Lab No. <u>050509</u>	-03				
	Т	Percent Compaction		69%		% R÷S	
Weight = V Cubic Feet		Pounds = lbs Gram	s = G	Pounds per Cubi Conversion Gran			

Date	Location	Tare	Wet soil + tare	Dry soil + tare	water	soil	Moisture Content
5/11/2009	hand mix sand pile pad	139.0o	715.00	693.00	22.00	554.00	4.00%
5/11/2009	hand mix upper court yard pad	110.40	406.10	373.0o	33.10	262.60	12.60%
5/11/2009	hand mix 1' cut pad	137.00	708.00	653.00	55.0o	516.00	10.70%
		ļ					1.44
5/12/2009	for nuke gauge - sand pile @ 10% SG	138.40	804.50	756.40	48.10	618.00	7.80%
5/12/2009	for nuke gauge - sand pile @ 10% 6"	137.10	633.10	599.2o	33.90	462.10	7.30%
5/12/2009	for nuke gauge - sand pile @ 10% 12"	110.60	839.10	785.9o	53.20	675.30	7.90%
5/13/2009	for nuke gauge - 1' cut @ 5% SG	367.40	913.60	846.2o	67.40	478.80	14.10%
	for nuke gauge - 1' cut @ 5% 6"	365.10	890.20	823.30	66.90	458.20	14.60%
5/13/2009	for nuke gauge - 1' cut @ 5% 0	368.90	937.20	865.3o	71.90	496.40	14.50%
5/13/2009		366.20	937.20 977.60	902.60	75.0o	536.40	14.00%
5/13/2009	for nuke gauge - 1' cut @ 10% SG			573.4o	59.8o		12.90%
5/13/2009	for nuke gauge - 1' cut @ 10% 6"	110.80	633.20			462.60	
5/13/2009	for nuke gauge - 1' cut @ 10% 12"	137.50	721.70	642.70	79.00	505.20	15.60%
5/13/2009	for nuke gauge - sand pile @ 5% SG	138.20	546.80	510.2o	36.60	372.00	9.80%
5/13/2009	for nuke gauge - sand pile @ 5% 6"	138.40	542.70	512.70	30.00	374.30	8.00%
5/13/2009	for nuke gauge - sand pile @ 5% 12"	137.3o	431.60	410.20	21.40	272.90	7.80%
5/13/2009	sand pile @ 5%	367.90	819.20	778.3o	40.90	410.40	10.00%
E/44/2000	for nuke gauge - upper court @ 10% SG	136.60	538.0o	491.40	46.60	354.80	13.10%
5/14/2009	for nuke gauge - upper court @ 10% 6"	137.10	478.40	435.80	42.60	298.70	14.30%
5/14/2009	for nuke gauge - upper court @ 10% 0	137.10	500.00	453.60 452.60	47.40	313.90	15.10%
5/14/2009		138.50	579.90	519.50	60.40	381.00	15.10%
5/14/2009	for nuke gauge - upper court @ 15% SG						14.30%
5/14/2009	for nuke gauge - upper court @ 15% 6"	138.10	479.30	436.70	42.60	298.60	
5/14/2009	for nuke gauge - upper court @ 15% 12"	138.0o	585.7o	518.7o	67.00	380.70	17.60%
	00:-::	110.70	600.00	F00.1a	20.90	100.10	6.00%
5/20/2009	for nuke gauge - area A2 insitu test #1	110.70	628.80	599.10	29.80	488.40	0.00%
5/27/2009	for nuke gauge - area A3 insitu test #1	109.40	648.0o	636.90	11.10	527.50	2.10%
	for nuke gauge - area A3 insitu test #2	110.70	566.80	538.30	28.50	427.60	6.70%
5/27/2009	for nuke gauge - area A3 insitu test #3	137.20	567.40	549.8o	17.60	412.60	4.30%
5/27/2009	for nuke gauge - area A3 insitu test #4	136.70	641.80	625.60	16.20	488.90	3.30%
5/27/2009	for nuke gauge - area A3 insitu test #4	137.50	494.60	477.5o	17.1o	340.00	5.00%
5/27/2009	for nuke gauge - area A3 insitu test #6	137.30	529.1o	519.5o	9.60	381.30	2.50%
5/27/2009	101 Hake gauge - area A3 Irisita test #0	130.20	323.10	313.30	3.00	301.30	2.00.70
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							Testiti ist
							3 1. W. F
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A	Geosphere Con	ints, Inc.				AIL۱	/ FIELD	REPOR	T
	Geotechnical Engineering • Engine Environmental Management • Wat	eering Geology ter Resources	Report	# #P	5832	5	Date:	61109	
Project Nam	e: LLNL Site 300	B850 501 R	Projec	t Number:	LAW 1	257	Page _	of	
Field Rep:	Robert W	ibe	Projec	t Manager	: Cal	Dicke	EMMOR O	<u> </u>	
Scope of Work:	Mass Grading Pavement	Utility Trench	Other	Hour	s Charged:	☑ Full Time		Part Time	
Contractor:	Cerrudo		Condition		Sunny	□ Windy		Hot 🗹	Mild
Contractor R	epresentative: Avdy	Bell	Condition	"" .Ø.	Cloudy	Rain .		Cold 🔲	Fog
Equipment	Туре	**************************************		Vumber		☐ Nuclea	т Туре	e: 	
Compaction	Insitu				Density Testing Equipment	☐ Tube			
Moving						Sand C	one		
Water		en e		- 	Fill Source	✓ Native		egen og gregorienske	
Support				9-30-3332-0-332-		☐ Import			· · · · · · · · · · · · · · · · · · ·
Plan	Enginee	er		Date	Fill-Location:	1/ cu	t on	rea A	4
Civil				· · ·					
Geotech					1				
Curve#	Descr	iption		Max Densi	ityOpt. Moistu	re Required Cor	npaction	Required Moi	sture
050509-33	icit dk bis	a saudy (1	122	5 12.0	□ 90%		Opt. + 2%	
				•		□ 95%	1	Opt. + 2%	to 5%
				•		Othe	r: [Other:	
						Inst-	1-14_	Moitu	<u> </u>
		1	El	Wet Den	sity Moisture	Dry Density_		Percent	Pass/
Test #	Location		Elevation	(pcf)	Content	(pcf)	Curve #	Compaction	Fail
1	Adj. to test #6	W/Nuke 6/107	<u>59</u>	78.	2 1.8°	77.3	০১১১১৭	H 63	N/A
			•	<u> </u>					ļ
			:	5					
			<u> </u>						
			1.1						
Comment/ Sketch:	Test A	in the	dos		minist	and	1205	1 4-1	
	Test for # 6 with	Alution		,	11.1		1124	7031	
	A 6 WHY	Nate of	curge	راق ر	0/1/0	77			
1.1.1			5						
								1	سے در
NOTICE: Our firm's profess	sionals are represented on site soley to observe operations o	of the con-					erCa e		+
tractor identified, to form opin ions to our client. The presence from its obligation to meet con	nions about the adequacy of those operations, and to report the e and activities of our field representatives do not relieve any ontractural requirements. No one except our client may re	contractor solely as evidence to solely as evidence to or conclusions and/	cnat neid observati or recommendatio	on was perrorme ns conveyed in the	ary report is provided d. Observations and/ e final report may vary	This DFR is service. Any conclusion evaluated by the profe	ns drawn from th	il report is an instrumen his report should be disc	t of professiona cussed with an
operations, and sequences of	e contractor retains sole responsibility for site safety and the construction.	from and shall take	precedence over th	ose indicated in a	preliminary report.	· · · · · ·	· .		
Field Representat	tive:	Date: b	19	Reviewed B	Sy:	· ·	Da	nte:	-



DATE:	6/1	INSPECTO	or: Rober	t Wribe
PROJECT #:	1.#	th 1257 PROJECT	NAME: LLNL 5	ite 30) B-85) 5:
COMPACTION SF	PEC:	insita TEST LOC	ATION: 1 Cut an	an Ay
MOISTURE SPEC) :	insitu #B-583	005 aproast \$72	F
		CAND CONE	TECTINO	
		SAND CONE 1	ESTING	
	А	WT of cone, jar, sand - Before	6922.7	g
	В	WT of cone, jar, sand - After	3837.4	g
	С	WT of sand in cone	1580	ġ ····································
	D	WT of sand used	3085.3	g A-B
	Ε	WT of sand in hole	1505.3	g D-C
	F	Density of sand	89.6	pcf
	G	Volume of hole	.0370	cf E÷F
	Н	Gross WT of excavated soil + TARE		lbs
	1.	WT of TARE		Ibs
	j	Net WT of soil	1322.3/2.915	lbs H-I
	ĸ	WT Density	78.8	pcf J÷G
	L	Soil + TARE (Wet)	906.0	lbs
	М	TARE #2	1383	Ibs
	N	Soil + TARE (Dry)	891.8	lbs
	0	WT of Water	14.2	lbs L - N
•	Р	WT of Soil	753.5	lbs N - M
	Q	Moisture Content	1.9 %	% O÷P
		Optimum Moisture Content	12.0	- %
	R	Dry Density	77.3	pcf K ÷ (I + Q)
	S	Lab Maximum	122.5	pcf Dcy
		(Lab No. # 050509 -03		· !
	Т	Percent Compaction	63/	_ % R÷S
Weight = Vi Cubic Feet		Pounds = Ibs Grams = G	Pounds per Cubic Feet = pcf Conversion Grams ÷ 453.6 = lbs	

	Geosphere Con: Ints, Inc.				AIL۱	/ FIEL	D REPOR	Т .
	Geotechnical Engineering - Engineering Geology Environmental Management - Water Resources	Report	#: B	- 58300	5	Date:	5/2/09	
Project Name	e:U_NC 5He 300 B850 5011	R. Project	Number:		257	Page	of	
Field Rep:	Pubert Wilbe	Project	Manager:	Cod I	Dicker	wan.	· · · · · · · · · · · · · · · · · · ·	
Scope of Work:	Mass Grading Pavement Utility Trench	☐ .Other	Hours	Charged:	,☑ Full Time		Part Time	
Contractor:	Cerrudo			Sunny	□ Windy		Hot 🗹	Mild
Contractor Re		Conditio		Cloudy	Rain Rain		Cold 🔲	Fog
, Equipment 4	Туре	N.	lumber :		☐ Nuclea	г Тур	e:	
Compaction	Insitu			Density Testing Equipment	☐ Tube			
Moving					Sand C	one		
Water				STUCE TO STUCE	✓ Native			
Support				Fill Source	☐ Import			1
Plan	. Engineer		Date	Fill Location:	Area	IDV		· .
Civil					THEA	/T/X		
Structural			<u> </u>					
Geotech	Description		Max Densit	y Opt. Moistu	re Required Cor	mnaction	Required Moi	ictura
Cui VC T			HUA PENSIE		90%	SAME MAKES COM TO	Opt. + 2%	
7	() / ()		 	<u> </u>	□ 95%		Opt. + 2% Opt. + 2%	
					Othe		☐ Other:	3 10 3%
				,	NOV		PINCH PINCH	
·		•						
Test#	Location	Elevation	Wet Dens (pcf)	ity Moisture Content	Dry Density (pcf)	Curve#		Pass/ Fail
2 (132 22 24 24 24 24 24 24 24 24 24 24 24 24	Alea Ax. near Nuke #6	SG1	96.8	98-C2590 9000 9000 1045 91694-	93.7	NA	1944-1-1 (1971-1975-1975-1975-1975-1975-1975-1975-	NA
	PERSON LOS MAN POWER ALD	4 .) 0.5	10		3	10 17
		<u> </u>						,
		<u> </u>	1		4.			
						-		
								<u> </u>
		<u> </u>						
						<u> </u>		ļ .
								ļ
Comment/ Sketch:	insitu seodina	: 4 3	nlý	, NO C	TOWN OF OF	Lino	toati	W~
	insitu seading		. (, , , , ,	-		test	1
	undustanted &)⊖ ₁	n 5	pobe	near	Nul	re tes	+
	#6 on 6/2/09							
					SUM	14	77.5°F	_
tractor identified, to form opini	ionals are represented on site soley to observe operations of the conions about the adequacy of those operations, and to report those opin-	R is Prelimina	ry - A preliminar	y report is provided	This DFR is	f s Final - A fina	al report is an instrumen	t of professiona
ions to our client. The presence from its obligation to meet con findings and opinions. The	e and activities of our field representatives do not relieve any contractor solely as evidence or conclusions and/ contractor retains sole responsibility for site safety and the methods.	that field observatio	on was performed. s conveyed in the f	Observations and/ inal report may vary	service. Any conclusion evaluated by the profes	ins drawn from t	his report should be disc	cussed with an
operations, and sequences of c	OIDSTOCKUST.	/ 1		Vr		. 7		
Field Representat	tive: Date: 6/3	-129	Reviewed By			Da	ate:	



DATE:	62	99	INSPECTO	R;	Robert	Uribe
PROJECT #:	L.F	tw 1257	PROJECT	NAME:	LLNL SH	2301 B850) 50i
COMPACTION	SPEC:	None	TEST LOC	ATION:	Area Ax	
MOISTURE SPE	EC:	None				
		SAND	CONE T	ESTING		
				6822.	- 7	
	Α	WT of cone, jar, sand - Before				g ·
	В	WT of cone, jar, sand - After	-	4086.4		g
	С	WT of sand in cone		1580	····	ģ
	D	WT of sand used		2736.3		g A-B
· ·	E	WT of sand in hole	-	1156.3		g D-C
	F	Density of sand		89.6		pcf
	G	Volume of hole		,0	<u> 285 </u>	cf E÷F
•	Н	Gross WT of excavated soil +	TARE			lbs
	1	WT of TARE	•			lbs
	J	Net WT of soil		1251.4	/2.759	Ibs. H - I
	K	WT Density		96.8	· · · · · · · · · · · · · · · · · · ·	pcf J÷G
	L	Soil + TARE (Wet)	•	752.4		lbs
	M	TARE	#7	137.6		lbs
	N	Soil + TARE (Dry)	•	732.9		lbs
•	0	WT of Water		19.5		lbs L-N
	P	WT of Soil		595.3	4	lbs N-M
	Q	Moisture Content		3.3 /		% O÷P
•	•	Optimum Moisture Content		NA		%
•	R	Dry Density		93.	7	pcf K ÷ (I + Q)
	S	Lab Maximum		Ala		pcf
		(Lab No. No. No.)	• .		
	т	Percent Compaction		NA		% R÷S
Weight = Cubic Fe		Pounds = Ibs Grams	s = G	Pounds per Cubic Conversion Grams		

	Geosphere Contents, Inc.				AILY ر	FIELD	RĘPORT	
	Geotechnical Engineering - Engineering Geology Environmental Management - Water Resources	-Report	:#: R-	5830	55	Date:	43/09.	
Project Name	ELLINE Site 300 B850 Soil R	Projec	t Number: \		257	Page	of	
Field Rep:	Robert Uribe	Projec	t Manager:	Cal	Dicker	MGN		
Scope of Work:	Mass Grading' Pavement Utility Trench	Other,	Hours Cha	arged:	☑ Full Time	☐ Par	rt Time	
Contractor:	Cerrudo			iny Kathy	□ Windy	□ i	ы Ди	ild
Contractor Re	epresentative: Andy Bell	Condition		oudy .	Rain .		old 🗖 Fo	g
Equipment	Type		Number		☐ Nuclear	Туре:		
Compaction	Insitu			Density Testing - Equipment	☐ Tube			
Moving		:			Sand Co) né		
Water		-			☐ Native			
Support		1 4 4 7 5 4 TO 1		Fill Source	☐ Import			
Plan	Engineer		Date	Fill-Location:	Avea B			
Civil			<u> </u>			1		
Structural								
Geotech				0 - W			D	1000
Curve#	Description	M. 1400	Max Density	Opt. Moistu		Service Production	Required Moistu	ire
	AND THE PROPERTY OF THE PROPER				☐ 90%		- opu/-	
					☐ 95%		Opt. + 2% to	0 5%
					Other:	1	l Other: しかへい	
					, which		<u>oonie</u>	
Test #	Location	Elevation	Wet Density		Dry Density	Curve #	Percent	Pass/
		<u> </u>	(pcf)	Content	(pcf):		Compaction	Fail
	2'W of Nuke test #9	D91	76.3	7.3	76.5	- Water	* Anthroperate	
				-			-	
						· ·		-
								-
		· · · · · · · · · · · · · · · · · · ·						
		*						
		:						
			•					
-								· · ·
Comment/ Sketch:	. , , , , , , , , , , , , , , , , , , ,	. •		1			1	
	Insitu testin	5.0	f' ave	a B	, 2	wes:	t- 0F	
	Nuko Last +	<i>4</i> 9	2n L	/3/29	· · · · · · · · · · · · · · · · · · ·	Mo	·	
	Nuke test &	~~			ndistru	-h-	12.1	
	Conjust 1000	1 =91	incur	its, la	11061574	r ve ca	721/	
				Parth	Cloud	79	,5° F	
tractor identified, to form opin	sionals are represented on site soley to observe operations of the con- tions about the adequacy of those operations, and to report those opin-	is Prelimin	ary - A preliminary re	eport is provided	This DFR is	Final - A final r	eport is an instrument of	f professiona
from its obligation to meet cor	ntractural requirements. No one except our client may rely on our or conclusions and/o e contractor retains sole responsibility for site safety and the methods?	r recommendatio	tion was performed. O ons conveyed in the fina hose indicated in a prel	l report may vary	service. Any conclusions evaluated by the professi		report snould be discuss	sea with and
-panning one sequences of								
Field Representat	tive. Date: 5/	3/29	Reviewed By: _			Date	2:	·



DATE:	1/3	/09 INSPECT	OR: Rober	+ Urbe
PROJECT #:	1 P	W 1257 PROJECT	TNAME: LLNL 5	ite 300 B850 50
COMPACTION SPE	EC:	None TEST LO	CATION: Area E	3, 2 west o
MOISTURE SPEC:		None Nuke to	ext # 9 on 6/3/09 Part	ly Chudy 79.5
		SAND CONE	TESTING	,
	A	WT of cone, jar, sand - Before	6724.1	
	. ′ В	WT of cone, jar, sand - After	3844.0	- _ 9.
	С	WT of sand in cone	1580	g
	D.	WT of sand used	2880.1	g A-B
	E	WT of sand in hole	1300.1	g D-C
	F	Density of sand	89.6	_ pcf
	G	Volume of hole	0.0320	cf E÷F
	H	Gross WT of excavated soil + TARE		_ lbs
	1 .	WT of TARE		lbs
	.J .	Net WT of soil	1136.6/2,506	lbs H - I
	K	WT Density	78.3	pcf J÷G
	L	Soil + TARE (Wet)	991.3	lbs
	М	TARE #7	138.0	lbs
	N	Soil + TARE (Dry)	971.8	Ibs
	0	WT of Water	19.5	lbs L-N
	Р	WT of Soil	833.8	lbs N - M
	Q	Moisture Content	2.3/	% O÷P
		Optimum Moisture Content	N/A	. %
	R	Dry Density	76.5	_ pcf K ÷ (I + Q)
	s	Lab Maximum	N/A	_ pcf
		(Lab No. No. No.		•
	т	Percent Compaction	N/A	% R÷S
Weight = W7 Cubic Feet =		Pounds = lbs Grams = G	Pounds per Cubic Feet = pcf Conversion Grams ÷ 453.6 = lbs	i.

	AN ETS COMPANY				AILYد	FIELD I	REPORT	•
	Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	Report-	#- B	-583a	5	Date:	6/4/09	
Project Nam	e:LLNL Site 31) 8850 Soil R.	Project	Number:	LAW	1257	Page	of	
Field Rep:	Robert Unibe	Project	Manager:	Cal	Dickery	van		
Scope of Work:	☑ Mass Grading ☐ Pavement ☐ Utility Trench	Other	Hours (Charged:	☑ Full Time	☐ Part	Time	
Contractor:	Cerrudo		Øs	unny.	□ Windy	🔲 🗖 н	ot 🛮 🗹 N	Aild
Contractor R	epresentative: Avdy Bell	Condition		Cloudy	☐ Rain	. □ c	old 🗖 F	og
Equipment	Type Type	N _L	ımber		☐ Nuclear	Туре:	3	- And the second second
Compaction	Insitu			Density Testing Equipment	☐ Tube	~~~		
Moving					Sand Cor	ne)		• .
Water			:	Fill Source	Native D	· · · · · · · · · · · · · · · · · · ·		
Support		-67-4-11 NACES 110 SA			☐ Import			
Plan	Engineer	and Parisbut 1	Date	-Fill-Location:	Avea	Ai		
Civil						· · ·		
Structural Geotech			······································					
Curve#	Description		Max Density	v Opt. Moistu	re Required Comp	action	Required Moist	ture
					□ 90%		Opt. + 2%	200
					D 95%		Opt. + 2%	
		,			Other:		Other:	:
			*		None		None	
								-
Test#	Location	Elevation	Wet Densi (pcf)	ty Moisture Content	Dry Density (pcf)	Curve#	Percent Compaction	Pass/ Fail
Manager Constitution of Constitution (Co.)	ZOE and ION of Nuke test #1	SGI	123.	3 1.7	121.2		J	
	70.75	 						
		•				,		
								· .
								
		<u> </u>	:					· · ·
		 ,						
		* *						
Comment/ Sketch:	./.	I^{-}		1:/	1. 1	/		1
	INSITU TES	رت آج م	F 41	nct15th	ibe of t	Dor!	adjac	ient
	to excavated area i	· 44	E ()	gard c	one tee	et we	is nea	:√
- N	Insitu tes to excavated area is take test #1 on 5/	18/09	, no	compe	iction s	equit	enient	5,
, if	ocky sandy soil				:	V	-	,
	· · · · · · · · · · · · · · · · · · ·				SUNNY	, 7	1ºF	
tractor identified, to form opin ions to our client. The presence	sionals are represented on site soley to observe operations of the con- nions about the adequacy of those operations, and to report those opin- re and activities of our field representatives do not relieve any contractor	is Preliminary	y – A preliminary was performed	report is provided Observations and/	_ /	inal - A final rep	ort is an instrument o	of professional
from its obligation to meet co	ntractural requirements. No one except our client may rely on our or conclusions and/or e contractor retains sole responsibility for site safety and the methods,	recommendations	conveyed in the fir	nal report may vary	evaluated by the professio	nal involved.	susua de distu:	man and
	11/1/11/11	/_		•				
Field Representa	tive Date: 5/4	<u> </u>	Reviewed By:	·		Date:	-	



DATE:	6/4	(O)	SPECTOR:		Ruber	+ Uribe	
PROJECT#:	(A)	N 1257 PR	OJECT NAM	ME:	LUNLSite	2300 B850 5	ا ن
COMPACTION SP	EC:		ST LOCATIO	ON:	Area 1	4, 20 east	<u>G</u>
MOISTURE SPEC		none w	North of	Nuke to	est #1 ov	5/18/09	
		OAND CO	ONE TES	TINO			
•		SAND CO	JNE IES	TING			
	Α	WT of cone, jar, sand - Before		4806.4	1	g	
•	В	WT of cone, jar, sand - After		4314.1		g .	
•	С	WT of sand in cone	,	1580		g	• .
	D	WT of sand used	****	2492.3		g A-B	
	E	WT of sand in hole		912.3		g D-C	
	F	Density of sand		89.6		pcf	
	G	Volume of hole		<u> </u>	2224	cf E÷F	
		O MET Committed at Last Last Last		· .		lbs	
	· H	Gross WT of excavated soil + TAI				lbs	
	1	WT of TARE		12.53	2/2,763		
	J	Net WT of soil		1200	<u> </u>	103 11-1	
	K	WT Density		123.3	· ·	pcf J÷G	
	L	Soil + TARE (Wet)	ــــــــــــــــــــــــــــــــــــــ	1392.0)	lbs	
•	M		F13	138.8		lbs	
•	N	Soil + TARE (Dry)		1371.3	>	lbs	
·	0	WT of Water		20.7		lbs L-N	
	Р	WT of Soil		1232.	5	lbs N - M	
	Q	Moisture Content		1.7%	,	% O÷P	
		Optimum Moisture Content		N/F	4	%	
	R	Dry Density		121.2		pcf K ÷ (I + Q)	
·	S	Lab Maximum		N/A		pcf	
	3	(Lab No. N/A	. ,			· •	
		(Lab No	/			•	
	Т	Percent Compaction		N/A		% R÷S	
Weight = W Cubic Feet		Pounds = lbs Grams =		ounds per Cubi onversion Gran	c Feet = pcf ns ÷ 453.6 = lbs		

CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation B-583005

Sample Date time molded	Sample 4" diam.	Break Date time	Sample Location/ %cement	unit wt. wet	Max Load (Ibs)	Test Strength (psi)	moist. C.
5/12/2009 2pm	#1a	5/15/2009 1pm	sand pile 10%	144.70	548	40	7.80%
5/12/2009 2pm	#1b	5/19/09 12pm	sand pile 10%	144.70	829	70	7.80%
5/12/2009 2pm	#1c	5/26/09 8am	sand pile 10%	144.70	814	60	7.80%
5/12/2009 2pm	#1d	6/9/09 8am	sand pile 10%	144.70	1407	110	7.80%
5/12/2000 Zpiii	7.0						
5/13/09 9:30am	#2a	5/16/09 7:30am	sand pile 5%	134.10	2048	160	10.00%
5/13/09 9:30am	#2b	5/20/09 8am	sand pile 5%	134.10	3659	290	10.00%
5/13/09 9:30am	#2c	6/10/2009 8am	sand pile 5%	134.10	3717	290	10.00%
5/13/09 10:30am	#3a	5/16/09 8am	1' cut 5%	126.90	3980	320	14.10%
5/13/09 10:30am	#3b	5/20/09 8:30am	1' cut 5%	126.90	5104	410*	14.10%
5/13/09 10:30am	#3c	6/10/09 8:30am	1' cut 5%	126.90	4976	390	14.10%
5/13/09 11am	#4a	5/16/09 8:15am	1' cut 10%	125.50	3915	310	14.00%
5/13/09 11am	#4b	5/20/09 9am	1' cut 10%	125.50	5104	410*	14.00%
5/13/09 11am	#4c	6/10/09 9am	1' cut 10%	125.50	5104	410*	14.00%
5/14/09 12pm	#5a	5/18/09 8am	upper yard 10%	124.10	5160	410	13.10%
5/14/09 12pm	#5b	5/21/09 8am	upper yard 10%	124.10	5104	410*	13.10%
5/14/09 12pm	#5c	6/11/09 8am	upper yard 10%	124.10	5104	410*	13.10%
5/14/09 1pm	#6a	5/18/09 8:30am	upper yard 15%	123.30	4892	390	15.90%
5/14/09 1pm	#6b	5/21/09 8:30am	upper yard 15%	123.30	5104	410*	15.90%
5/14/09 1pm	#6c	6/11/09 9am	upper yard 15%	123.30	5104	410*	15.90%
			Cement mixed by hand	,			
5/18/09 12:30pm	#7a	5/21/09 9am	upper yard 10%	124.10	5104	410*	12.50%
5/18/09 12:30pm	#7b	5/26/09 8:30am	upper yard 10%	124.10	5104	410*	12.50%
5/18/09 12:30pm	#7c		upper yard 10%	124.10			12.50%
5/18/09 2:30pm	#8a	5/21/09 9:30am	sand pile 5%	134.10	1179	90	5.10%
5/18/09 2:30pm	#8b	5/26/09 9am	sand pile 5%	134.10	1430	110	5.10%
5/18/09 2:30pm	#8c		sand pile 5%	134.10			5.10%
5/18/09 1:30pm	#9a	5/21/09 10am	1' cut 5%	125.50	3300	260	10.70%
5/18/09 1:30pm	#9b	5/26/09 9:15am	1' cut 5%	125.50	4605	370	10.70%
5/18/09 1:30pm	#9c		1' cut 5%	125.50			10.70%
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						<u> </u>	<u> </u>

تتقير	
Geosphere Con.	ants Inc.
AN ETS COMP	
Geotechnical Engineering • Eng	neering Geology ater Resources

JAILY FIELD REPORT

	Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	Report #	:			Date: /	Sizalo	1
Project Name		Project N	lumber: (_	AW.	12.57	Page	of _	
Field Rep:	Robert Uhile	Project A	Nanager: 🧹	al I	DICKOUM	<u> </u>		
Scope of Work:	Mass Grading Pavement Utility Trench	Other	Hours Charg	ged:	☑ Full Time	☐ Par		ora serve se superior
Contractor:	Cerrudo	Condition	Sunn	y	□ Windy	. ' '	lot 🔲	Mild
Contractor Re	epresentative: Andy Bell	Continuo	Clou	dy	Rain .	_ □ c	old 🎖 🔲 -	Fog
Equipment (Туре	Nu	mber		☐ Nuclear	Туре:		:
Compaction	insitu		.De	nsity Testing Equipment	☐ Tube			:
Moving					✓ Sand Co	one		
Water				Fill Source	✓ Native	Jn 51.	he	
Support	Contains the action of the Contains of the Con	***			☐ Import			
Plan Civil	Engineer	i i i i i i i i i i i i i i i i i i i	ate Fill	Location:	trea 1	4x -	2	
Structural				di +	trea d to Nuke	Lar	1 #1	
Geotech		Carrie of second			- IVELE		. // 1	12 m 32 m 32 m 12 m 17
Curve#	Description		Max Density	Opt. Moistu	e Required Com	paction	Required Mo	isture
				* Transaction	□ 90%		Opt. + 2%	6
					95%	· □	Opt. + 29	6 to 5%
				1 4	Other:		Other:	
			: .		None		Novie	
Test#	Location	Elevation	Wet Density (pcf)	Moisture Content	Dry Density (pcf)	Curve #	Percent Compaction	. Pass/ Fail
	adj. to Nuls test #1 4/29/29 -	2		6.3	77,3		N/A	A K
3	The state of the s			0.0			,,,,,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
			<u></u>				1 1	
		er t	 					
		· · · · · · · · · · · · · · · · · · ·						
						· · · · · ·		-
		· ·						
								1
		,					<u> </u>	
Comment/ Sketch:	Insitu sand cone ub grade was subexed		الم	Λ	~ ~	, <u>j</u>	-011	
ية.	de la contraction de la contra	i ive	WE ESC	FTX	Q -L	120 04	epin	<i>t</i>
5	hy made was subexec	d app	NOK 2	e an	d exp	osed	40	
elew	ients for over a we	eret_						
NOTICE: Our firm's profess	cionals are represented on site soley to observe operations of the con-							
tractor identified, to form opin ions to our client. The presence from its obligation to meet cor	ions about the adequacy of those operations, and to report those opin- e and activities of our field representatives do not relieve any contractor ntractural requirements. No one except our dient may rely on our	t field observation		rvations and/	This DFR is service. Any conclusion evaluated by the profess	s drawn from this	eport is an instrumer report should be dis	nt of professiona scussed with an
findings and opinions. The operations, and sequences of o	e contractor retains sole responsibility for site safety and the methods, 🥒 from and shall take pre				, ,			
		- / I						
Field Representat	tive: 5/2	9,091	Reviewed By:			Date	•	

COMPACTION TEST

Test Procedure ASTM D 1557-91

Project Name: LLNL Site 300 B850 Screen Project No.: LAW 1257 Location: area Ax Sample No.: 061709-01 Visual Sample Description: Redo	oil Remediation	CL w/ agg	Tested By : Calculated By : Checked By : Depth (ft) :	R. Uribe R. Uribe	•	06/17/09 06/17/09
876>3/8" ToT=18098 MOLD VOLUME (CU.FT)	0.033333		Compaction Met		X ASTM D ASTM D X Moist Dry	
Trail No.	1 1	2	3	4	5	6
Wt. Comp. Soil + Mold (gm.)	6438.6	6598.8	6603.3	6569.9		
Wt. of Mold (gm.)	4596.4	4596.4	4596.4	4596.4		
Net Wt. of Soil (gm.)	1842.2	2002.4	2006.9	1973.5		
Container No.						
Wt. of Container (gm.)	138.4	109.6	137.5	138.6		
Wet Wt. of Soil + Cont. (gm.)	473.6	457.6	481.4	333.1		
Dry Wt. of Soil + Cont. (gm.)	444.6	415.5	434.3	302.2		
Moisture Content (%)	9.47	13.76	15.87	18.89		
Wet Density (pcf)	121.84	132.44	132.73	130.52		
Dry Density (pcf)	111.30	116.41	114.55	109.79		
Maximum Dry Density (p Assumed Specific Gravity = 2.65 PROCEDURE USED	·	126.0	Optimum Mo	isture Conten	t (%)	11.0
Procedure A Soil Passing No. 4 (4.75 mm) Sieve Mold: 4-in. (101.6 mm) diameter Layers: 5 (Five) Blows per layer: 25 (twenty-five) May be used if No.4 retained < 20% Procedure B Soil Passing 3/8-in. (9.5 mm) Sieve Mold: 4-in. (101.6 mm) diameter Layers: 5 (Five) Blows per layer: 25 (twenty-five) Use if + No.4 > 20% and - 3/8-in. < 20% Procedure C Soil Passing 3/4-in. (19.0 mm) Sieve Mold: 6-in. (152.4 mm) diameter Layers: 5 (Five) Blows per layer: 56 (fifty-six) Use if + 3/8-in. > 20% and + 3/4-in. < 30%					G = 2.5	

COMPACTION TEST

Test Procedure ASTM D 1557-91

	•	Calculated By : Checked By : Depth (ft) :		-	06/29/09 06/29/09
0.033333		•	,		91557-91 9698 field
1	2	3	4	5	6
6433	6528.3	6539	6507.2		
4596.4	4596.4	4596.4	4596.4		
1836.6	1931.9		1910.8		
139	138.8	138.5	110.7		
582.2	606.9	-566.3	457.5		
522.1	538	495.8	394.2	·	
15.69	17.26	19.73	22.33		
121.47	127.77	128.48	126.38		
105.00	108.97	107.31	103.31		
		Optimum Mo	isture Conter	nt (%)	11.5
- 125 % 115				Gs = 2.6	
	1 6433 4596.4 1836.6 139 582.2 522.1 15.69 121.47 105.00 pcf) 135	0.033333 1	Checked By: Depth (ft): 1	Checked By: Depth (ft): Compaction Method Preparation Method Preparation Method 1 2 3 4 6433 6528.3 6539 6507.2 4596.4 4596.4 4596.4 4596.4 1836.6 1931.9 1942.6 1910.8 139 138.8 138.5 110.7 582.2 606.9 566.3 457.5 522.1 538 495.8 394.2 15.69 17.26 19.73 22.33 121.47 127.77 128.48 126.38 105.00 108.97 107.31 103.31 pcf) 126.0 Optimum Moisture Contel 135	Checked By: Depth (ft): Compaction Method X ASTM D ASTM D ASTM D Dry

COMPACTION TEST

Test Procedure ASTM D 1557-91

Project Name: LLNL Site 300 B850 So Project No. : LAW 1257 Location: Stock pile@ Ax Sample No. : 063009-01 Visual Sample Description: Redo 876>3/8" ToT=18098 MOLD VOLUME (CU.FT)	dish Brn sandy	CL w/ agg	Tested By: Calculated By: Checked By: Depth (ft): Compaction Met	thod	Date:)1557-91
Trail No.	1	2 .	3	4	5	6
Wt. Comp. Soil + Mold (gm.)	6433.1	6509	6557.8	6559		
Wt. of Mold (gm.)	4596.4	4596.4	4596.4	4596.4		
Net Wt. of Soil (gm.)	1836.7	1912.6	1961.4	1962.6		
Container No.						
Wt. of Container (gm.)	. 110.8	138.2	138.2	139.3	·	
Wet Wt. of Soil + Cont. (gm.)	395.6	397.1	410.1	480		
Dry Wt. of Soil + Cont. (gm.)	365.8	365.7	371.4	426.3		
Moisture Content (%)	11.69	13.80	16.60	. 18.71		
Wet Density (pcf)	121.48	126.50	129.72	129.80		
Dry Density (pcf)	108.77	111.15	111.26	109.34		
Assumed Specific Gravity = 2.65 PROCEDURE USED Procedure A Soil Passing No. 4 (4.75 mm) Sieve Mold: 4-in. (101.6 mm) diameter Layers: 5 (Five) Blows per layer: 25 (twenty-five) May be used if No.4 retained < 20% Procedure B Soil Passing 3/8-in. (9.5 mm) Sieve Mold: 4-in. (101.6 mm) diameter Layers: 5 (Five) Blows per layer: 25 (twenty-five) Use if + No.4 > 20% and - 3/8-in. < 20% Procedure C Soil Passing 3/4-in. (19.0 mm) Sieve Mold: 6-in. (152.4 mm) diameter Layers: 5 (Five) Blows per layer: 56 (fifty-six) Use if + 3/8-in. > 20% and + 3/4-in. < 30%	135 125		Optimum Mo	isture Conter	nt (%)	15.5



	į	LABURAI		0 1 1	1 .
DATE:	6 29	INSPEC	CTOR:	Kuhert	· Wibe
PROJECT #:	1-#	(N) 1257 PROJE	CT NAME:	LLUL Sit	<u>e30 3850 3.</u>
COMPACTION SP	EC:	NA TEST L	LOCATION:	Ax -2	ady, to Nuk
MOISTURE SPEC:	: _	N A	1 on 6/29/09		
		SAND CON	E TESTING		
	А	WT of cone, jar, sand - Before	6733.8		g
	В	WT of cone, jar, sand - After	3799,1		g
	С	WT of sand in cone	1580		g
	D	WT of sand used	2934.7		g A-B
	E	WT of sand in hole	13547		g D-C
	F	Density of sand	89.6	· · · · · · · · · · · · · · · · · · ·	pcf
	G	Volume of hole	15.1 / .0	333	cf E÷F
	H	Gross WT of excavated soil + TARE			lbs
	7 7	WT of TARE			lbs
Nuke	J	Net WT of soil	1245.6	12.746	lbs H-I
1017/11.2	κ	WT Density	82.5		pcf J÷G
the second second second	L L	Soil + TARE (Wet) #5	1380.4		lbs
	Μ	TARE	136.5		lbs
,	Ν	Soil + TARE (Dry)	1307.1		lbs
	0	WT of Water	73.3		lbs L-N
	Р	WT of Soil	1170.6		lbs N-M
	Q	Moisture Content	6.3		% O÷P
		Optimum Moisture Content	NA		%
	R	Dry Density			pcf K ÷ (I + Q)
	S	Lab Maximum	N/A_		pcf
		(Lab No. N/A)		
	Т	Percent Compaction	N/A		% R÷S
Weight = W Cubic Feet		Pounds = lbs Grams = G	Pounds per Cubic Conversion Gram		

CONSOLIDATED ENGINEERING LABORATORIES

Date	Location	Tare	Wet soil + tare	Dry soil + tare	Wt. of water	Wt. of soil	Moisture Content
5/11/2009	hand mix sand pile pad	139.00	715.00	693.00	22.0o	554.0o	4.00%
5/11/2009	hand mix upper court yard pad	110.40	406.10	373.0o	33.1o	262.6o	12.60%
5/11/2009	hand mix 1' cut pad	137.00	708.0o	653.00	55.0o	516.0o	10.70%
							gris .
5/12/2009	for nuke gauge - sand pile @ 10% SG	138.40	804.50	756.40	48.1o	618.0o	7.80%
5/12/2009	for nuke gauge - sand pile @ 10% 6"	137.1o	633.10	599.2o	33.90	462.10	7.30%
5/12/2009	for nuke gauge - sand pile @ 10% 12"	110.60	839.10	785.9o	53.20	675.3o	7.90%
							Jan Bart
5/13/2009	for nuke gauge - 1' cut @ 5% SG	367.40	913.60	846.20	67.40	478.8o	14.10%
5/13/2009	for nuke gauge - 1' cut @ 5% 6"	365.10	890.20	823.3o	66.90	458.20	14.60%
5/13/2009	for nuke gauge - 1' cut @ 5% 12"	368.90	937.20	865.3o	71.90	496.40	14.50%
5/13/2009	for nuke gauge - 1' cut @ 10% SG	366.2o	977.60	902.60	75.0o	536.40	14.00%
5/13/2009	for nuke gauge - 1' cut @ 10% 6"	110.80	633.20	573.4o	59.80	462.60	12.90%
5/13/2009	for nuke gauge - 1' cut @ 10% 12"	137.50	721.7o	642.7o	79.0o	505.20	15.60%
5/13/2009	for nuke gauge - sand pile @ 5% SG	138.20	546.80	510.2o	36.60	372.0o	9.80%
5/13/2009	for nuke gauge - sand pile @ 5% 6"	138.40	542.70	512.7o	30.0o	374.30	8.00%
5/13/2009	for nuke gauge - sand pile @ 5% 12"	137.3o	431.60	410.2o	21.40	272.9o	7.80%
5/13/2009	sand pile @ 5%	367.9o	819.20	778.30	40.9o	410.40	10.00%
							A TANK DANK #
5/14/2009	for nuke gauge - upper court @ 10% SG	136.60	538.00	491.40	46.60	354.80	13.10%
5/14/2009	for nuke gauge - upper court @ 10% 6"	137.1o	478.40	435.8o	42.60	298.70	14.30%
5/14/2009	for nuke gauge - upper court @ 10% 12"	138.7o	500.00	452.60	47.40	313.90	15.10%
5/14/2009	for nuke gauge - upper court @ 15% SG	138.50	579.90	519.50	60.40	381.00	15.90%
5/14/2009	for nuke gauge - upper court @ 15% 6"	138.1o	479.30	436.7o	42.60	298.60	14.30%
5/14/2009	for nuke gauge - upper court @ 15% 12"	138.0o	585.7o	518.7o	67.0o	380.70	17.60%
5/20/2009	for nuke gauge - area A2 insitu test #1	110.7o	628.80	599.1o	29.80	488.40	6.00%
					,		
5/27/2009	for nuke gauge - area A3 insitu test #1	109.40	648.00	636.90	11.10	527.50	2.10%
5/27/2009	for nuke gauge - area A3 insitu test #2	110.7o	566.80	538.30	28.50	427.60	6.70%
5/27/2009	for nuke gauge - area A3 insitu test #3	137.20	567.40	549.80	17.60	412.60	4.30%
5/27/2009	for nuke gauge - area A3 insitu test #4	136.70	641.80	625.60	16.20	488.90	3.30%
5/27/2009	for nuke gauge - area A3 insitu test #5	137.50	494.60	477.50	17.10	340.00	5.00%
5/27/2009	for nuke gauge - area A3 insitu test #6	138.20	529.10	519.5o	9.60	381.30	2.50%
6/1/2009	for nuke gauge - area A4 insitu test #1	136.70	645.70	613.50	32.20	476.80	6.80%
6/1/2009	for nuke gauge - area A4 insitu test #2	109.30	614.10	602.10	12.00	492.80	2.40%
6/1/2009	for nuke gauge - area A4 insitu test #3	138.10	676.30	657.60	18.70	519.50	3.60%
6/1/2009	for nuke gauge - area A4 insitu test #4	139.00	872.40	854.60	17.80	715.60	2.50%
	/			<u> </u>			
6/2/2009	for nuke gauge - area Ax insitu test #1	138.7o	567.10	534.40	32.70	395.70	8.30%
6/2/2009	for nuke gauge - area Ax insitu test #3	109.10	663.30	582.50	80.80	473.40	17.10%
6/2/2009	for nuke gauge - area Ax insitu test #5	137.10	713.00	697.1o	15.90	560.00	2.80%
6/2/2009	for nuke gauge - area Ax insitu test #7	136.40	822.90	805.60	17.30	669.20	2.60%
6/2/2009	for nuke gauge - area Ax insitu test #9	138.20	762.80	707.00	55.8	568.80	9.80%
6/2/2009	for nuke gauge - area Ax insitu test #11	137.50	610.60	600.60	10.00	463.10	2.20%
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CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation B-583005

Date Location Moisture content Moisture content Points Difference with oven burn-out with nuke gauge with nuke gauge

		With Oven burn-out		33
5/11/2009	hand mix sand pile pad	4.00%	5.30%	1.30
5/11/2009	hand mix upper court yard pad	12.60%	18.00%	5.40
5/11/2009	hand mix 1' cut pad	10.70%	9.50%	-1.20
5/12/2009	for nuke gauge - sand pile @ 10% SG	7.80%	8.80%	1.00
5/12/2009	for nuke gauge - sand pile @ 10% 6"	7.30%	13.30%	6.00
5/12/2009	for nuke gauge - sand pile @ 10% 12"	7.90%	21.60%	13.70
0				
5/13/2009	for nuke gauge - 1' cut @ 5% SG	14.10%	16.40%	2.30
5/13/2009	for nuke gauge - 1' cut @ 5% 6"	14.60%	18.60%	4.00
5/13/2009	for nuke gauge - 1' cut @ 5% 12"	14.50%	17.80%	3.30
5/13/2009	for nuke gauge - 1' cut @ 10% SG	14.00%	16.10%	2.10
5/13/2009	for nuke gauge - 1' cut @ 10% 6"	12.90%	16.20%	3.30
5/13/2009	for nuke gauge - 1' cut @ 10% 12"	15.60%	19.80%	4.20
5/13/2009	for nuke gauge - sand pile @ 5% SG	9.80%	10.10%	0.30
5/13/2009	for nuke gauge - sand pile @ 5% 6"	8.00%	11.60%	3.60
5/13/2009	for nuke gauge - sand pile @ 5% 12"	7.80%	11.10%	3.3
5/14/2009	for nuke gauge - upper court @ 10% SG	13.10%	14.10%	1.00
5/14/2009	for nuke gauge - upper court @ 10% 6"	14.30%	17.10%	2.8
5/14/2009	for nuke gauge - upper court @ 10% 12"	15.10%	15.50%	0.40
5/14/2009	for nuke gauge - upper court @ 15% SG	15.90%	17.30%	1.40
5/14/2009	for nuke gauge - upper court @ 15% 6"	14.30%	18.90%	4.60
5/14/2009	for nuke gauge - upper court @ 15% 12"	17.60%	19.40%	1.8
5/20/2009	for nuke gauge - area A2 insitu test #1	6.00%	7.60%	1.60
5/27/2009	for nuke gauge - area A3 insitu test #1	2.10%	6.90%	4.8
5/27/2009	for nuke gauge - area A3 insitu test #2	6.70%	12.10%	5.40
5/27/2009	for nuke gauge - area A3 insitu test #3	4.30%	5.70%	1.40
5/27/2009	for nuke gauge - area A3 insitu test #4	3.30%	6.50%	3.20
5/27/2009	for nuke gauge - area A3 insitu test #5	5.00%	10.10%	5.1
5/27/2009	for nuke gauge - area A3 insitu test #6	2.50%	6.00%	3.50
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6/1/2009	for nuke gauge - area A4 insitu test #1	6.80%	9.60%	2.80
6/1/2009	for nuke gauge - area A4 insitu test #2	2.40%	5.50%	3.10
6/1/2009	for nuke gauge - area A4 insitu test #3	3.60%	4.90%	1.30
6/1/2009	for nuke gauge - area A4 insitu test #4	2.50%	10.00%	7.5
6/2/2009	for nuke gauge - area Ax insitu test #1	8.30%	11.50%	3.20
6/2/2009	for nuke gauge - area Ax insitu test #3	17.10%	19.00%	1.90
6/2/2009	for nuke gauge - area Ax insitu test #5	2.80%	5.40%	2.6
6/2/2009	for nuke gauge - area Ax insitu test #7	2.60%	7.80%	5.20
6/2/2009	for nuke gauge - area Ax insitu test #9	9.80%	10.10%	0.30
6/2/2009	for nuke gauge - area Ax insitu test #11	2.20%	3.00%	0.80
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CONSOLIDATED ENGINEERING LLNL Site 300 B-850 Soil Remediation **LABORATORIES**

Date	Location	Tare	Wet soil + tare	Dry soil + tare	Wt. of water	Wt. of soil	Moisture Content
6/3/2009	for nuke gauge - area B1 insitu test #1	368.60	1250.60	1238.10	12.50	869.50	1.40%
6/3/2009	for nuke gauge - area B1 insitu test #2	366.20	1283.7o	1277.70	6.00	911.50	0.70%
6/3/2009	for nuke gauge - area B1 insitu test #3	365.7o	1006.7o	998.20	8.50	630.30	1.30%
6/3/2009	for nuke gauge - area B1 insitu test #4	367.90	1266.70	1241.90	24.80	874.0o	2.80%
6/3/2009	for nuke gauge - area B1 insitu test #5	367.20	888.80	877.9o	10.90	510.70	2.10%
6/3/2009	for nuke gauge - area B1 insitu test #6	138.70	743.40	723.50	19.90	584.80	3.40%
6/3/2009	for nuke gauge - area B1 insitu test #7	110.8o	661.1o	654.50	6.60	543.7o	1.20%
6/3/2009	for nuke gauge - area B1 insitu test #8	137.2o	594.60	577.6o	17.0o	440.40	3.90%
6/3/2009	for nuke gauge - area B1 insitu test #9	138.40	633.30	624.90	8.40	486.50	1.70%
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Difference of moisture content with oven and nuke gauge

CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation B-583005

Moisture content Moisture content Points Difference Location Date with oven burn-out with nuke gauge with nuke gauge 1.40% 4.50% 3.10 6/3/2009 for nuke gauge - area B1 insitu test #1 0.70% 2.50% 1.80 6/3/2009 for nuke gauge - area B1 insitu test #2 for nuke gauge - area B1 insitu test #3 1.30% 3.40% 2.10 6/3/2009 2.80% 4.80% 2.00 for nuke gauge - area B1 insitu test #4 6/3/2009 2.10% 5.60% 3.50 6/3/2009 for nuke gauge - area B1 insitu test #5 for nuke gauge - area B1 insitu test #6 3.40% 6.10% 2.70 6/3/2009 1.20% 4.60% 3,40 6/3/2009 for nuke gauge - area B1 insitu test #7 3.90% 6.60% 2.70 6/3/2009 for nuke gauge - area B1 insitu test #8 1.70% 5.60% 3.90 for nuke gauge - area B1 insitu test #9 6/3/2009

CONSOLIDATED ENGINEERING LLNL Site 300 B-850 Soil Remediation LABORATORIES

Date	Location	Tare	Wet soil + tare	Dry soil + tare	Wt. of water	Wt. of soil	Moisture Content
6/3/2009	for nuke gauge - area B1 insitu test #1	368.60	1250.60	1238.10	12.50	869.50	1.40%
6/3/2009	for nuke gauge - area B1 insitu test #2	366.20	1283.7o	1277.7o	6.00	911.5o	0.70%
6/3/2009	for nuke gauge - area B1 insitu test #3	365.70	1006.7o	998.20	8.50	630.30	1.30%
6/3/2009	for nuke gauge - area B1 insitu test #4	367.90	1266.7o	1241.90	24.80	874.0o	2.80%
6/3/2009	for nuke gauge - area B1 insitu test #5	367.20	888.80	877.9o	10.90	510.70	2.10%
6/3/2009	for nuke gauge - area B1 insitu test #6	138.7o	743.40	723.50	19.90	584.80	3.40%
6/3/2009	for nuke gauge - area B1 insitu test #7	110.8o	661.1o	654.50	6.60	543.70	1.20%
6/3/2009	for nuke gauge - area B1 insitu test #8	137.2o	594.60	577.6o	17.0o	440.40	3.90%
6/3/2009	for nuke gauge - area B1 insitu test #9	138.40	633.30	624.90	8.40	486.5o	1.70%
6/29/2009	for nuke gauge - area Ax -2' insitu test #1	138.30	796.0o	746.9o	4 9.1o	608.60	8.10%
6/29/2009	for nuke gauge - area Ax -2' insitu test #2	110.9o	705.0o	635.70	69.30	524.80	13.20%
6/29/2009	for nuke gauge - area Ax -2' insitu test #3	109.40	477.30	453.40	23.90	344.0o	6.90%
6/29/2009	for nuke gauge - area Ax -2' insitu test #4	137.2o	816.60	790.7o	25.90	653.50	4.00%
6/29/2009	for nuke gauge - area Ax -2' insitu test #5	137.5o	659.60	607.0o	52.6	469.50	11.20%
6/29/2009	for nuke gauge - area Ax -2' insitu test #6	137.0o	731.8o	700.5o	31.3	563.50	5.60%
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Difference of moisture content with oven and nuke gauge

CONSOLIDATED ENGINEERING LLNL Site 300 B-850 Soil Remediation LABORATORIES

Date	Location		Moisture content with nuke gauge	
6/3/2009	for nuke gauge - area B1 insitu test #1	1.40%	4.50%	3.10
6/3/2009	for nuke gauge - area B1 insitu test #2	0.70%	2.50%	1.80
6/3/2009	for nuke gauge - area B1 insitu test #3	1.30%	3.40%	2.10
6/3/2009	for nuke gauge - area B1 insitu test #4	2.80%	4.80%	2.00
6/3/2009	for nuke gauge - area B1 insitu test #5	2.10%	5.60%	3.50
6/3/2009	for nuke gauge - area B1 insitu test #6	3.40%	6.10%	2.70
6/3/2009	for nuke gauge - area B1 insitu test #7	1.20%	4.60% .	3.40
6/3/2009	for nuke gauge - area B1 insitu test #8	3.90%	6.60%	2.70
6/3/2009	for nuke gauge - area B1 insitu test #9	1.70%	5.60%	3.90
6/29/2009	for nuke gauge - area Ax -2' insitu test #1	8.10%	11.20%	3.10
5/29/2009	for nuke gauge - area Ax -2' insitu test #2	13.20%	14.40%	1.20
6/29/2009	for nuke gauge - area Ax -2' insitu test #3	6.90%	10.60%	3.70
5/29/2009	for nuke gauge - area Ax -2' insitu test #4	4.00%	8.60%	4.60
6/29/2009	for nuke gauge - area Ax -2' insitu test #5	12.20%	12.90%	0.70
5/29/2009	for nuke gauge - area Ax -2' insitu test #6	5.60%	10.20%	4.6
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CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation B-583005

Sample Date time molded	Sample 4" diam.	Break Date time	Sample Location/ %cement	unit wt. wet	Max Load (lbs)	Test Strength (psi)	moist. C.
5/12/2009 2pm	#1a	5/15/2009 1pm	sand pile 10%	144.70	548	40	7.80%
5/12/2009 2pm	#1b	5/19/09 12pm	sand pile 10%	144.70	829	70	7.80%
5/12/2009 2pm	#1c	5/26/09 8am	sand pile 10%	144.70	814	60	7.80%
5/12/2009 2pm	#1d	6/9/09 8am	sand pile 10%	144.70	1407	110	7.80%
5/13/09 9:30am	#2a	5/16/09 7:30am	sand pile 5%	134.10	2048	160	10.00%
5/13/09 9:30am	#2b	5/20/09 8am	sand pile 5%	134.10	3659	290	10.00%
5/13/09 9:30am	#2c	6/10/2009 8am	sand pile 5%	134.10	3717	290	10.00%
				400.00			44.400/
5/13/09 10:30am	#3a	5/16/09 8am	1' cut 5%	126.90	3980	320	14.10%
5/13/09 10:30am	#3b	5/20/09 8:30am	1' cut 5%	126.90	5104	410*	14.10%
5/13/09 10:30am	#3c	6/10/09 8:30am	1' cut 5%	126.90	4976	390	14.10%
5/13/09 11am	#4a	5/16/09 8:15am	1' cut 10%	125.50	3915	310	14.00%
5/13/09 11am	#4a #4b	5/20/09 9am	1' cut 10%	125.50	5104	410*	14.00%
5/13/09 11am 5/13/09 11am	#4c	6/10/09 9am	1' cut 10%	125.50	5104	410*	14.00%
5/13/09 Tram	#40	0/10/09 9aiii	1 Cut 1070	120.00	3104	710	14.0070
5/14/09 12pm	#5a	5/18/09 8am	upper yard 10%	124.10	5160	410	13.10%
5/14/09 12pm	#5b	5/21/09 8am	upper yard 10%	124.10	5104	410*	13.10%
5/14/09 12pm	#5c	6/11/09 8am	upper yard 10%	124.10	5104	410*	13.10%
0/14/00 12pm	,,,,,	67 1700 Carr	проступности		7.14		
5/14/09 1pm	#6a	5/18/09 8:30am	upper yard 15%	123.30	4892	390	15.90%
5/14/09 1pm	#6b	5/21/09 8:30am	upper yard 15%	123.30	5104	410*	15.90%
5/14/09 1pm	#6c	6/11/09 9am	upper yard 15%	123.30	5104	410*	15.90%
			Cement mixed by hand				Lagran
5/18/09 12:30pm	#7a	5/21/09 9am	upper yard 10%	124.10	5104	410*	12.50%
5/18/09 12:30pm	#7b	5/26/09 8:30am	upper yard 10%	124.10	5104	410*	12.50%
5/18/09 12:30pm	#7c	6/15/09 8:30am	upper yard 10%	124.10	5104	410*	12.50%
				40440	4470		E 400/
5/18/09 2:30pm	#8a	5/21/09 9:30am	sand pile 5%	134.10	1179	90	5.10%
5/18/09 2:30pm	#8b	5/26/09 9am	sand pile 5%	134.10	1430	110	5.10%
5/18/09 2:30pm	#8c	6/15/09 9am	sand pile 5%	134.10	2896	230	5.10%
		F/04/00 40	41 - 4.50		2200	260	10.70%
5/18/09 1:30pm	#9a	5/21/09 10am	1' cut 5%	125.50	3300 4605	370	10.70%
5/18/09 1:30pm	#9b	5/26/09 9:15am	1' cut 5%	125.50		390	10.70%
5/18/09 1:30pm	#9c	6/15/09 9:30am	1" cut 5%	125.50	4969	390	10.70%

"Partners in Quality"

August 12, 2009

Mr. Steve Ellis Lawrence Livermore National Laboratory P.O. Box 808: L-651 Livermore, California 94551-0808

Subject:

LLNL B-850 Soil Remediation

B850-S300 Livermore, CA

CEL Project #10-01260-LAW & 10-01262-LAW

EARTHWORK AND LABORATORY TESTING SUMMARY July 1, 2009 thru July 31, 2009

CEL representatives observed site operations and/or performed nuclear gauge moisture and density determinations on compacted soils at the above project from July 1st thru July 31, 2009. Laboratory testing was performed on soil samples from the site. Enclosed are the results of the field and laboratory testing.

It is the responsibility of LLNL to review and after consulting with SCS Engineers, approve these test results.

Eric J. Swenson, PE, GE

Principal Geotechnical Engineer

Respectfully submitted.

CONSOLIDATED ENGINEERING LABORATORIES

Michael Wissink

Project Manager

Daily Field Reports

Moisture/Density Curves

Sand Cone Testing

Moisture Content Summary

Break Log Summary

Distribution:

Enclosures:

1 to Addressee

MW/EJS: pmf

R:\Geotech Projects by Number\LLNL\LLNL Bldg 850 Excavation and Remediation Plan - 95% Submittal\Monthly Summary Reports\July Summary (Steve Ellis).doc

UNDERGROUND FOOTING MASONRY BOLT INSP.	Do not proceed with work Make necessary corrections FORMWORK
General Contractor: CEARUDO SERVICES Work Approved Work in Violation TYPE OF INSPECTION: AEROUGH PARTIAL COMPLETE BUILDING STRUCTURAL CONCRETE STEEL DECK UNDERGROUND FOOTING MASONRY BOLT INSP. COLUMNS WELD INSP.	Do not proceed with work Make necessary corrections FORMWORK
SCS ENGINEERING TYPE OF INSPECTION: AEROUGH PARTIAL COMPLETE BUILDING STRUCTURAL CONCRETE STEEL DECK UNDERGROUND FOOTING MASONRY BOLT INSP. ELECTRICAL FOUNDATION COLUMNS WELD INSP.	Make necessary corrections FORMWORK
TYPE OF INSPECTION: PARTIAL COMPLETE BUILDING STRUCTURAL CONCRETE STEEL DECK UNDERGROUND FOOTING MASONRY BOLT INSP. BLECTRICAL FOUNDATION COLUMNS WELD INSP.	
☐ UNDERGROUND ☐ FOOTING ☐ MASONRY ☐ BOLT INSP. ☐ ☐ ELECTRICAL ☐ FOUNDATION ☐ COLUMNS ☐ WELD INSP. ☐	
☐ ELECTRICAL ☐ FOUNDATION ☐ COLUMNS ☐ WELD INSP.	
	FIREPROOFING
TRILIMBING DEPAMING DETER	WATERPROOFING
□ PLUMBING □ FRAMING □ STEEL □ REIN. STEEL □ □	EXCANA Trem
☐ MECHANICAL ☐ REFRIG. ☐ DRYWALL ☐ ROOFING . ☐	
□ HEAT VENT. □ GAS PIPING □ SEWER \$\(\mathbb{RMASS GAADTA}\)	V6
COMMENTS: 6-29-69	
INSITU & SAND CONE TESTING,	MOISTURE BORN
DE OUTS, & CORVE TAKEN OF Cho	
SECTOR A-X. TOT. OF 6 INSITU	7657 70450
45 FER SOIL ENGINEER.	777.674
SCS = STARTED PITEXCAVATA	EN IN SECTION
A-X @ SAND PILE TO APPROXIMATE	
FOLLOWING SANDSTONE TO THAT	1 2) 3711 48
FER LENGRY LONG (SOIL ENGINEER WI	2.77
CREW EXCAVATED DEPTH ON WE	PRILE FROM
ENGINEER.	
6-30-09	
LLNG = EDD TEAM ON SITE TO TAK	VE DER COIL
SAMPLES FROM SECTOR A-4. TES	et cample
#1,2,4,23,24,7 MOVED DUE TO S	SANN STONE
SES = CONTINUES TO EXCAVATE	
A-X TO A DEPTH OF 10; & THEN SC.	
PIT TO SEE IF ANOTHER 10'15 N	
EXCAVATES.	veed to be
SOIL SAMPLE TAKEN DUT TO	Soil COMPOSITION
SOIL SAMPLE TAKEN DUE TO CHANGE DURING EXCAVATION, IN S.	Soil Compositions
SOIL SAMPLE TAKEN DUT TO CHANGE DURING EXCAVATION, IN S. 7-1-09), 7.
SOIL SAMPLE TAKEN DUE TO CHANGE DURING EXCAVATION, IN S.	CAVATION

Consolidated Engineering Laboratories 534 23rd Avenue PROJECT NARRAT Oakland, CA 94606-5307	IVE REPORT	Building Permit	#
Job Name & Address:	Date:	Time:	Cel No.
General Contractor:	7-6-09	0700	10-01260-UACE
CEARVDO SERVICES	☐ Work Approved	☐ Do not proc	eed with work
Subcontractor: SCS ENGINEERING	☐ Work in Violation	☐ Make neces	ssary corrections
TYPE OF INSPECTION: ROUGH PARTIAL	☐ COMPLETE		
☐ BUILDING ☐ STRUCTURAL ☐ CONCRETE ☐ ST	LEET DECK	☐ FORMWORK	
☐ UNDERGROUND ☐ FOOTING ☐ MASONRY ☐ BO	OLT INSP.	FIREPROOFIN	G 🗀
ELECTRICAL FOUNDATION COLUMNS W	ELD INSP	☐ WATERPROOF	FING []
☐ PLUMBING ☐ FRAMING ☐ STEEL ☐ RE	EIN. STEEL	O	
☐ MECHANICAL ☐ REFRIG. ☐ DRYWALL ☐ RC	OOFING .	<u>·</u>	
☐ HEAT VENT. ☐ GAS PIPING ☐ SEWER ###	NASS EXCH	VA Tron	
COMMENTS: 7-6-09			
0730 = SCS CONTINUES EXCAN	INTION D	- 10'13	UT ON
PIT @ SECTOR A-X.			
1500 = 1- LOADER, 1- EXCAVATOR =	+ 1- 6 DOW	NO CAFE	2 5 TANT=1
S'OVER EXCAVATION OF PIT			
1530 = 1- MORE LOADER HELPS			
5' OVER-EX & PLACE SPOILS O			
VARIFIED 10' DEPTH OF CO.			
W/SCS FROM/USING ASPHA			
BE FINICHEN BRANE		0.00	20-6.50
1600 = CREW STOPPED WORK	DN DIT		·
1630 = JOBSITE CLEAN UP	0// ///	1	
1600 Sep Si VE CACAM CI			
			
		· · · · · · · · · · · · · · · · · · ·	<u> </u>
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Consolidated E 534 23rd Avenu Oakland, CA 94		tories PROJECT NARRA	TIVE REPORT	Building Permit	# · · · · · · · · · · · · · · · · · · ·
Job Name & Address		= 1 2 1	Date:	Time:	Cel No.
General Contractor:	Soil REM	CDIATION	7-8-09	0700	
	ERRUDO	:	☐ Work Approved	☐ Do not proce	
Subcontractor:	ecs	· · ·	☐ Work in Violation	☐ Make necess	sary corrections
TYPE OF INSPECTION	ON: ROUGH	☐ PARTIAL	· [] COMPLETE	·	
BUILDING	STRUCTURAL .	□ CONCRETE □	STEEL DECK	FORMWORK	
UNDERGROUND	☐ FOOTING	☐ MASONRY ☐	BOLT INSP.	☐ FIREPROOFING	B
· 🗆 ELECTRICAL	☐ FOUNDATION	☐ COLUMNS ☐	WELD INSP	☐ WATERPROOF	NG 🗆
☐ PLUMBING	☐ FRAMING	□ STEEL . □ I	REIN. STEEL,	0	
☐ MECHANICAL	. ☐ REFRIG.	☐ DRYWALL ☐ ☐ F	ROOFING		_ 0
☐ HEAT VENT.	☐ GAS PIPING	SEWER .	MASS EXCAV	HATION	
COMMENTS:		7-8-09	7	•	
0730 HAS	s= 1-EXCA	WATER, 1- DO:	ZER, 2 LOA	10 ERS. 4	2 GROUNA
		NTINUES TO			
O	_	9-X & SCR.			
Or		EXPOSE ROL			
PIT		IN SANDS			
0845=	· · · · ·	PENTE ON S		PICK Wh	TRENCH
7	LATES.	·			
1500 HAS	= DINO W	ISES HAD E	XEAVATOR	POT HO	OKE ±17"
		VER EXCAVA			DS READING
OF A		1265 70			37-1 Doen
					TENEOUNTER
@ 7	THE DEDT	ALTHOUGH	d nistr	VF 800	1 10 1AP
		17051TION C			
9		AMPLE WAS	•		10 Luevi
1630 4	De = To	3 SITE SH	ATT DOWN	14/12	- AN OLD
TOO HI		S S/ /6 - A	0 / 000010	· CAU,	ANO CV.
	, , , , , , , , , , , , , , , , , , , ,				
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· · · · ·	ARRATIVE REPORT	Building Permit #	
Oakland, CA 94606-5307		J A	
Job Name & Address: Soil REMEDIATI	Date: 7-9-09	Time: Cel No.	160
General Contractor: LEARUDO	☐:Work Approved	☐ Do not proceed with work	
Subcontractor: SCC	☐ Work in Violation	☐ Make necessary corrections	
TYPE OF INSPECTION: ROUGH PARTIA	L COMPLETE		
☐ BUILDING ☐ STRUCTURAL . ☐ CONCRETE	STEEL DECK	☐ FORMWORK ☐	
☐ UNDERGROUND ☐ FOOTING ☐ MASONRY	BOLT INSP.	FIREPROOFING	
☐ ELECTRICAL ☐ FOUNDATION ☐ COLUMNS.	☐ WELD INSP.	☐ WATERPROOFING ☐	
☐ PLUMBING ☐ FRAMING ☐ STEEL	☐ REIN. STEEL	Ö	
☐ MECHANICAL ☐ REFRIG. ☐ DRYWALL	ROOFING	O	
☐ HEAT VENT. ☐ GAS PIPING ☐ SEWER	DMASS EXCAN	HTION 0_	····
COMMENTS: 7-9	7-09		
0730 HRS = 1- EXCAVATOR	1, 1.DOZER,	2-LOADERS, 2=0	Round
CREO @ SECTOR	A-X TO	CUT 5' OVER	-EX
a STOCK PILE SPE	oils in h	OWER CORP	
YARD.			+
0830 = 1 MAN IN SEC	TOR A-3	+ A4 TO TA	KE_
GPS READING OF	POST EX	CAVATION DEO	DTHS
IN I'CUT AREA			
1630 = CREW SHUT	DOWN, of CL	TAN UP JOB	
SITE			
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534 23rd Avenue PROJECT NARF		Building Permit #		
Oakland, CA 94606-5307	ANVE HEFORT		:	
Job Name & Address: B-850 Sold REMEDIATION	Date: 7-13-09	Time: 0700	Cel No. 1260	
General Contractor:	₩ork Approved	☐ Do not pro	oceed with work	
Subcontractor: SUS ENGINEERING	☐ Work in Violation	☐ Make nece	essary corrections	
TYPE OF INSPECTION: ZBOUGH PARTIAL	· · LI COMPLETE			
☐ BUILDING ☐ STRUCTURAL ☐ CONCRETE [STEEL DECK	☐ FORMWORK	0	
☐ UNDERGROUND ☐ FOOTING ☐ MASONRY	BOLT INSP.	☐ FIREPROOF	NG 🗆	
☐ ELECTRICAL ☐ FOUNDATION ☐ COLUMNS ☐	WELD INSP.	☐ WATERPROC	DFING	
☐ PLUMBING ☐ FRAMING ☐ STEEL ☐] REIN. STEEL	0		
☐ MECHANICAL ☐ REFRIG. ☐ DRYWALL ☐	ROOFING	0		
☐ HEAT VENT. ☐ GAS PIPING ☐ SEWER	EMASS GRAD	WE / ES	XCAVA Tion	
COMMENTS: 7-13-	09			
0730 = EXCAVATER, I DOZE	A, & LOAD	ERS, 2	GROUND CREW	
CONTINUES TO OFF HA	-	_ /	*	
EXCAVATION FROM PIT IN	_			
YAAD.				
0900 = LLAVL ERD TEAM 3	NEN ON S	17E 7	O TAKE PUB	
Soil SAMPLES OUT SI				
0915 = HYDRAULIC HOST BRO.			i	
1045 - ERD TEAM LEFT SI				
1113 = MEATZ RENTS MEC		TOFI	X EXCAUATOR	
1115 = LOADERS STOPPEL	4			
1145 - EXCAUATED FIXED				
1330 = CREW STARTED			EAVAT-DAG	
1630 = CLEAN UP JOB S.				
7-14-	<i>e</i> 9			
0730 = 1 EXCAVATOR, 1 DOZER		S A BR	OUND CREW	
CONTINUE 10° OVER				
SECTOR A-X TO A TO	•		1	
BELOW AC TIMISH GRA				
CUT @ 1275 PER 8CS			1	
	4			
CREW MOUTNE SPOIL		K CON	or ymark)	
1645 = CLEAN UN JOB S.	16.			
	<u> </u>			
·			· .	
			,	
			,	

Consolidated Et 534 23rd Avenue Oakland, CA 946			IARRATIVE REPORT	Building Pern	nu
	Sork KEM	EDIATION	Dale: 7-15-09	r į	Cel No. 1260
General Contractor:	EARTH C	ERRUDO.	SEAV Work Approved	☐ Do not pr	oceed with work
Subcontractor:	SUS ENG.	INTERING	☐ Work in Violation	☐ Make ned	essary corrections .
TYPE OF INSPECTION	ON: DEBOUGH	☐ PARTIA	AL · [] COMPLETE		
BUILDING	STRUCTURAL	CONCRETE	STEEL DECK	☐ FORMWORE	
UNDERGROUND	FOOTING	· [] MASONRY	☐ BOLT INSP.	☐ FIREPROOF	ING
ELECTRICAL	☐ FOUNDATION	COLUMNS	- 🗆 WELD INSP.	☐ WATERPRO	OFING [
PLUMBING	FRAMING	STEEL	REIN. STEEL		
MECHANICAL	REFRIG.	☐ DRYWALL	ROOFING	D	[
☐ HEAT VENT.	☐ GAS PIPING	SEWER	BMASS GRAZ	VING- / É	XCAVATION
COMMENTS:		7-15	-09		
	i I EXCA	VATOR IA	DOZER QLOA	DERS 1	GREUND CREES
•		•	TIONAL 10' &		
			A-X & OF	•	_
•	LOWER C		•	7,,,,	0,0,2,3
1645		I UP Joi	•		
1673	- GXZP7N	or vox	3.76		
		7-16-0	<u> </u>		
0730 = 1	1= V 1 1:11 1 1		·LOADERS, 2=61	Anna 1	1=1
0702-7	- CAUMIOR,	POZZER, a	10° 1 Fue	econo c	ON PITIN
		DITTONIAL	# OVER EXE	WATION	BM PIIIM
3867	TOR A-X.	- N -/	1ED 86" 30M	20 - 5h	EEPS - OF
	_	SELIVER	120 06 1001.	114 6- 6-	7 7001
•	PACTOR.	11111011		e 200 = 1	Paulant
		•	ON SITE TO		30/11/16 4 70
			OF JOB 517		
	MAN W/SC	5 TO VARI	THE THE	F FINI	AL EXCHVATION
	F # 25'				
•			TEAM TO C	OllECT	PCD SOCK
	ES 007 512				
					TO SUBGRADO
				N DEPT.	4 4 MOISTURE
P			PACTION.		
					N FOR MOUSTE
Confee	Client, SEE	TABLE	I FOR TEST	PESUL	T.S.
1300=1	EXCAUMTA	A TO HO	6 007/EXC	QUATE.	007 WE 784
will ?	Y BAKSIL	WALLOF F	ROM E OF M	CED 15th	EB" LIFTOVER
Eompact	ted surgal	ADE			

Conditions:			COMPANY	s, Inc.				_AILY	FIELD RE	PORT
Field Rep: Toy Mill Mary Optimized Optimize		Geotechnical Engineer Environmental Manag	ring • Engineering G ement • Water Reso	Seology ources	Report #:				Date:	16-0
Scope of Work: States Gooding Prevener Untilly Tench Other Hours Charged: State State Other Other Contractor: Listen Word State Other Other Other Other Contractor: Representative: ANNY DINCO Other Other Contractor: ANNY DINCO Other Other Contractor: ANNY DINCO Other Other Contractor: ANNY DINCO Contractor:	Project Nam	: 18-850 S	OIL REM	50 A Tres	Project Nu	ımber: 🕻	LAWIS	160	-	
Contractor:	Field Rep:	Ton	Phi/14	25	Project M	anager:				
Contractor Representative: ANNY DANO Conditions: Cloudy Rain Cold F. Equipment Phys Number All-Nuclear Type: The Number Tube All-Nuclear Type: The Nuclear Tube All-Nuclear Type: The Nuclear Tube All-Nuclear Tube Al	Scope of Work:	Mass Grading \	Pavement	Utility Trench	☐ Other	Hours C	harged:	Full Time	☐ Part Tim	ie
Contractor Representative: ANDY DINIO Conditions: Cloudy Rain Cold F. Equipment / / / / / / / / / / / / / / / / / /	Contractor:	CERRUSO	150	S		₽ Si	ınny	☐ Windy	Hot	□ мі
Equipment /bype Number All-Nuclear Type: The Nuclear Type: The Number All-Nuclear Type: The Number All-Nuclear Type: The Nuclear Type: The	Contractor R				Conditions:			i .	☐ Cold	☐ Fo
Density resting Tube Tube	Equipment		_/_		Num	ber		Nuclear Nuclear	Туре:	Pox.
Moving	Compaction	BOMAG	<u></u>		1			☐ Tube		
Support Supp	Moving				/			* Sand C) 	
Support BOZER	Water			TIPE HO	50)2		Fill Caurea	Native		
Structural Geotech	Support				/		Saperatoria	☐ Import		
	Plan		Engineer		Dat	e i en a	Fill Location:	5013 6	RADE ((BTA
Geotech LENARD LONG Curve* Description Max Density Opt. Moisture Required Compaction Required Moist O 708U9-1 LT BLN SHWBY SILT U/3-5 6,5							OF PI	TIN	SECT	OR P
Curve # Description Max Density Opt. Moisture Required Compaction Required Moist Opt. 42% Opt. 4		1=116	ממנ חו	1/1/-						
1 1 3 1 3 1 3 1 3 1 3 1 3 3	1901-1 - 18 ⁴ 170-11-41-10	LENMA			l A	lax Densitv	Opt. Moistu	re Required Con	npaction Re	quired Moistu
Test #		1/1/2	STATUTE STREET, CREETS, C.	(d) e e e e e e	Personal a supplied of the	States of the Conference of	regulariya ya ya saggin dan asa			
Test # NATH Location Instruction Blevation Wet Density Moisture Dry Density Curve # Percent Compaction 1	-	1		,						
Test# NONTH Location Lestifical Elevation. Wet Density Moisture Content (pcf) Gurve# Compaction. 1 426459.4 1695381 1274.8 119.2 12.8 105.7 A 9.3 2 4264648 1695921 1275.0 117.9 14.7 102.8 A 9.1 3 426468.9 1695921 1274.8 120.8 18.9 101.6 A 9.0 4 436516.4 1695939 1274.5 128.4 20.1 101.9 A 9.0								.		
2 436464.8 1695921 1275.0 117.9 14.7 102.8 A 91 3 42645.9 1695921 1274.8 120.8 18.9 101.6 A 90 4 436516.4 1695939 1274.5 128.4 20.1 101.9 A 90	Test#	NORTH	Location ##	TNES	Elevation			Dry Density (pcf)		
3 426-85.9 1695 921 1274.8 120.8 18.9 101.6 A 90 4 4186516.4 1695 939 1274.5 128.4 20.1 101.9 A 90		426459.4	16958	881	1274.8	119,	2 12,8	105.7	19 9	73
4 486516.4 1695 959 1274.5 128.4 20.1 101.9 A 90	2_	426464.8	1695	921	275.0	117.			A	7/
	_3	426485.9	1695	921	1274.8	120.	8 18.9	101.6		
		2/26516.4	1695	959	12745	128.	4 20.1	101.9	A	70
Comment/ Sketch:										
Comment/ Sketch:										
Comment/ Sketch:				,						
Comment/ Sketch:										
Comment/ Sketch:										
Comment/ Sketch:										
	Comment/ Sketch	<u> </u>								
NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to the contractor identified to form opinions about the adequacy of those operations, and to report those opinions and the contractor identified to form opinions about the adequacy of those operations, and to report those opinions and the contractor identified to form opinions about the adequacy of those operations, and to report those opinions are contractor identified.	ractor identified, to form opi	nions about the adequacy of those operat	ions, and to report those opin-	☐ This DFI	R is Preliminary -	A preliminary	report is provided	This DFR is	: Final - A final report is	an instrument of
This DFR is PFRIminary - A preliminary report is provided some processing and the presence and activities do united and united and united the processing and united the processing and united and united the processing and united	tractor identified, to form opi ions to our client. The present from its obligation to meet co findings and opinions. Th	nions about the adequacy of those operat e and activities of our field representative intractural requirements. No one excep e contractor retains sole responsiblity for	ions, and to report those opin- s do not relieve any contractor t our client may rely on our	solely as evidence or conclusions and/	that field observation w /or recommendations cor	as performed. veyed in the fir	Observations and/ nal report may vary	service. Any conclusion	ns drawn from this report	an instrument of should be discuss
ractor identified, to firm opinions about the adequacy of those operations, and to report this copin- ons to our client. The presence and activities of our field expressed as on technical control of the control of th	ractor identified, to form opi ons to our client. The presend rom its obligation to meet co indings and opinions. Th	nions about the adequacy of those operat e and activities of our field representative intractural requirements. No one excep e contractor retains sole responsiblity for	ions, and to report those opin- s do not relieve any contractor t our client may rely on our	solely as evidence or conclusions and/ from and shall take	that field observation w /or recommendations cor e precedence over those i	as performed. veyed in the fir	Observations and/ nal report may vary	service. Any conclusion	ns drawn from this report	an instrument of should be discusse

Geosphere Constants, Inc. AN ETS COMPANY Geotechnical Engineering • Engineering Geology

JAILY FIELD REPORT

Environmental Management · Water Re	Перы			Date: 7-20 72	
oject Name: P-850 Soil ROME		rt Number: <i>LAW 14</i> rt Manager:	60	Pageo	<u> </u>
eld Rep: Joney Philips		A. 1574	4.4		-
ppe of Work: Mass Grading: Pavement Pavement D	Utility Trench	SA TO	Full Time	☐ Part Time	
ontractor: CERRUDO Ses .	ENG. Condition	Sunny	Windy Windy	After the second] Mild
ontractor Representative: ANIDA	IND	☐ Cloudy	☐ Rain	Cold C	l Fog
omment/ Sketch:	7-20-				
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Representative	Date: 7-20-09	Reviewed By:	Date:	

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Geosphere Cons nts, Inc. _AILY FIELD REPORT AN ETS COMPANY Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources Report #: 7-21-09 Project Number: Ald 1860 Project Name: 8-850 Soil REMEDIATION Page of Field Rep: Project Manager: Mass Grading Scope of Work: ☐ Pavement ☐ Utility Trench Other Hours Charged: Full Time ☐ Part Time Contractor: Windy Hot ☐ Mild Sunny Conditions ☐ Cold Contractor Representative: ☐ Rain ☐ Fog ☐ Cloudy Type: ROXIES Equipment Type Number Nuclear Density Testing Equipment Compaction ☐ Tube BOMAG Moving Sand Cone LOADED £ Water Native Fill Source ☐ Import Support Fill Location: 3 PD, 47445 TH LIFTS Plan Engineer Date IN BOTTOM OF PIT INSECTOR A-X Civil Structural MW = MONITORING WEILS LENARY) LONB Geotech Max Density Opt. Moisture Required Compaction Required Moisture A= 071459-01 MIXBANSANDY SILT W/AGG 90% □ Opt. + 2% 114,5 **95%** Opt. + 2% to 5% Other: Other: Moisture Dry Density Percent Pass/ Wet Density Elevation Test# Curve # NORTH FASTINGS (pcf) Content (pcf) Compaction Fail JRO LIFT Ω 1695945 1276.4 123.5 91 426511.8 18.6 104.1 91 1696002 1272.0 123,5 426523.4 90 1695888 1278.6 123.1 426451.5 18.5 474 90 126460.2 1695945 124.2 20.6 LIFT S 1695895 90 4264 76.8 20.7 90 426515 1695950 1277.5 121.9 ZNO LIFT E.OFMW 426524.1 1272.6 91 12.7.8 1696011 126.5 94 5 TH 1695 892 12803 18.0 426472.4 1695 917 12800 121.5 17.4 104.3 426473.2 LIFT 91 426462.8 1695 939 1279.9 123.7 18.1

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Field Representative	Date: 7-21-09 Reviewed By:	Date:
04-08)		

Geosphere Con: ants, Inc. JAILY FIELD REPORT AN ETS COMPANY Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources Report #: 7-32-09 Soul REMEDIA TransProject Number: 1AW 1260 Page Project Manager: Field Rep: Full Time Mass Grading Pavement Utility Trench Other Scope of Work: Hours Charged: ☐ Part Time Sunny SESENA. Windy Hot ☐ Mild Contractor: Conditions: ☐ Rain ☐ Cold ☐ Fog ☐ Cloudy Type Type: THOXLE Number Muclear Nuclear Equipment Density Testing ☐ Tube Compaction RomAG Equipment Sand Cone Moving LOADEN Native Native Water Fill Source ☐ Import Support 5 THLIFT N. OF MIW Engineer Plan Date 9 3AD, 4TH 45TH LIFT E. OF Civil m.w. Structural MW = MONITORING WEIL'S LENARD 1016 Geotech Max Density Opt. Moisture Required Compaction Required Moisture A = 071409-01 MIX BRAI SANSY SILT W/AGG **20** 90% Opt. + 2% □ 95% Opt. + 2% to 5% Other: Other: Pass/ **Wet Density** Moisture Dry Density Percent Curve# Test # Elevation (pcf) Content (pcf) Compaction Fail 51111 D 90 123. 103.1 1278.8 3'KIFT 426543.2 1696000 12241 125.5 42117 4265 21.2 1696004 1274,5 124.3 19.5 51/11/1 17.2 Comment/Sketch: NOTICE: Our firm's professionals are represented on site soley to observe operations of the con-tractor identified, to form opinions about the adequacy of those operations, and to eport those epini-ons to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on un-findings and opinions. The contractor retains sole responsibility for site safety and the methods operations, and exquences of constructions. This DFR is Preliminary – A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report. This DFR is Final - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Date:

Reviewed By:

Date:

D.F.R. Page 1 (04-08)

Field Representative:

JAILY FIELD REPORT

	Geotechnical E Environmental	ingineering • Engineering Ge Management • Water Reso	ology urces	Report #:			Date: 7-27 4 7-8		
Project Name	B-850	Soll Deme Or	ATWA	Project Nui	nber: LAW /	260	Page	of	
Field Rep:	Toney	Phillips		Project Ma	nager:				
		g 🔲 Pavement 🔲 U	Itility Trench	Other	Hours Charged:	Full Time	☐ Part Time		
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Contractor (PMMMM) Set Stand Conditions: Condition	Field Rep:	Tons	Λ .			t Manager:							_
Concarcor Representatives	Scope of Work:	Mass Grading	☐ Pavement	Utility Trench	Other	Hours	Charged:		☐ Full Time		Part Time	e	
Cloudy Rain Cold Fog Equipment Type Number Part Type	Contractor:	CEARVOR	1/50	IS ENGL	?	423	Sunny	Ć	₩indy	42	Hot		⁄Iild
Equipment Type Number	Contractor F	epresentative:	1 4 / V	Sino	Condition	ons:	Cloudy		☐ Rain		Cold	□ F	og
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AILY FIELD REPORT

	Geotechnical En Environmental N	gineering • Engineering Ge Nanagement • Water Reso	eology urces Re	port #:			Date: 7-	19-09	
roject Name	B-850	SOIL BEM	DIA TION Pro	oject Nur	mber: LAWIA	60	Page of		
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Geosphere Cont ants, Inc. JAILY FIELD REPORT AN ETS COMPANY Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources Report #: Project Number: 1441260 Project Name: 8-850 Soil REMEDIATION Page Project Manager: Mass Grading | Pavement ☐ Utility Trench Full Time Scope of Work: Other Hours Charged: ☐ Part Time Hot Hot Sunny Windy ☐ Mild Contractor: Conditions: ☐ Fog ☐ Rain ☐ Cold ☐ Cloudy Type Type: Number ∆ Nuclear Equipment POYLEN Density Testing Equipment ☐ Tube Compaction ✓ Sand Cone Moving Water Native Fill Source ☐ Import Support Fill Location: Det INI SECTION A-X Plan Engineer Date FILELEUMTION = 1282 4 Civil 2 MD & 3RD LIFTS Structural LENAAD) LONG Geotech Max Density Opt. Moisture Required Compaction Required Moisture A= 072809-0 1/5.5 **1** 90% ☐ Opt. + 2% Opt. + 2% to 5% □ 95% Other: Other: Pass/ **Wet Density** Moisture Dry Density Percent Curve # Test# Location Elevation (pcf) Content (pcf) Compaction AND LIFT tho'w or mw 90 90 103.5 3RD LIFT I. 40' N. E. OF MW 90 93 124.4 530 E OT MW 3 123.7 103.8 90 93 Comment Sketch: MW = MONITORING WELLS: WET DENSITIE MAX = 133.5

NOTICE: Our firm's professionals are represented on site saley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and or report this ceptimisms to our dient. The presence and activities of our field representants who not relieve any contractor from its ollipation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor relains sole responsibility for site safety and the methods, operations, and sequences of construction.

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Geosphere Cons. ants, Inc.

AN ETS COMPANY

Geotechnical Engineering - Engineering Geology

AILY FIELD REPORT

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	Geotechnical E Environmental	Management • Wa	iter Resou	rces	Report					_ D	ate: 🔀	-30.	-09
ct Name	:XJ-85Q	SOIL PL	EMEL	VATION	Project	Number	:2A41	120	50	Pa	age	of _	
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Geosphere Con: ints, Inc. JAILY FIELD REPORT Seotechnical Engineering • Engineering Geology Environmental Management • Water Resources Report #: 7-30-09 Project Name: B-850 SOL AZMEDIA TION Project Number: 1AW1260 Page Project Manager: Field Rep: **Æ** Full Time Mass Grading Pavement ☐ Utility Trench Other Hours Charged: ☐ Part Time Scope of Work: **Sunny** Sunny **W**indy Hot ☐ Mild Conditions: ☐ Cold ☐ Fog ☐ Rain ☐ Cloudy Muclear Type: AOXLEK Type Number Equipment **Density Testing** ☐ Tube Compaction Equipment ☐ Sand Cone Moving ∕**⊠** Native Water Fill Source ☐ Import Support PIT IN SECTOR A-X Date Fill Location: Plan Engineer ELEVATION 1284 + 1285 Civil WTH 4 5 TH LIFTS Structural LEWARD LONG Geotech Max Density Opt. Moisture Required Compaction Required Moisture Description Curve# 115.5 90% ☐ Opt. + 2% 15.0 4=072809-01 **5** 95% Opt. + 2% to 5% Other: Other: WET DENSITY Pass/ Dry Density Percent Wet Density Moisture Location Elevation Curve # Test# (pcf) Content (pcf) Compaction Fail 4TH LIFT 91 90 TEOF PITW. WALL 1284 121,0 17.0 103.4 92 1284 123.3 18.2 ± 15'N. OF MW 20 5TH LIFT #20' E. OF MW 91 90 121.8 17,8 103.4 ±10'8 OF M.W 20,1 102,2 89 92 122.8 1285 91 121.9 16.4 91 ±30'SE OF M.W Comment/Sketch: MW=MONITORING WELLS; WET DENSITY MAX = 137.5 Soil ENGER OKED 89% COMPACTION ON TEST #4

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives don reflexe any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.	or conclusions and/or recommendation	ary – A preliminary report is provided ion was performed. Observations and/ ins conveyed in the final report may vary hose indicated in a preliminary report.	This DFR is Final - A final report is an instrument of prol service. Any conclusions drawn from this report should be discussed veraluated by the professional involved.				
Field Representative us hard	Date:	Reviewed By:		Date:			

Geosphere Cons. Ants, Inc.				L	AILY	FIEL	D RĘI	POR	Ţ
Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	Report /	: B-S	8300	5		Date	: 7/6	-9	109
Project Name: LLNL Site 300, B850 Soil R	, Project I	Number: 🗘	AW 1	26		Page		_ of .	
Field Rep: Robert Uribe	Project I	Manager:	Cal-	Dic	kern	rav	\		
Scope of Work: Mass Grading Pavement Utility Trench	Other	Hours Char	ged:	F E	ull Time		Part Time	deser sur	d. v. 2 v. 3 . 2 . 3 . 3 . 3 . 3 . 3 . 3 . 3 . 3
Contractor: Cerrudo	Condition	, Z Suni	ıy		Windy		Hot	25.50	Mild
Contractor Representative: Analy Bell		∵ □ Clou	dy	(D)	Rain		Cold		Fog
Comment/Sketch: 7/6/09 mov Soil San Paports Cimu Soil S	mple	- For	Cam Fi	ee	Ŋ	7-7	0 7	12.22.24	
7/8/09/ wes	se Sen	yle	for su	C	w y &	<i>C</i>	o f		
ions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to mater contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsible—for fisher safety and the methods, findings and opinions. The contractor retains sole responsible—for fisher safety and the methods, the contractor retains sole responsible—for fisher safety and the methods, and contract the contractor retains to the contractor retains to the contractor of the contractor of the contractor retains to the contractor of the	at field observation recommendations	conveyed in the final r	ervations and/ eport may vary	T service.	his DFR is I	drawn from	this report sh		nt of professiona
operations, and sequences of construction.	recedence over thos	e marcatea in a prelim	шагу терогт. ——————						
Field Representative Date: 7	199	Reviewed By:					Date:		
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Geosphere Concents, Inc.		AILY F	IELD REPORT
Geotechnical Engineering · Engineering Geology Environmental Management · Water Resources	Report # 13-583 a	5	Date: 7/13-16/09
Project Name: LLNL 5the 300 B850 Soil Rem	Project Number: LAW 12	61	Page of
Field Rep: Robert Wribe	Project Manager: Cau J	Dickerma	~
Scope of Work: Mass Grading Pavement Utility Trench	☐ Other Hours Charged:	Full Time	☐ Part Time
Contractor: Cerrido	Conditions:	☐ Windy	☑ Hot- □ Mild
Contractor Representative: Andy Bell	Cloudy	□ Rain :	☐ Cold- ☐ Fog
Comment/Sketch: 7/13/09/Mor - Soil San - Raport - Cenve (Type for come	cumy a	100° F
NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to or client. The presence and activities of our field representatives do not retelve any contractor or o	s Preliminary - A preliminary report is provided to field observation was performed. Observations and/ecommendations conveyed in the final report may vary scedence over those indicated in a preliminary report. Reviewed By:	This DFR is Fin	al - A final report is an instrument of professional wan from this report should be discussed with and
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Geosphere Cons. ants, Inc.			AILY F	ELD	REPOF	RT,
Geotechnical Engineering · Engineering Geology Environmental Management · Water Resources	Report#:	B583005		Date: 7	20-2	3/09
Project Name: LLNL Site 3W B850 501 Dem	, Project Nun	nber: LAW 12		Page	of	·
Field Rep: Rabert Wibe	Project Mar	nager: Cal 1	Pickerm	ew.		
cope of Work: Mass Grading Pavement Utility Trench	Other .	Hours Charged:	Full Time	☐ Part	Time	
Contractor: Gerrudo	Conditions:	Sunny	□ Windy	A H	ot 🛮 🗖	Mild
Contractor Representative: Andy Bell	Conditions.	Cloudy	Rain	□ c	sia - 🗀	Fog
Comment/ Sketch:		1111				:
7/20/09/mon						
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to our client. The presence and activities of our field representatives do not relieve any contractor solely as evidence this obligation to meet contractural requirements. No one exceptions dient may rely on our or conclusions and/or	at held observation was recommendations conve	performed. Observations and/ yed in the final report may vary	service. Any conclusions di evaluated by the professiona	awn from this re	eport should be	liscussed with
mage and dymonics. The contraction recens one expensionally to she safety and me memory from and shall take pl alons, and sequences of construction.	recedence over those indi	cated in a preliminary report.		- -		
ield Representative: Date: 7/2	3/09 Revi	ewed By:		Date:		

	AN ETS COMPANY	ts, Inc.					AILYر	FII	ELD RE	PORT	Γ
	Geotechnical Engineering • Engineering Environmental Management • Water Re	Geology sources	Repor	t#:	B :	583005	·	Da	ite: 🧻	2109	
Project Nam	e: LLNL Site 300 B8	5) 5011	Projec	t Num	ber:	LAW 12	_61	Pa	ge	of	
Field Rep:	Robert Wibe		Projec	t Man	ager:	<u>Cal</u>	Dicken	1014	~		
Scope of Work:	Mass Grading Pavement	Utility Trench	Other		Hours Cl	narged:	☑ Full Time		☐ Part Tin	ne	
Contractor:	Cerrido				⊿ Su	inny	□ Windy		d Hot		Mild
Contractor R	epresentative: Avoly £	iell	Conditi	ons:	☐ CI	oudy	☐ Rain		□ Cold		⁷ og
Equipment	Туре			Number			☐ Nuclear	.	Туре:		
Compaction	sheeps foot rol	lec		l		Density Testing Equipment	☐ Tube				
Moving						Equipment -	Z Sand C	one			
Water	hose					dama ja par jan ja	☑ Nativ e	or	Sit		
Support		.				Fill Source	☐ Import				
Plan	Engineer			Date		Fill Location:		Δ.	· 2	7 E	<u> </u>
Civil						ا مناسعہ کا	frea isting		 	i succession	, (C
Structural						~ 50	sing	ac	y, 3	urjae	سد
Geotech			owiet was	.cobavar	Hereite	es es es es estables					0:05-400h24045
Curve#	Description			e separate	Density	Opt. Moistur		npactio	n Re	quired Mois	ture
071409-01	Mix Bin Sandy S	silt w/a	19	114	1.5	14.5	90%)pt. + 2%	
		Sands	tore				95%			pt. + 2%	to 5%
							☐ Other	:		ther:	i
									ab	ope sec	<u> </u>
			Santani kara	a an	. No.		Dev Donath:				
Test #	Location		Elevation	We	et Density (pcf)	y Moisture Content	Dry Density (pcf)	Cu		Percent Impaction	Pass/ Fail
ì	adj. to test w/Nu	ke#1 -	-22 FA	d i	22,4	1 16.5	105.1	יורט	4090	92	
	on 7/21/09										
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				-	_						
Comment/ Sketch:	see Tony P. of test.	ساريا يمان	ጎ ል	242	<u>,</u>	7/21/09	i for	ex		best	7.00
	JEE 10119 1.	merc.	<u>.</u> 0	~~\\ <u>~</u>	-		, , , , , ,	-, -		J-4-01	V 40 1
	of test.										
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tractor identified, to form opinions to our client. The present	sionals are represented on site soley to observe operations of the con nions about the adequacy of those operations, and to report those opin e and activities of our field representatives do not relieve any contractor intractural requirements. No one except our client may rely spride	solely as evidence that	at field observat	tion was pe	erformed. (report is provided Observations and/	This DFR is service. Any conclusion	ıs drawn	from this report	an instrument should be disco	of professional ussed with and
findings and opinions. Th operations, and sequences of	e contractor retains sole responsibility for site safety and the method:	or conclusions and/or from and shall take pr					evaluated by the profes.	ovilai inv	oivea.		
ri-14 p	Mata III.	7/2	109	Б	uaci P				D-4-		
Field Representa	tive: Office	_ Date:		Revie	wed By:				Date:		



CONSOLIDATED ENGINEERING

DATE:	7/21	09	INSPECTO	R:	R. Uvil	Je
PROJECT #:	LUN	site 300 B850 Soil R.	PROJECT I	NAME:	LAW 1	261
COMPACTION S	PEC:	90	TEST LOCA	ATION:		
MOISTURE SPE				7844		
		SAND	CONE T	ESTING		
·		<u> </u>				
	А	WT of cone, jar, sand - Before	e _	6766.5		9
#1	В	WT of cone, jar, sand - After	· · ·	3547.5		g
0. PI G	С	WT of sand in cone	-	1580		ġ ····································
m 19.5	D	WT of sand used		3219.0		g A-B
	E	WT of sand in hole	-	1639.0		g D-C
	F	Density of sand	-	89.6	·	pcf
	G	Volume of hole	-	18.3 / 3.0	0403	cf E÷F
	Н	Gross WT of excavated soil	+ TARE			lbs
	1.	WT of TARE	_	·		Ibs
·	J	Net WT of soil		2238.1,	14.934	lbs H-l
	K	WT Density		127.4		pcf J÷G
	L	Soil + TARE (Wet)	#K .	1291.1		lbs
	М	TARE		137.3		lbs
•	N	Soil + TARE (Dry)		1127.3		lbs
	0	WT of Water		163.8		lbs L-N
	Ρ	WT of Soil		990.0		lbs N-M
	Q	Moisture Content	_	16.5		% O÷P
		Optimum Moisture Content	•	14.5		%
	R	Dry Density	. ,	105.1		pcf K÷(I+Q)
	S	Lab Maximum		114.5		pcf
		(Lab No. <u>071409</u> -	<u>ol</u>)			
	T	Percent Compaction	· .	92		% R÷S
: Weight = \Cubic Fee		Pounds = lbs Gram	ns = G	Pounds per Cubic l Conversion Grams		

Water Notice Pill Source Import Import		Geosphere Con	nts, Inc. Y				AILY	FIELI) REPOR	T
Field Rep: Robert Uritler Souped Work Associating Premiss Discharch Work Associating Premiss Discharch Work Contractor Representative Analy Bell Conditions Conditio		Geotechnical Engineering • Engineeri Environmental Management • Water	ng Geology Resources	Report #:	BS	58320	5	Date:	7/22/0	7
Scape of Want Mans Cadago Prevent Usaby Treats Online Hous Chargest Fall Time Part Time	Project Name	ELLUL Site 300 B	5850 Soil R.	Project Nu	ımber: [LAW 1	261	Page	of _	
Contractor Canado Contractor Representative Andy Bell Conditions: Cloudy Rain Cold Roll Roll Explanent Ope Number Colorate Type: Number Open Colorate Type: Discourse Type: Compaction Sheaps foot rolled Delity being Confinent Type: Table Compaction Sheaps foot rolled Delity being Confinent Type: Table Water Noving Shand Cone Water Asset Noving Information Type: Compaction Sheaps foot rolled Delity being Confinent Type: Table Support Roll Information Type: Compaction Type: Confinent Ty	Field Rep:	Robert Unibe	.	Project Ma	anager:	Cal	Dicker	war	`	
Contractor Representative: Andy Bell Conditions Cloudy Rain Cold Fog Squement Type Number Number Number Type Compaction Sheap for roller Denty lesting Sand Conc Martire Sand Conc Water Martire Martire Martire Martire Martire Martire Support Import Title Fill location Area Ax - ZO FAC Civil Successful Sequent Mosture General General General General General General General General General General Ge	Scope of Work:	Mass Grading Pavement	Utility Trench	Other	Hours Ch	arged:	Full Time		Part Time	
Contractor Representative: Andy Bell Cloudy Rain Cold Rog Equipment Type Number Rain Cold Rog Equipment Roger Rain Cold Rog Rog Roger Rain	Contractor:	Cerrudo		Conditions	✓ Su	nny	☐ Windy	Ø	Hot 🔲	Mild
Compaction Sheeps foot rolled Description Tube Gallement Stand Cone Stand	Contractor Re	epresentative: Andy B	ell	Conditions.	□ Cl	oudy	☐ Rain		Cold	Fog
Water Water Note	Equipment	Type		Numl	ber		☐ Nuclear	Тур	e:	
Water howe Fillsource Stand Cone Native on sixty Native on sixty Import Im	Compaction	Sheeps foot	roller	1	. 3		☐ Tube			
Support Plan togineer Plan togineer Plan togineer Plan togineer Plan togineer Plan togineer Fill Location: Area, Ax - ZO FAC Sexisting adj. Surface Surface Survey adj. Surface Survey adj. Surface Survey adj. Surface Survey adj. Surface Survey and survey adj. Survey and	Moving				1.5		☑ Sand C	one		
Support Plan togineer Plan togineer Plan togineer Plan togineer Plan togineer Plan togineer Fill Location: Area, Ax - ZO FAC Sexisting adj. Surface Surface Survey adj. Surface Survey adj. Surface Survey adj. Surface Survey adj. Surface Survey and survey adj. Survey and	Water	hose					☑ Native	-3VA_S	à de	
Plan Engineer Date Fill Location: Area Ax - 20 FAC Structural Groves General Description Max Density: Opt. Moisture Required Compaction: Regulated Mosture OPI-40Pol Mix Brn Scrooly Sift WiscordSpore 114.5 14.5 190% Opt. + 2% Opt. + 2% Opt. + 2% Opt 2% Opt. + 2% Opt 2% Opt. + 2% Opt	Support					Fill Source -			<u> </u>	
Georeth Grey Boschiption Max Density Opt Mosture Required Compaction Required Mosture O7140701 Mix Brn Sundy 2iff Wandsfare 1/4.5 14.5 90% Opt. + 2% Opt. + 2% to 5% Other: Other	Plan	Engineer.	The state of the s	Dat	e	Fill Location:			20 E	Ac
Georeth Grey Boschiption Max Density Opt Mosture Required Compaction Required Mosture O7140701 Mix Brn Sundy 2iff Wandsfare 1/4.5 14.5 90% Opt. + 2% Opt. + 2% to 5% Other: Other	Civil					<i>F</i>	trea f	τx -		•
Gurve 8 Description Mix Brn Suvely 2iff Wisardsfore 1/4.5 1/4.5 90% Opt. + 2% Opt. + 2% Opt. + 2% Other: Other: Other: John 7/22/99 Other: John 17/22/99 Other: John 17/22/9	Structural					of ex	istring	ady	. Surfa	ce
O7140901 Mix Bin Sundy 5iff W Sundsfore 114.5 14.5 \$\frac{1}{2}\$ 90% \$\left Opt. + 2% \$\frac{1}{2}\$ 0.5% \$\left Other: \$\lef	EDSG LIFTWISE SERVICE									
95% Opt. + 296 to 596 Other: Other: Other: Other: Other: Joseph Opt. + 296 to 596 Other: Other: Other: Other: Joseph Other: Joseph Other: Joseph Other: Joseph Other: Other: Joseph Other: Jos	Curve #		- 11 1		Madein South	Orn PRESIDENCE VALLEY		npaction (Required Mo	oisture
Test # Location Development	07140901	Mix BM Sandy	sitt w/san	dstore 1	14.5	14.5	90%		Opt. + 29	%
Jest # Location Elevation Wet Density Moisture Dry Density Curve # Compaction Fall adj							95%			% to 5%
Test# Location Elevation Wet Density (pt) Moisture (pt) Griner # Percent Pass/ Compaction Fall adj - to Nuke test # -20'FAC 121.0 17.5 103.0 071409.N 90 Omment/Sketch: See Torry P. Teable deated 7/22/09 for 103.0 7/22/09 for 103.0 104.0 103.0 104.0 103.0 104.0							☐ Othe	r: /	Other:	
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7/2/10	operations, and sequences of	construction.	Horn and Shan take b		cuccu in a prei		· · · · · · ·			
Field Representative: Date: Da	Field Representat	Jan Carl	Date: 2/2:	2/09 Re	viewed By:		· <u> </u>	D	ate:	



CONSOLIDATED ENGINEERING

DATE:	7/2	209	INSPECTOR:	Robert Wibe
PROJECT #:	LA	W 1261	PROJECT NAME:	LLNL Site 300 B850 Soi
COMPACTION SP	EC:	90%	TEST LOCATION:	
MOISTURE SPEC:	:	above opt.		· · · · · · · · · · · · · · · · · · ·
. : 		SAND	CONE TESTING	
	· A	WT of cone, jar, sand - Before	6793.8	g
	В	WT of cone, jar, sand - After	3561.8	g
wet 122.6	Ċ	WT of sand in cone	1580	g
1, M 21.5	D	WT of sand used	3232.0	g A-B
	Ε	WT of sand in hole	1652.0	g D-C
	F	Density of sand	89.6	pcf
	G	Volume of hole	18.437 / 0	.0406 cf E÷F
	Н	Gross WT of excavated soil + T	ARE	lbs
	1.	WT of TARE		, lbs
	J	Net WT of soil	2228.0/	4.9// lbs H-I
	κ	WT Density	121.0	pcf J÷G
	L	Soil + TARE (Wet)	1241.4	lbs
	М	TARE	138.9	lbs
	N.	Soil + TARE (Dry)	1076.8	lbs
	0	WT of Water	164.6	lbs L-N
•	P	WT of Soil	937.9	lbs N-M
	Q	Moisture Content	17.5	% O÷P
		Optimum Moisture Content	14.5	%
	R	Dry Density	103.0	pcf K ÷ (I + Q)
	s	Lab Maximum	114.5	pcf
		(Lab No. 071409-0	<u>(</u>	
	Т	Percent Compaction	90	% R÷S
Weight = W		Pounds = lbs Grams	= G Pounds per Cubic F Conversion Grams	•

Geosphere Cons ants, Inc.	AILY FIELD REPORT					
Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	Report#: B 55300 S			Date:'7 27	1-30/09	
Project Name: LLNL Site 300 B850 Soil K.				Page	_ of	
Field Rep:	Project Ma	nager: Cal]	Dickerm	an		
Scope of Work: Mass Grading Pavement D Utility Trench.	Other	Hours Charged:	Full Time	☐ Part Time		
Contractor: Gerrudo		Sunny	□ Windy.	Hot -	☐ Mild	
Contractor Representative: Avoly Bell	Conditions:	☐ Cloudy	Rain	□ Cold	☐ Fog	
Comment/Sketch: 7/27/09 Mon						
- Keparta - Coloward			Sunny	100		
2/28/09/we -compostion		- come	# 077	1809-01		
- Campaction - Moist Com - 9:50 Am	t. Sang	he	ng 92°		ilAm	
- Compaction - moist cont sample @ 8		-n and @11:40	nolds #12	a @1Z:40	#116@ 9:20 ;#126@12:50 ₁	
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from its obligation to meet contractural requirements. No one except our dient may rely on our or conclusions and/or a	recommendations conve ecedence over those ind	peronneal. Observations and year in the final report may vary icated in a preliminary report.	evaluated by the profession		THE WASSESSEE THAT WHE	

A	Geospher A N I	e Con. ets compa	ants, Inc.				AILY	FIELD	REPQ	RT	
	Geotechnical Eng Environmental M	ineering • Engine lanagement • Wat	ering Geology er Resources	Report#	B	58300	5	Date:	7 29	9	
Project Name	ع: للكارة عنالك عنالية	site 30	B852 501-	K. Project N					Page of		
Field Rep:	Rober	r Lhik		Project N	lanager:	Cal I	Dickerw	an			
Scope of Work:	Mass Grading	☐ Pavement	Utility Trench	☐ Other	Hours (Charged:	Full Time	□ P	art Time		
Contractor:	Cen	nglo			₽s	unny	☐ Windy	Ø	Hot [Mild	
Contractor R	epresentative:	Andy	Roll	Conditions		Cloudy	☐ Rain		Cold C] Fog	
Equipment		Туре		Nu	nber		☐ Nuclear	Туре	:		
Compaction	Lo	×.)		Density Testing Equipment	☐ Tube				
Moving		23				cyurpinent	Z Sand Co	ne			
Water						enre.	Native of	on 6	ite		
Support						Fill Source	☐ Import				
Plan		Enginee	r internal est in mandi	D	ate	Fill Location:	1~- 14	v e		a E	
Civil		<u></u>				, <i>r</i>	trea A, itoring	ک _۽ ک	1 -	0 1	
Structural						Mor	utoring	wel	15		
Geotech											
Curve#		Descri		DESCRIPTION AND	Max Density			action	Required	Moisture	
07280901	Bon San	ay Sitt i	w/55 plus	S/.Cewat	<u>ک کِان</u>	15.0	90%		_ Opt. + _		
							95%	L		2% to 5%	
							Other:		Other:		
							-	-	above	OPT	
					Wet Densi	ity Moisture	Dry Density	ere carre	Percen	it Pass/	
Test#		Location		Elevation	(pcf)		(pcf)	Curve #	Compact		
	adj. to	Nuka te	st#3	1283	123.	1. 18.5	103.7	72807	-01 90)	
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									_		
Comment/ Sketch:	~va	1	r /- "		, <u> </u>	<i>и</i> , -	. 1 0	7/2	./~		
Saud	cove /re	est ae	g b i	oure a	test	#5 0	dated	1/29	109	**	
									*		
NOTICE: Our firm's newfac	sionals are represented on site s	oley to observe operations a	f the con-				П				
tractor identified, to form opin ions to our client. The presence	ionals are represented on site si ions about the adequacy of thos e and activities of our field repres ntractural requirements. No one	e operations, and to report th entatives do not relieve any c	ontractor solely as eviden	PFR is Preliminary ce that field observation nd/or recommendations of	was pertormed.	Observations and/	This DFR is F service. Any conclusions evaluated by the profession	drawn from th		ument of professiona se discussed with and	
findings and opinions. The operations, and sequences of	contractor retains sole respons	blity for site safety and the		ske precedence over those	indicated in a p	reliminary report.	- and the profession				
Field Representa	tive:	5//	Date: _7/	12/09	Reviewed By	:		Da	te:		



CONSOLIDATED ENGINEERING

DATE:	29	09	INSPECTO	R:	Robert	Unibe
PROJECT#:	AL	<i>V</i> ,	PROJECT I	VAME:	LUL S	te 300 B850 0
COMPACTION SPEC	D:	90%	TEST LOCA		Ax	
MOISTURE SPEC:		above spt	adj.	to Fest #	3 date	1 7/29/09
		SAND	CONF T	ESTING	· .	1 1
		<u>OAND</u>		<u> </u>		: ···· · · · · · · · · · · · · · · · ·
	Α \	<i>N</i> T of cone, jar, sand - Before	· -	6773.8	3	9
	В	WT of cone, jar, sand - After	· · · · · _	4031.0	!	g .
	C 1	WT of sand in cone	· _	1580		g
•	D . 1	WT of sand used		2742.8		g A-B
	E \	WT of sand in hole	· · · · · · · · · · · · · · · · · · ·	1162.8		g D-C
	F [Density of sand	_	89.6		pcf
	G '	Volume of hole	-	13.0 /0.0	2286	cf E÷F
		• WIT 6				lbs
		Gross WT of excavated soil + T	ARE _		<u> </u>	
		WT of TARE	· · · · · · · ·	1601 6	3.520	lbs
	J	Net WT of soil		1596.5/	<u> </u>	lbs H-I
	K '	WT Density	-	123.1		pcf J÷G
•	L :	Soil + TARE (Wet)		947.4		lbs
		TARE #4		138.8		lbs
	N .	Soil + TARE (Dry)	· · · ·	820.9		lbs
		WT of Water		176.5		lbs L-N
	Р,	WT of Soil	· · · · ·	682.1		lbs N-M
	Q I	Moisture Content	_	18.5		% O ÷ P
		Optimum Moisture Content		15.0		%
	R	Dry Density	-	173.9		pcf K ÷ (I + Q)
·	S	Lab Maximum		115.5		pcf
		(Lab No	-01			•
		Percent Compaction		90%		% R÷S
Weight = WT Cubic Feet = 6		Pounds = lbs Grams	= G	Pounds per Cubic Conversion Grams	•	

CONSOLIDATED ENGINEERING LABORATORIES

Date	Location	Tare	Wet soil + tare	Dry soil + tare	Wt. of water	Wt. of soil	Moisture Content
6/3/2009	for nuke gauge - area B1 insitu test #1	368.60	1250.6o	1238.10	12.50	869.50	1.40%
6/3/2009	for nuke gauge - area B1 insitu test #2	366.20	1283.7o	1277.70	6.00	911.50	0.70%
6/3/2009	for nuke gauge - area B1 insitu test #3	365.7o	1006.7o	998.2o	8.50	630.30	1.30%
6/3/2009	for nuke gauge - area B1 insitu test #4	367.90	1266.7o	1241.90	24.80	874.0o	2.80%
6/3/2009	for nuke gauge - area B1 insitu test #5	367.2o	888.80	877.9o	10.90	510.7o	2.10%
6/3/2009	for nuke gauge - area B1 insitu test #6	138.70	743.40	723.5o	19.90	584.80	3.40%
6/3/2009	for nuke gauge - area B1 insitu test #7	110.8o	661.1o	654.5o	6.60	543.70	1.20%
6/3/2009	for nuke gauge - area B1 insitu test #8	137.20	594.60	577.6o	17.00	440.40	3.90%
6/3/2009	for nuke gauge - area B1 insitu test #9	138.40	633.30	624.9o	8.40	486.50	1.70%
6/29/2009	for nuke gauge - area Ax -2' insitu test #1	138.3o	796.0o	746.9o	4 9.1o	608.60	8.10%
6/29/2009	for nuke gauge - area Ax -2' insitu test #2	110.9o	705.0o	635.7o	69.30	524.80	13.20%
6/29/2009	for nuke gauge - area Ax -2' insitu test #3	109.40	477.3o	453.40	23.90	344.00	6.90%
6/29/2009	for nuke gauge - area Ax -2' insitu test #4	137.20	816.6o	790.7o	25.90	653.50	4.00%
6/29/2009	for nuke gauge - area Ax -2' insitu test #5	137.50	659.6o	607.0o	52.6	469.50	11.20%
6/29/2009	for nuke gauge - area Ax -2' insitu test #6	137.0o	731.8o	700.5o	31.3	563.50	5.60%
					: i		
7/16/2009	for nuke gauge- area Ax -25' test #1	137.10	755.0o	683.6o	71.40	546.50	13.10%
7/16/2009	for nuke gauge- area Ax -25' test #2	137.20	499.90	453.50	46.40	316.30	14.70%
7/20/2009	for nuke gauge - area Ax -24' test #1	138.50	915.50	825.9o	89.60	687.40	13.00%
7/20/2009	for nuke gauge - area Ax -24' test #3	139.20	1003.0o	896.7o	106.30	757.50	14.00%
	`						
7/28/2009	for nuke gauge - area Ax - lift 1test #1	137.20	892.40	794.8o	97.60	657.60	14.80%
7/28/2009	for nuke gauge - area Ax - lift 1test #2	138.50	1155.30	988.30	167.0o	849.80	19.70%
7/29/2009	for nuke gauge - area Ax - lift 2 test #1	137.30	486.80	436.80	50.00	299.50	16.70%
7/29/2009	for nuke gauge - area Ax - lift 2 test #2	138.9	698.50	601.0o	97.50	462.10	21.10%
7/29/2009	for nuke gauge - area Ax - lift 3 test #3	138.60	965.30	832.1o	133.20	693.50	19.20%
							<u> </u>
	,		<u> </u>	<u> </u>		<u> </u>	



"Partners in Quality"

September 17, 2009

Mr. Steve Ellis Lawrence Livermore National Laboratory P.O. Box 808; L-651 Livermore, California 94551-0808

Subject:

LLNL B-850 Soil Remediation

B850-S300 Livermore, CA

CEL Project #10-01264-LAW & 10-01265-LAW

EARTHWORK AND LABORATORY TESTING SUMMARY August 1, 2009 thru August 31, 2009

CEL representatives observed site operations and/or performed nuclear gauge moisture and density determinations on compacted soils at the above project from August 1, 2009 thru August 31, 2009. Laboratory testing was performed on soil samples from the site. Enclosed are the results of the field and laboratory testing.

We note that some density tests were measured below 90% as presented by these test results. We recommend that you confir with the Project Engineer, SCS Engineers, to resolve the low density results observed in these tests. It is the responsibility of LLNL to review and after consulting with SCS Engineers, approve these test results.

No. 2474 Exp. 12/2011

Eric J. Swenson. PE. GE

Principal Geotechnical Engineer

Respectfully submitted.

CONSOLIDATED ENGINEERING LABORATORIES

Michael Wissink Project Manager

Enclosures: Daily Field Reports

Moisture/Density Curves

Sand Cone Testing

Moisture Content Summary

Break Log Summary

Distribution:

1 to Addressee

MW/EJS: pmf

R:\Geotech Projects by Number\LLNL\LLNL Bldg 850 Excavation and Remediation Plan - 95% Submittal\Monthly Summary Reports\August Summary (Steve Ellis).doc

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Consolidated Engineering Laboratories 534 23rd Avenue PROJECT NARRATIVE REPORT, Oakland, CA 94606-5307					n # : : : : : : : : : : : : : : : : : :				
Job Name & Address:	Soil REME	= DIA Tron	Date. 8-3-09	Time: 0700	Cel No.				
General Contractor:	2-11.00	☐ Do not pro	ceed with work						
Subcontractor:	SCS ENGI.	☐ Make nece	essary corrections .						
TYPE OF INSPECTIO	N: BOUGH	☐ PARTIAL ·	COMPLETE						
☐ BUILDING	STRUCTURAL	□ CONCRETE □	STEEL DECK	□ FORMWORK					
UNDERGROUND	FOOTING	· 🗆 MASONRY 🗆	BOLT INSP.	☐ FIREPROOF!	NG 🖸				
☐ ELECTRICAL	FOUNDATION	COLUMNS - D	WELD INSP.	☐ WATERPROC	DFING []				
☐ PLUMBING	☐ FRAMING	STEEL	REIN. STEEL	B 5016 5	OLIUMACH TION				
☐ MECHANICAL	REFRIG.	☐ DRYWALL ☐	ROOFING	0					
☐ HEAT VENT.	GAS PIPING	SEWER D.	MASS GRAI	1416 / ES	KCAUM TION				
COMMENTS:		8-3-09							
0730	= GRIFFIN	SPREAD 5	To CEMEN	IT ovek	LIFT #6				
E)	7=18.00 9	LSTARTED M	TIX & RE	MIX OF	LIFT.				
0900=		IL SAMPLE C			EST.				
1000 =		15174 7557	,	سيمين	EV. 1286.				
1830 =	2 ND DENS	SITY TEST O	OF LIFT	6 ELC	U. 1286				
1300 =	3 RD DENSI	14 7257 01		LELEV.	1286				
1315 =	SES STAC	TED PLACEM	ENTOF	LIFTE	7 ELEV. 1280				
1445 = 0	GAIFFIN ST	PEAD 5% CE	MENIT OU	ER HAL	FOFLIFTER				
ON	S. SIDE ME	TORING WE	US, MIX	9 DEN	Mix				
1600 = 7	TOOK SOIL	CAMPLE FOR	Cyh. B.	RK.					
1640 = 4	ITH DENSIT	G TEST BI	V LIFT &	# 17					
1700 = 3	CS CREW	PLACED SM	AN LIFT	OF CON	TAMENOS TES				
S	och over	MIX a Com	DALTED S	Porl 70	Photeet 17.				
					·				
				•					
	· ·								
·									

Consolidated Engineering Labo 534 23rd Avenue Oakland, CA 94606-5307	pratories PROJECT NA	RRATIVE REPORT	.Building Peri	Trul #
				:
Job Name & Address: 3-850 Sold Res	m= > 1 - 1 - 1	B-4-69	Time: 0700	Cel No. 267
General Contractor:				
Canado	CERRUDO S	Work Approved ☐ Work in Violatio		roceed with work
Subcontractor: SCS EM	GINTERING			cessary corrections
TYPE OF INSPECTION: CREOUG	H [] PARTIAL	COMPLETE		
BUILDING STRUCTURAL	CONCRETE	STEEL DECK	☐ FORMWOR	к 🗆
UNDERGROUND DEFOOTING	· □ MASONRY	☐ BOLT INSP.	☐ FIREPROOF	ING D
☐ ELECTRICAL ☐ FOUNDATION	☐ COLUMNS	· 🗆 WELD INSP.	☐ WATERPRO	OOFING D
PLUMBING FRAMING	STEEL	REIN. STEEL		
☐ MECHANICAL ☐ REFRIG.	☐ DRYWALL	ROOFING	Desout Sof	DIFICATION
☐ HEAT VENT. ☐ GAS PIPING	SEWER	DMASS CRA	DAG 1 E	XCAUSTION
	8-4-09			
COMMENTS:			AND WALE	05 11FT #17
0730= GRIFFIN S	PREAN CEMENT	STO OVER 2	MALF	of Lift !
			Ell WT.	or coment 18
CREW MIX 9	REMIX SOIL	<u> </u>		
0800 = TOOK SAN	DLONE TEST			
0850 = NEW MIXE	R DELIVERED	To SITE		
0845 = CHECK CEN	WENT WT. 1	7.0		
0920 = AFTER RED			FOR NEW	U CURVE &
CYL. BAE		•		
0945 - TOOK DEN		FIELL 190	7 & Mail	Trest Presence
1030 = SCS PLACE		@ ELEV-128		
1215 = GAITFIN SPA			11X 4 /2	EMILX 4 CENTIFIC
1400 = TOOK DENSI	747551@1	288 ELEV.	. 1	17-11-11
1430 = GRIFFIN CON	TINUE'S TO PLAC	E CEMENT &	WER LIF	7 8 WT. 19.5"
1600 = TOOK DENSON 1630 = SCS PLAGE	14 TEST 6	ELEU-128	080	
1630 = SCS DLAGE	ED PLACED 1	2"LIFT F	OR LIF	7 09 ELEVISS
		,,, , , , , , , , , , , , , , , , ,		

						Tananan araba a
	igineering Laborato	ories		IVE REPORT ,	Building Permit	ŧ
534 23rd Avenue Oakland, CA 946	: 506-5307					
				1		
Job Name & Address:	e 1 1-	= 51.1	_	5-5-09	Time: 0700	Cel No.
General Contractor:	Soil Ronge		4	Í _		KHW IGEN
<u> </u>	iAMOND CE	PRUDO.	SERV		☐ Do not prod	
Subcontractor:	SUS ENGIN	NEERING		☐ Work in Violation	∟j Make nece	ssary corrections
TYPE OF INSPECTIO		☐ PARTIA	AL ·	☐ COMPLETE		
BUILDING	STRUCTURAL	☐ CONCRETE	□ ST	EEL DECK	□ FORMWORK	
UNDERGROUND	FOOTING	. MASONRY	□ BC	OLT INSP.	☐ FIREPROOFIN	۱G 🗓
DELECTRICAL	FOUNDATION	☐ COLUMNS	- □ WI	ELD INSP.	☐ WATERPROO	FING
PLUMBING	FRAMING	☐ STEEL	. D BE	IN. STEEL	<u> </u>	
☐ MECHANICAL	☐ REFRIG.	☐ DRYWALL	□RC	OOFING (SSOIF SOK	1DIFREATION
☐ HEAT VENT.	☐ GAS PIPING	SEWER	DE M	ASS GRAD	WE JEX	CAUR Trong
COMMENTS:		8-5	-09			
0730=	SES RELOC	CATES C.	PZ			
	28 STARTED			107 S.E.	EMBANKA	TENT ON W.
	07 PT40					
PILEG						1
11.70 = 6	DIFFIN STA	APTED SPA	EAD)	5% CEN	MENT 4	17.17.00
OVE	A LIFT#9	FLEV. ±	128	9 MIX	+ REN	IX of COMPACT
1200 = 3	Soil SAMPK	E TAKE	W FO	R 641.	1102D 4	BLEAK.
	BENSITY 7					MOISTURE
	SAMPLE				/	
1230 =	CHECK LE	MENT 4	WT.	16.47		
1500 = 1	CHECK CE DENSITY T SCS PLAC ELEV. 189	EST EL	LEU.	1289		
1530 =	SES PLAC	ED LH	-1 t	+10 ±18	Q"LIFT	FOR
土	ELEV. 129	O				
						
					<u> </u>	
				<u> </u>		

Consolidated Engineering Laboratories 534 23rd Avenue PROJECT NARRAT Oakland, CA 94606-5307		Building Permit	
Job Name & Address:	Date. 8-6-09	Time: 0700	Cel No.
General Contractor:		□ Do not proce	eed with work
Subcontractor:	☐ Work in Violation	1	•
SCS ENGINEERING			
TYPE OF INSPECTION: JEBOUGH PARTIAL .	COMPLETE		
☐ BUILDING ☐ STRUCTURAL ☐ CONCRETE ☐ ST	TEEL DECK	⊡ FQRMWORK	
☐ UNDERGROUND ☐ FOOTING ☐ MASONRY ☐ BO	OLT INSP.	☐ FIREPROOFING	G 🖸
☐ ELECTRICAL ☐ FOUNDATION ☐ COLUMNS ☐ W	ELD INSP.	☐ WATERPROOF	ING 🗆
☐ PLUMBING ☐ FRAMING ☐ STEEL ☐ RE	EIN. STEEL		
	DOFING	\$ 5016 SOL16	
☐ HEAT VENT. ☐ GAS PIPING ☐ SEWER ☑ 🗷 🗷	1455 GRAZ	WAG EXC	CAUR Tiene
COMMENTS: 8-6-09	,		
0810 - GRIFFING SPACAD CEMENT	47. 16	5. 4 may	X & PENNIX &
compact tis "LIFT CELEV.		DTALIF	7
0900 = Took Soil SAMPLE F.	of Cuk	NE & TO	57 6415
0985 = DENSITY TEST TAKEN	ELEU ±	1290	
1010 = QEMENT WT. 17			
1145 = DENSITY TEST TAKEN	(ELEU.	# 1890	
SCS STARTED COMPAC			V-SITCH
WEST OF RT. #4 RD.			
1330 = DENSITY TEST TAKEN	ve V-	0,704 -	4'ACGRADE
1430 = DESCS CONTINUES TE	BACK	FILL W	-DITEH +
COMPACT EMBANKINENT	ev-017	eif, of 1	LACE
BACK FILLIN PIT FOR LIF	7 4 11	+1201	IFT @
FLEV. ± 1291.			·
DENSITY TEST TAKEN.	-3'AC	GRADE.	
·			

Consolidated Engineering Laboratories 534 23rd Avenue PROJECT NARRAT Oakland, CA 94606-5307	Building Permit #	
Job Name & Address:	Date:	Time: Cel No.
B-850 SOIL DEMEDIATION	8-10-09	0700 47/10/269
General Contractor: (EARWDO / ANDY	☐ Work Approved	☐ Do not proceed with work
Subcontractor: SCS/JASOM	☐ Work in Violation	☐ Make necessary corrections
TYPE OF INSPECTION: TO ROUGH TO PARTIAL	COMPLETE	
☐ BUILDING ☐ STRUCTURAL ☐ CONCRETE ☐ ST	EEL DECK	□ FORMWORK □
☐ UNDERGROUND ☐ FOOTING ☐ MASONRY ☐ BO	OLT INSP.	☐ FIREPROOFING ☐
☐ ELECTRICAL ☐ FOUNDATION ☐ COLUMNS ☐ W.	ELD INSP.	☐ WATERPROOFING ☐
☐ PLUMBING ☐ FRAMING ☐ STEEL ☐ RE	EIN. STEEL .	X SOIL SOLW STIGHTION
- MEGNATIONE	OOFING	0
☐ HEAT VENT. ☐ GAS PIPING ☐ SEWER Ø Ø	1455 GRADI	8 <i>C</i>
COMMENTS: 8-10-09		
0730 = TOOK DENSITY TEST OF	1 EMBAN	VKAJENIT @ V-DITEH
0830 = GAIFFIN SPARAD CEMENT		
0915 = START COMPACTION OF L	•	
Took Soil SAMPLE FOR	•	
0925 = DENSITY TEST TAKEN	· ·	
1015 = DENSITY TEST TAKEN C	@ V-01	TCH
1115 = CEMENT WT. 16.5		
1245 = DENSITY TEST TAKENE	2 11-017	CH
1430 = DENSITY TEST TAKEN	@ ELE	V ± 124/
1500 = SES BACK FILL LIFT		
1545 = SPREAD CEMENT WT 16		
1600 = 51ART MIX & REMIX	A compi	Action of LIFT
3/2 only HALFOF LI	FTON	SOUTH SIDE OF
MONITORINE WEILS		
1645= DENSITY TEST TAKEN	e ELEV	1. ± 1292

						
Consolidated Eng 534 23rd Avenue Oakland, CA 9460	gineering Laborato 06-5307	PROJECT NA	ARRAT	IVE REPORT	Building Permit :	#
Job Name & Address:	Soil REM	EDIATION		Date: 8-11-09	Time: 0700	Cel No. LAW 1364
General Contractor:	PERANDO			₩ork Approved	☐ Do not proce	eed with work
C b seed to the	estable.	1 GRIFFI	N	☐ Work in Violation	☐ Make neces	sary corrections
TYPE OF INSPECTION	v: □ ROUGH	[] PARTIA	L	COMPLETE		
BUILDING	STRUCTURAL	□ CONCRETE	S1	EEL DECK	FORMWORK	0
UNDERGROUND	☐ FOOTING	☐ MASONRY	□ВС	OLT INSP.	TIREPROOFING	G []
☐ ELECTRICAL	☐ FOUNDATION	☐ COLUMNS	□ W		☐ WATERPROOF	
PLUMBING	☐ FRAMING	STEEL	☐ RE	EIN. STEEL	a MASS	6RADINE
☐ MECHANICAL .	☐ REFRIG.	☐ DRYWALL		OOFING	<u> </u>	0
☐ HEAT VENT.	GAS PIPING	SEWER	Di_	Soik Solio	WA CATIE	0r1 -
COMMENTS:		8-11	-09	3		
305	CONTINE	ES To	PLA	CE/BACK	KFME.	LEAN Soch
1N N-2	SITCH/EM	BANKME	NT	111 -6" L	1FT5 4	compact
USING	· ••• /				·····	
GAIFA	FIN CONTIN	1005 50	ih.	SOLIDIFIE	Alion 1.	u PIT OM
LIF	7 #12 EL	EV. ± 129	Ŧ J		•	
0890 = D.	ENSITY TO	ST TAKE	n C	E VOITE	4 E-SIK	DE PIT.
1000 = D.	ENSITY TO	FET TAK	EN	@ ND	iTeH	
66	IFFIN STAI	OTED OF	5	To CEMIC	NT OV	ER AND
MAA		7412 EL				
Mone	ITORING W					
	CEMENT		T-			
	MIXARE			il & CEM	ENT.	
1045 =	Soil SAM	NPLE TAI	YEN	FOR EY	1. BREM	KS,
1115 =	COMPAC	Tron OF	LIF	7 12 5	TANTS	
	DENISITA					
1230 =	DENSITY	75.87 7		N LIFT	#12	
14100 =	SAND C	PAG TE	57	TAKEN		
16/20 =	CCS 57	TART RAI	- X	Fell OF	LIFT H	13 ELEU
F	1293 IN	DIT.	<u> </u>			
	121011					
						· · · · · · · · · · · · · · · · · · ·

	The second secon
Consolidated Engineering Laboratories 534 23rd Avenue PROJECT N Oakland, CA 94606-5307	Building Permit #
Job Name & Address:	Date: Time: Cel No.
5-850 Soil REMEDIATION	11 8-12-090700 LAW 1264
General Contractor: CERROSO	☐ Work Approved ☐ Do not proceed with work
Subcontractor: SCS / GRIFFIM	☐ Work in Violation ☐ Make necessary corrections
TYPE OF INSPECTION: AROUGH APARTIA	AL [] COMPLETE
☐ BUILDING ☐ STRUCTURAL ☐ CONCRETE	☐ STEEL DECK ☐ FORMWORK ☐
☐ UNDERGROUND ☐ FOOTING ☐ MASONRY	☐ BOLT INSP. ☐ FIREPROOFING ☐
☐ ELECTRICAL ☐ FOUNDATION ☐ COLUMNS	☐ WELD INSP. ☐ WATERPROOFING ☐
☐ PLUMBING ☐ FRAMING ☐ STEEL	REIN STEEL DE MASS GARDANG
☐ MECHANICAL ☐ REFRIG. ☐ DRYWALL	ROOFING
☐ HEAT VENT. ☐ GAS PIPING ☐ SEWER	ox Soit SolidiFicAtion
COMMENTS: 8-13-	09
	CK FILL & COMPACTION OF V-DITCH
	OF DIT @ TOE IN OF CONTAMINATE
Soil & CLEAN SOIL , BOT	
of comPACTED AS ONE	<i>-</i> .
	L SOLIDIFICATION OF SOIL @
TIE IN	
0800 = SPREAD CEMENT 3	5% WT. 17# , MIX & REMIX
	16 REX. LIFTED
*	WEN @ TIE IN ELEV. ± 1288
With moretuas	SAMPLE.
1000 = SPATAD CEMENT	137.16#
Jours Strenk Ezeret	compact LIFT & & TIEIN
1120 - DEWELTH TENT	TAKEM ON LIFT # Q ELEU.
± 1289	771224
	SPAEAD OF STO CEMENT OVER
11FT #13 ON SOUTH	SIDE OF MONITORING WELLS ONLY
@ ELEU ± 1293.	
1300 = CEMENT WT	177
1330 = MIX, REMIX 4 C	COMPACTION OF LIFT#13
S. SIDE MONITOR	fine wells only.
1345= SOIL SAMPLE 7	TAKEN FOR CYL. BREAKS
1410 = DENISITY TEST 7	TAKEN OF LIFT #13 ELEU
土 1293.	
·	
<u> </u>	

Oakland, CA 94606-5307 Job Name & Address:	Consolidated En	gineering Laborato	ories PROJECT NA	RRATI	VE REPORT	Building Permi	il #
JOB NAME & ACCITES. S. S. S. S. S. S. S. S. ATTON S. 13-09 OTW 144 164 General Contractor: CAPUDO General Contractor: CAPUDO GENERAL CONCRETE BUILDING STRUCTURAL CONCRETE STEEL DECK FORMWORK UNDERGROUND FOOTING MASONRY BOLT INSP. FIREPROOFING PELECTRICAL FOUNDATION COLUMNS WELD INSP. WATERPROOFING PLUMBING FRAMING STEEL REIN. STEEL REFRIG. DRYWALL ROOFING HEAT VENT. GAS PIPING SEWER EMECHANICAL GAS PIPING SEWER STEEL COMMENTS: SOJO TO TIE IN TO SOLIDIFIED CONTAMINATED SOIL 1030 - DENSITY TEST THEN C. VDITCH 1360 - DENSITY TEST THEN C. VDITCH 1360 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1030 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1030 - DENSITY TEST THEN C. VDITCH 1360 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1030 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1045 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1050 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1050 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1050 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1050 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1050 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1050 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1050 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1050 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1050 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1050 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1050 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1050 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1050 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1050 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1050 - LEE CONTINUES TO EXCENDED VENT CONTAMINATED SOIL 1050 - LEE CONTAMINATED SOIL 1050	Oakland, CA 946	06-5307					
General Contractor: Work Approved Do not proceed with work Work in Violation Make necessary corrections	Job Name & Address:	Soil PEN	EDIATION				_ · · · _ · ·
Subcontractor: CLS CNED. TYPE OF INSPECTION: BOUGH PARTIAL COMPLETE BUILDING STRUCTURAL CONCRETE STEEL DECK FORMWORK UNDERGROUND FOOTING MASONRY BOLT INSP. FIREPROOFING PLUMBING FRAMING STEEL REIN. STEEL REIN. STEEL REFRIG. DRYWALL ROOFING HEAT VENT. GAS PIPING SEWER FIXENWATE FORMWORK MATERPROOFING MATER	General Contractor:	PERPURO	• •			☐ Do not pro	oceed with work
TYPE OF INSPECTION: BOUGH PARTIAL COMPLETE BUILDING STRUCTURAL CONCRETE STEEL DECK FORMWORK UNDERGROUND FOOTING MASONRY BOLT INSP. FIREPROOFING ELECTRICAL FOUNDATION COLUMNS WELD INSP. WATERPROOFING PLUMBING FRAMING STEEL REIN. STEEL, MECHANICAL REFRIG. DRYWALL ROOFING HEAT VENT. GAS PIPING SEWER KACANATOR COMPRETATION COMMENTS: S-13-09 O 750 = SES CONTINUES TO EXCANATOR W-D. TEHY FIND BANK RIDENT & RECOMPACT V-D. TEHY X & 6" LIFTS TO TIE IN TO SONDIFIED CONTAMINATED SOIL 1030 = DENSITY TEST TAKEN V-D. TEHY 1145 = DENSITY TEST TAKEN V-D. TEHY 1360 = OF DENSITY TEST TAKEN V-D. TEHY 1370 = OF DENSITY TEST TAKEN V-D. TEHY 1370 = OF DENSITY TEST TAKEN V-D. TEHY 1370 = OF DENSITY TEST TAKEN V-D. TEHY 1370 = OF DENSITY V-D. TEHY 1370 = OF DENSITY V-D. TEHY 1371 V-D. TEHY 1371	Subcontractor:		ED.		☐ Work in Violation	☐ Make nece	essary corrections
UNDERGROUND FOOTING MASONRY BOLT INSP. FIREPROOFING				L	COMPLETE		
DELECTRICAL DEVISION DOLLARS DELL DESCRIPTION DELLARSTER DEVISION DELLARSTER DEVISION DEVISION DELLARSTER DEVISION DEVIS	BUILDING	STRUCTURAL	CONCRETE	□ ST	EEL DECK	☐ FORMWORK	
PRIMBING FRAMING STEEL REIN. STEEL	UNDERGROUND	FOOTING	☐ MASONRY	□во	OLT INSP.	☐ FIREPROOF	NG 🗓
MECHANICAL OREFRIG. ORYWALL OROOFING O OF MAXIMUTES TO EXCAVATION SCOMPRESSION OF THE TOTAL OR SOLD OF TAKEN ON THE SOLD OF MAXIMUTES TO EXCAVATE V-DITCH IN ± 6" LIFTS TO TIE IN TO SOLD OF FRED CONTAMINATED SOIL 1145 = DENSITY TEST TAKEN ON V-DITCH IN TOTAL OR SOLD OF MAXIMUTES TO EXCAVATE V-DITCH IN TO SOLD OR TAKEN ON V-DITCH IN TO SOLD OR TAKEN OF MAXIMUTES TO EXCAVATE V-DITCH OR TAKEN ON THE TAKEN OF MAXIMUTES TO EXCAVATE V-DITCH OR TAKEN	ELECTRICAL	FOUNDATION	☐ COLUMNS	□ W	ELD INSP.	☐ WATERPROO	OFING
THEAT VENT. GAS PIPING SEWER BEXCAVATION SCOMMENTS: S-13-09 0.730 = SCS CONTINUES TO EXCAVATE V-DITCH/ EMBANNAONT & RECOMPACT V-DITCH IN ± 6" NIFTS TO TIEINTO SOLIDIFIED CONTAMINATED SOIL 1030 = DENSITY TEST TAKEN @ V-DITCH 1145 = DENSITY TEST TAKEN @ V-DITCH 1300 = CAED CONTINUES TO EXCANATE NEDITCH/ CONTENSITY SIDE OF M-X PIT @ PJ. #4	PLUMBING	FRAMING	STEEL	□ RE	EIN. STEEL,		
COMMENTS: 8-13-09 0.730 = SCS CONTINUES TO EXCAVATE V-DITEM! EMBANKMENT & RECOMPACT V-DITEM! IN ± 6" LIFTS TO TIEINTO SOLIDIFIED CONTAMINATED SOIL 1030 = DENSITY TEST TAKEN @ V-DITEM 1145 = DENSITY TEST TAKEN @ V-DITEM 1300 = CAEU CONTINUES TO EXCAVATE V&DITEM! @ N.E. SIDEO OF M-X PIT @ P1. #4	☐ MECHANICAL	` ☐ REFRIG.	☐ DRYWALL		OOFING		
0730 = SES CONTINUES TO EXCAVATE V-DITCH/ EMBANNATA PECOMPACT V-DITCH IN ± 6" LIETS TO TIEINTO SOLIDIFIED CONTAMINATED SOIL 1030 = DENSITY TEST TAKEN @ V-DITCH 1145 = DENSITY TEST TAKEN @ V-DITCH 1300 = CAED CONTINUES TO EXCAVATE NO DITCH/ @ N.E. STOTON SIDE OF 1A-X PIT @ PT. #4	☐ HEAT VENT.	☐ GAS PIPING	☐ SEWER		EXCAVATION	LEO MAR	Thora
0.730 = SES CONTINUES TO EXCAVATE V-DITER! EMBRINENT & RECOMPACT V-DITER IN ± 6" NIFTS TO TIEINTO SOLIDIFIED CONTAMINATED SOIL 1030 = DENSITY TEST TAKEN @ V-DITER! 1145 = DENSITY TEST TAKEN @ V-DITER! 1300 = CAEU CONTINUES TO EXCAVATE VEDITOR! @ N.E. STORES SIDE OF A-X PIT @ PT. ITY	COMMENTS:		8-13-	09	·		
EMBANKMENT & RECOMPACT V-DITCH IN ± 6"NETS TO TIEINTO SOLDIFIED CONTAMINATED SOIL 1030 = DENSITY TEST TAKEN @ V-DITCH 1145 = DENSITY TEST TAKEN @ V-DITCH 1300 = CAEW CONTINUES TO EXCAVATE NEDITCH/ @ N.E. STOTON SIDE OF A-X PIT @ PT. IT Y		SES CO	NTINVES	75	EXCAV	ATE V	1-DITEHI
1030 = DENSITY TEST TAKEN @ V-DITCH 1145 = DENSITY TEST TAKEN @ V-DITCH 1300 = CAED CONTINUES TO EXCAVATE VEDITCH/ @ N.E. STORES SIDE OF A-X PIT @ PT. IT Y	J. upo	BANKMEN	TA RECOI	n PA	CT V-DI	TEM 1.	N + 6" LIETS
1030 = DENSITY TEST TAKEN @ V-DITCH 1145 = DENSITY TEST TAKEN @ V-DITCH 1300 = CAEW CONTINUES TO EXCAVATE VEDITCH! @ N.E. STOTON SIDE OF A-X PIT @ P1. IT Y							
1145 = DENSITY TEST TAKEN @ V-DITCH 1300 = CAEW CONTINUES TO EXCAVATE V& DITCH/ @ N.E. SIDEO SIDE OF 19-X PIT @ P1. IT Y							
1300 = CAEW CONTINUES TO EXCAVATE VEDITORY) CONTE. STOROWS SIDE OF M-X PIT CO PT. IT Y	1145 =						
QNE. SIDE OF A-X PIT'O	1300 =		NTIMUES.	70	EXEAVA	The No	DITEM
P/ II	10				= 0=	19-X	P17 @
1600 Link SHUF DOWN FOR DUE TO FIRE	D-7						
	1600	Loub SH	Toolal	- 4	TOZ DO	E 70	FIRE
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Consolidated Engineering Laboratori 534 23rd Avenue Oakland, CA 94606-5307	Building Permit 4	1		
Job Name & Address:	1 . /	Dale: Karana	1 .	Cel No.
General Contractor: 8 - 10 A	1A Tron	8-17:708-18-6		1961364
GERRUDO /	ANDY BELL	☐ Work Approved ☐ Work in Violation	☐ Do not proce	
Subcontractor: SUS ENGA 1	Chillian o		☐ Make neces	sary corrections
TYPE OF INSPECTION:	☐ PARTIAL	COMPLETE		
☐ BUILDING ☐ STRUCTURAL	CONCRETE	STEEL DECK	☐ FORMWORK	
☐ UNDERGROUND ☐ FOOTING	☐ MASONRY	☐ BOLT INSP.	FIREPROOFING	G 🗆
☐ ELECTRICAL ☐ FOUNDATION	COLUMNS	WELD INSP.	☐ WATERPROOF	ING 🗆
☐ PLUMBING ☐ FRAMING	STEEL	REIN. STEEL		
☐ MECHANICAL ☐ REFRIG.	☐ DRYWALL	□ ROOFING .		
☐ HEAT VENT. ☐ GAS PIPING	SEWER	Desch SoliDiFi	A Tear	
COMMENTS:	8-17-09			
: SES = CONTINE	es excav	IN TION, BAC	KF111, 4 C.	omPACTion
OF N.F. V-DITCHE		r.		
	8-18-0			
SOS = CONTINUES S	OIL BACK FIL	11 M F. J.	102 7101	IN P. 12"
LIFTS AR NESIDE				
0730 = 6AITTEN = SP	PD 5% CC	MENT OUE	1 ± 12"	KIFT#3
@ ELV. ±1290 W	7. 194			
0800 = MIX & REMI				
0810 = Took coil SA	, ,	CYL BAK		
0880 = CREW START				
0838 = DENSITHTEST 01	= 3RD LIFT			
0845 = START PLACEMEN	alt of Solk	FOR 4THLI	MEZ.	SIDE TIE IN
EGEV ± 1291				
OPSO = DENSITY TES	- Q N.E.	V-DITCH		
0900 = BACK FILL LIFT	THY @ Z	E. SIDE TIE	FIN.COM	Times 5
1000 = MIX OF REMIX	of Consta	CTION OF	LIFT	
1030 = DENSIFY &				
1/30 = DENSITY @				
1140 = PLACE MENT			1292	
1130 - 1 = 1		1-11-11		
1245 = SPREAD CE	WENT OUT	PLIFT'S	WT 18.	YIT
1300 = MIX, REM	y of Com	201 5711	LIFT E	LEV. 1292
C TIE 1.				
1330 - SES CONT	TADIES TO	BACK FILL O	v com PAC	ET N.E. V-
DITEM.				
×)" / C°/ ;				

Consolidated En 534 23rd Avenue Oakland, CA 946		ories PROJECT NA	ARRAT	IVE REPORT	Building Permit	#
Job Name & Address:				Date: 8-19-09	Time:	Cel No.
3-5	30 Soil AD	MEDIA TION			0700	2A4 1264
General Contractor:	CERRUDO	SERVE		☐ Work Approved	□ Do not prod	ceed with work
Subcontractor:		GRIFFIN SON	<u> </u>	☐ Work in Violation	☐ Make nece	ssary corrections
TYPE OF INSPECTIO	N: 🗆 RÓUGH	PARTIA	L 	COMPLETE		
BUILDING	STRUCTURAL	CONCRETE	□ S1	FEEL DECK	☐ FORMWORK	0
UNDERGROUND	☐ FOOTING	☐ MASONRY	□ B0	DLT INSP.	☐ FIREPROOFII	NG 🗆
☐ ELECTRICAL	☐ FOUNDATION	☐ COLUMNS	□ W	ELD INSP.	☐ WATERPROO	FING
☐ PLUMBING	☐ FRAMING	☐ STEEL	□ RE	EIN. STEEL,	O	
☐ MECHANICAL	REFRIG.	☐ DRYWALL	□ RC	OOFING	O	□
☐ HEAT VENT.	☐ GAS PIPING	SEWER	Z	Soth SoliDi	REATHON	<u> </u>
COMMENTS:		8-101-	09	,	·············	
	ENSITY TEST					
084.2	ACEMENT OF	115-146	<u> </u>	CIDE THE	IN FLEV.	±1293
0830 = Pd	talif endil	1111 - 55 1	, <u>, , , , , , , , , , , , , , , , , , </u>	UPILE 3	En RANK on	ENT @ South
· ·		4 / 18N OF	1000	E 1122 472	#11207 1741 117 <u>1</u>	<u> </u>
	02-10-10	ر مدن سر سرد ر	سیسه و	104 -111	15-12-6	O TIFINS
	DREAL) CEM					
0935 = Da	ENSITY TES	7 6 V-DI	1019	Melle	-12/	
0940= 10	MIX, REMIX	4 COMPAC	<u> </u>	W BY WIF	10 7 = 1	1.1
	NSTY TES				0 772.7	1/14
	NSITY TEST				<u> </u>	
	LACEMENTO					
	PAEAD CE.					· · · · · · · · · · · · · · · · · · ·
	X, REMIX 9				7	
1335 = 5	AND COME	@ TIFIN L	1FT	# 17		
1410 = D	EMSITY TES,	- @ V-DIT		N.E. SIDE	-	
1445 = 1	PLACEMENT	OF LIFT	80	TIE IN	ELEV. I	1294
	SPR CORPER	TIAN TO E	KEV	1 ±1293	, 	
1600 = -	SPREAD CA	MENT 55	61	177	W7. 17.	8=
	only Two	PASSES	OME	on dit	1 # 8 C	E. SIDE
	TIE IN					
			710-	16F TAN	ATED 80	14.1N Two
	ASSES ONL		· · ·	, , , , , , , , , , , , , , , , , , , ,		
17	703 ES ENL	7			· · · · · ·	
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Consolidated En 534 23rd Avenue	gineering Laborate	ories PROJECT NA	RRATI	VE REPORT	Building Permit	#
Oakland, CA 946	06-5307					
Job Name & Address:	DEMITER	VATOON		Date:	Time:	Cel No.
_5-830	SOIL SOLIDIFIC	ATION		8-30-09	0700	11411364
General Contractor:	CERRUSO			☐ Work Approved	☐ Do not proc	eed with work
Subcontractor:	S / 6ATP	TIN	:	☐ Work in Violation	☐ Make neces	ssary corrections
TYPE OF INSPECTIO		☐ PARTIAL		COMPLETE		
☐ BUILDING	☐ STRUCTURAL	CONCRETE	□ ST	EEL DECK	☐ FORMWORK	0
UNDERGROUND	FOOTING	☐ MASONRY	□ BC	DLT INSP.	☐ FIREPROOFIN	IG 🗆
_ ELECTRICAL	☐ FOUNDATION	COLUMNS	□·Wf	ELD INSP.	☐ WATERPROOF	FING. 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
☐ PLUMBING	☐ FRAMING	STEEL	□ RE	IN. STEEL	<u> </u>	
☐ MECHANICAL	☐ REFRIG.	☐ DRYWALL	☐ RC	OOFING		
☐ HEAT VENT.	☐ GAS PIPING	SEWER		ah Sakt di Fr	Hrav.	
COMMENTS:		8-20-6	7			
0730=	GRIFFIN.	STARY TO	55	PAGAD	5% C	EMENT
ONER	Soil @ K	SIDE TIME	T. 1/4	1 of No F	MIFOF	270
ELEV	<u> </u>	4) T. OF	Ci	mENT	17#	4/1/13
0745 =	1118 4	REMIX	Co	EMENT	-4 50	16 .
0810 =	GAIFFIN	MIKER	1916	POKE DO	WN	
0840 =	REMIX S	tost w/	/ <u>~</u>	PARE 1	PIXER	
0900=	CLY BA	EAK SA.	of F	16 7	AKEN	
0930=	DENSITY	TAMEN	Ø.	5.8100	TIEIN	/
1.000 =	CHECK -	WT. OF	Ca	MENT	17.4	7
1015 =	MIX 9	REMIX	car	VTINOC	ES M.	SIDE
······		ING WEG				
1215 =	DENSIT	y TES?		TAKE	ns	
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AILY FIELD REPORT

	Geotechnical Engineering • Engineering Ge Environmental Management • Water Reso	ology urces	Report #:			Date: 9-14 76	0-15-100
Project Name	. Pesse Soil Stanto	مرورات کروس ای میا	+	1 Aut 1	164	Page of	3 2.0
Field Rep:	Tony Phillip-		Project Manager		(3. 3.)	1 - 3	
Scope of Work:	☐£Mass Grading ☐ Pavement ☐ :		⊒50ther Hour	s Charged:	■ CFull Time	☐ Part Time	
Contractor:	CENAUDO /SES		Conditions:	Sunny	⊿ -Windy	□SHot □ N	1100000
Contractor Re	presentative: ANDY BEI		H.	Cloudy	Rain	A DECEMBER	Dg
Comment/ Sk		_	14-09				
0730	o = SCS-PLACE	MENT	OF BACI	¥ F111 =	E 12"/	N PITOFF	4-X
0915		PEAD .	5% CEM	15117 0	oved d	IFT, CEME	NT.
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1010	os START mi						
La contract of the second			anten e	ont hill	7 22	124416	LIFT
1100	= CHECK CEN	a com	WT. 17	7. 3	/ \> /\=	46	
1110	" ,"						
	3.7						
1300	= SPAEND CEN = MIX + REN	TENT (ON N. SI	0000	1317.00	entern wit.	16.24
1415			والمنافع المتعارض المتعارض المتعارض	A - 27	سيدسيد	1.11044	
1615						2007	
						د د د محصه سید سه د و	
1830	= SES PLACE			SUER.	مرجم شده مها مساه	AIP / IT	7.0
	coren juda						
			25-09	The second secon			
073C	= SES PLACE	50 ±1	2" Soll	oved x	IT ABE	ACSECTO	2 12-1
, and the second	NO GPS RÉADI. LIFT #15	albert	AIFT. K	APPROXI.	MATE I	ELEVATION	1/295
	> GRIFFIN 3 PRO	40 C.E.M.	CHTOVER	LIFT	Compen	17 47 19.	3 ==
0950	= MIK AROUND ME	ONLITORE,	and WELL	g 4 505	DLACEN	MIK SOIL B	ETWEEN
	MENITERING WE	115 4	10.00,0ACT	ED USIA	6 7200	LE BACK UN	BERG PLA
	4 Jumpinit JAC.	of the same					
1050	The second of the						
1370	= DENSITY TES		アドレ ベイビノエア	CINE SHOW	THE.		
1500	= CPAFAA KIMBA	de en			م س	المنابع در صار سدا	00
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	- Soil SAMPLE						
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	GES CONTINU			FILF 4	COMPAC	(7 W/BOX	NACE SY A
	3 K.SIDE V-	DITCH	pro p	and the			
			•				
tractor identified, to form opinio	onals are represented on site soley to observe operations of the con-	This DFR	is Preliminary - A prelimin	ary report is provided		inal - A final report is an instrument or	
from its obligation to meet conti findings and opinions. The c	and activities of our field representatives do not relieve any contractor tractural requirements. No one except our client may rely on our contractor retains sole responsibility for site safety and the methods, partnersing.	or conclusions and/or	at field observation was performe recommendations conveyed in the recedence over those indicated in a	d. Observations and/ e final report may vary	service. Any conclusions evaluated by the professio	drawn from this report should be discus nal involved.	sea with and
operations, and sequences of co	D / 1 / /			· · · · · · · · · · · · · · · · · · ·			
Field Representati	ve Jall Malt	Date:	Reviewed E	Ву:	· · · · · · · · · · · · · · · · · · ·	Date:	
i iciu nepresentati	VECTOR OF THE PROPERTY OF THE	Date:	neviewed b	·y·		vale	

0830 = CAIRFIN START SPREAD OF STOCKMENT EVER LIFT THE

CEMENT WT 18.0 = 0815 = 1041 & REMIX LIFT

0900 = SOIL SAMPLE FOR LYL. BREAKS

0935 = DENSITY TEST ON LIFT

0945 = SPREAD 1070 CEMENT WT. 34 = @ TIEIN/SHEIL E.SIDE

OF PIT T 9'WIDE EL T 1293 APPROXIMATE.

1000 = MIX & REMIX OF 1070 TREATED SOIL

1010 = SOIL SAMPLE TAKEN OF 1070 TREATED SOIL FOR CURVE

Q CYL. BREAK.

1035 = DENSITY TEST ON 1070 TREATED SOIL

1300 = DENSITY TEST @ MONITORING WELLS

1315 = SIDEAD STOCKMENT ON SOUTH SIDE OF MONITORING

WELLS LIFT = 16 CEMENT ON SOUTH SIDE OF MONITORING

1450 = DENSITY TAKEN LIFT 16 WITH ENISTEDE SAMPLE

1515 = SAND COME TAKEN ON LIFT # 16

1630=ELEVATION CORRECTION BASEDOSSES ENGA. 6 PS

18 - LIFT # 16 1293 40 TIENE SIDE SHEIL - 1288

operations, and sequences of construction.	from and shall take precedence over those molcated in a premininary report.	
Field Representative:	Date: ————————————————————————————————————	Date:
in the same of the		

This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary

This DFR is Final - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

AILY FIELD REPORT

	Geotechnical Engineering • Engineering Environmental Management • Water Re	Geology sources	Report #:			Date: タニラ	
Project Name	B-850 Sold AEMIC	مودور ترثيق المتدر (م	Project Nu	mber: JAWS 197	£ £1		_ of
	Tom Dhilless		Project Ma			The second second	
Scope of Work:	Ass Grading Pavement	Utility Trench	☐ Other	Hours Charged:	☐ Full Time	☐ Part Time	
Contractor:	アンクリング はんしん はんかんかん		Conditions:	Sunny -	D(Windy	☐ Hot	□ Mild
Contractor Rep	presentative: ANDI 81	5//	conditions.	Cloudy	Rain	.≟ ☐ Cold	□ ·Fog /
Comment/ Sk			71-09	>			
0800	= met w/Al	IEN ESK	icker es.	F & PIFFIN	150114	LENARK	LONG
دُک	OIL ENGE WISCS	INGA.	4 74	TY 57472	المراجع لي (م	and the same	
P. F.	الر اليفرين من المراحظ المنظمة	يتغر منتو سندرجم	فتحواسمو سيخر فتنستهانه	ر و الرستونسية	رمست بالأفحم ورور	1	const 4
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Authority San	بي سيناه من المرابع ال	マリー・トリカ はちゃ	محر ومهويته فيطعم سيعي	را حدد ساسه و آوري	11	7 /g	
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							OR
		7		So it in the the	9 455	<). −	
C. C. 187 "	SCS START	EXPAIRA-	The sec	SEMI.		**	
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ح	TAGGING AREA	& DIA	TRING PEN	520125	takens .	5-1 70	19-X
/	EPREAD CEN	LEVE & S	A NA	20 JAN 18	MONITOR	ING W	315
1130	= MIX = Arm			184			
1210	= MIX & REM	1X, C	رس سے مرابور	REMT.	10% 1	74.	
	المراهمين الوسيونية والمنام التناسي	the said of the said	V2 66 6	CYL. BA	EAK-		
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Geosphere Con ants, Inc.

AN ETS COMPANY

Geotechnical Engineering - Engineering Geology
Environmental Management - Water Resources

JAILY FIELD REPORT

		Environmental Management · Water Res	ources	Report #:				Date: Z	3 48	24-09
	Project Name		IDATO	Project Number: 1A41136			64	Page	of _	
	Field Rep:	Joy Phillips	San and Section Advisor Date	Project N	lanager:	-		<u></u>		
	Scope of Work:	Mass Grading Pavement	Utility:Trench E	Other	Hours Cha	rged:	✓ ⊡ -Full Time	☐ Par	t Time	J
	Contractor:	CERRUNO		Conditions	Sun	ny	∠⊒-Windy	السلكك	lot 🔲	Mild
	Contractor Re	presentative: ANDY		conarions		udy	☐ Rain	. 🗖 с	old 🔲	Fog
	Equipment	Type		Nun	nber	Section 1	Nuclear	Туре:	7fiex 0	ER
	Compaction	REX		1	. D	ensity Testing : Equipment	☐ Tube			
	Moving	LOADER		1 St.			.⊠- Sand Co	ne OA	16 8-	4-00
	Water	WATER TRK		A		Fill Source	∠Z Native			
	Support	DOTER EXCAUATE	A IMIXELL	! /	Ž	A STATE OF THE STA	☐ Import			
	Plan :	, Engineer		Da	ite Fi	Il Location:	AEN FI	11 PM	- 1 M/SU	Crons
	Civil	· · · · · · · · · · · · · · · · · · ·				J-X E	5 1 5 T HAS	l 246 LFOF	7742	86
	Structural Geotech	LENARD	Long			1-600	Athon I	-128		
	Curve#	Description			Max Density	Opt. Moistur	Required Com	paction	Required Mo	isture
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Geosphere Con: ants, Inc. JAILY FIELD REPORT AN ETS COMPANY nical Engineering • Engineering Geology nental Management • Water Resources Report #: Date: \$2.5 9 8-6-09 Project Name: 8-850 SOIL PEMEDIA TION Project Number: 144 1264 Page Field Rep: m Phillips Project Manager: ∠ 🏻 -Full Time Scope of Work: Mass Grading Pavement Utility Trench Other Hours Charged: ☐ Part Time Windy ☐ Mild Contractor: ⊠_Sunny 己-Hot Conditions: □ · Cloudy Rain ☐ Fog Contractor Representative: Cold Equipment Number ✓ Nuclear Type: TAOX 451 **Density Testing** Compaction ☐ Tube Equipment Moving ☐ Sand Cone Water ☑/Native Fill Source ☐ Import Support PIT @ SECTOR A-X ... Plan Date Fill Location: LIFT 9 +10 ELEVATION Civil 128941290±, Structural LENAAD 20NG Geotech Description Max Density Opt. Moisture **Required Compaction** Required Moisture **Æ** 90% ☐ Opt. + 2% **□** 95% Opt. + 2% to 5% WETDENSITY 131,5 Other: Other: 15.0 14,5 Wet Density Moisture Dry Density Percent Pass/ Elevation Curve # (pcf) Content (pcf) Compaction Fail 1157 #9 93 1289 92 S.W.OFMW 42 92 93 93 91 9/ 3 FGA: 1261 9/ Comment/ Sketch:

NOTICE: Our firm's professionals are represented on site soley to abserve operations of the contractor identified, to form opinions about the adequacy of these operations, and to report those opinions to our client. The presence and earlies of our field representatives on the relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

This DFR is Final - A final report is an instrument of professiona service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

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Field Representative:	Date:	Reviewed By:	Date:

Geosphere Con ants, Inc. JAILY FIELD REPORT AN ETS COMPANY Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources Report #: Date: Project Number: 1461 1865 SOIL PEMEDIATION Project Name: Page Dicelos Project Manager: Field Rep: Other Hours Charged: ☐ Full Time ☐ Part Time Scope of Work: Mass Grading Pavement Utility Trench . Hor ☐ Mild Contractor: ☑ Sunny ☑-Windy Conditions: Rain ☐ Fog Contractor Representative: Cloudy Cold. Nuclear Type: Equipment Number **Density Testing** ☐ Tube Compaction 1 BOMAG Equipment Moving ☐ Sand Cone Water ∠ Native Fill Source ☐ Import Support SECTOPA-X IN PIT Plan 40 V-DITENE-OFDIT Civil + W. OF RT#4 Structural LINARY LONG Geotech Max Density Opt. Moisture Required Compaction Required Moisture A= 07/40901 MIX RAN CANDO CILT 6 14.5 **沼** 90% ☐ Opt. + 2% **5**95% **D** Opt. <u>+</u> 2% to 5% R = 08100901 BAN SANDU SILT Other: Other: ezment 105.5 125.5 Percent Pass/ Wet Density Moisture Dry Density Elevation Curve # Test# Location Content - (pcf) Compaction Fail 125.6 94 12' WOF ATTY V-DITUE-2'FG 16,2 100.0 +30'5 of MW 96 18.9 2 1191 95 = 6'WOFRTEN V-DITEN-1'FG 90 3 ±16 WOF ATEGIV-DITEN FE +60'NWOFMW 96.3 92 1291 90 =75'W OFME 92 94 98.0 Comment/ Sketch: MW= monitoding WEHS

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contactor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and exitivities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

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Field Representative	Date:	Reviewed By:	Date:
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Geosphere Con. ants. Inc. JAILY FIELD REPORT AN ETS COMPANY Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources Date: 8-11 48-12-09 Report #: B-850 SOIL DEMEDIATE Broject Number: 1AU 1764 Project Name: Project Manager: Field Rep: Mass Grading Pavement Utility Trench Other Hours Charged: ∠⊠-Fúll Time ☐ Part Time Scope of Work: -Windy 'D'\Hor ⊠-Sunny ☐ Mild Contractor: Conditions: Cold ☐ Fog Contractor Representative: Rain ANDY BEN Cloudy Nuclear Type . Number Type: --Equipment Density Testing ☐ Tube Compaction Equipment Sand Cone Moving Water ~☐ Native Fill Source ☐ Import Support V-DITCHULLOFRITHY Plan Engineer @ TIEIN I PIT IN SECTED Civil Structural Geotech Max Density Opt. Moisture Required Compaction Required Moisture **1** 90% ☐ Opt. + 2% **5**95% Opt. + 2% to 5% CANDY SIKT WIN SANIO Other: Other: 105.5 19-0 Moisture Percent Pass/ Wet Density **Dry Density** Test # Elevation Curve # DENSIT Compaction Fail 91 23. F 4/56 93 I 15' DOF ATTY V-NITER 123.7 سک * 70 W OF MG 21.9 20,7 9.7 120,4 8-18-09 15THEFEE.SIDETEM \$1288 181.0 92 20.7 100,2 LIFT & E. SIDE TIENS \$1289 115.7 18.6 72 97.7 93 =45150 = MW =1293 1185 216 97.5 94 MW = MONITORING WENS / FG = FINISH GRADE = TO OF ASPHALT @ AT. "Y ROAD WAY. NOTICE: Our firm's professionals are represented on site soley to observe operations of the con-tractor identified, to form opinions about the adequacy of those operations, and to report those opin-ions to our client. The presence and activities of our field representatives do not relieve any contractor This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report. This DFR is Final - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Date:

Reviewed By:

Date:

D.F.R. Page 1 (04-08)

Field Representative:

Geosphere Con ants. Inc. JAILY FIELD REPORT AN ETS COMPANY Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources Date: 8-13-09 Report #: Project Number: 1440156 Project Name: B-250 Sell REMEDIATION Page Project Manager: Field Rep: Mass Grading Utility Trench Other Hours Charged: 42 -Full Time ☐ Part Time Scope of Work: ☐ Pavement **Z** Hot Sunny ☐ Mild Contractor: ∠⊠ Windv Conditions: Cold □ hog Rain Contractor Representative: Cloudy Number ∕ 🖾 - Nuclear Type: Took Equipment **Density Testing** ☐ Tube Compaction Equipment Moving ☐ Sand Cone Water ■ Native Fill Source ☐ Import Support 1-DITEN W. OF Plan Engineer Date Civil Structural LONG Geotech Curve# Max Density Opt. Moisture Required Compaction Required Moisture 07/407-01 <u> 20% - اتتا</u>ء ☐ Opt. + 2% **5**95% **/四**_Opt. + 2% to 5% Other: Other: Pass/ **Wet Density** Moisture Dry Density Percent rercent Fail Location Elevation Curve # Test# (pcf) Content (pcf) 75 1061 19'W 0= ATWETON \$ 18'FE 90 Comment/ Sketch: FE= TOPOTACERT. TY DOND WAY

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives on our clieve any contractor from its obligation to meet contractural requirements. No one except our client may raly on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and exquences of construction.

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Field Representative:	, , , , , , , , , , , , , , , , , , ,	Date:	Reviewed By:	: :	Date:

Geosphere Cons ants, Inc. JAILY FIELD REPORT AN ETS COMPANY Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources Report #: Date: 8-18 TO 8-20-09 Project Number: LAW 1464 Project Name: B-850 SOIL REMEDIATION Field Rep: TONG Phillips Project Manager: Scope of Work: Mass Grading | Pavement Utility Trench 国 Other Hours Charged: چال Time ا ☐ Part Time ☑ Windy Contractor: CERRUDO Hot م Sunny ☐ Mild Conditions: Contractor Representative: ANOW 331 ☐ Rain Cloudy Cold ☐ Fog Max Density Opt. Moisture Required Compaction Required Moisture Curve # (A) 0714000 MIX BAN SAND SILTUSANDSTO 2-90% Opt. + 2% □ 95% D. Opt. + 2% to 5% Other: Other: 115.5 15% Wet Density (pcf) Dry Density (pcf) Moisture Percent Pass/ Elevation Curve # Content Compaction 8-18-09 JAD ZIF ± 1290 118.8 E.SIDE TIE IM 95 NE. V-DITCHERTY TI TE 1847 21.0 90 27 14/5 129/1223 90 18.3 3 27 92 99.6 94 90 90 120.6 17.8

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and exhibits of our field representatives don reflex or interest any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.	solely as evidence that field observati	ary – A preliminary report is provided ion was performed. Observations and/ ns conveyed in the final report may vary lose indicated in a preliminary report.	Final – A final report is an is s drawn from this report shou ional involved.	
Field Representative	Date: 8-10-09	Reviewed By:	Date:	
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Γ	Project Nam	ne: A-850 SAL AEMEDIAT	Proje	ct Nu	mber:مراجع	W126	25	Page	of
	Field Rep:	the state of the s	Proje	ct Ma	nager: ´				
	Scope of Work:	Mass Grading Pavement Utility Trencl	h (12 ,0th	er	Hours Char	ged:	Full Time		Part Time
	Contractor:	CEADULD.	. XX		□ Suinn	у	≰⊠—Windy	Æ	Hot L
,	Contractor F	Representative: And Co	Condi	tions:	☐ Clou	dy	☐ Rain		Cold [
	Curve #	Description		Ma	x Density	Opt. Moisture	Required Com	paction	Required
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4	the office	MIX BAN SAY SIT W	155	لم حر	14/5	14,5	95%		回 [《] Opt. +
387	1009-01	FLAN SAYSILT W/SS PLOSS	570 EM7	10	· 5. 5	19.0	Other:		Other:
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14	Test#	Location	Elevation	V	Vet Density	Moisture	Dry Density	Curve#	Percen
3					(pcf)	Content	(pcf) as	de ja	Compacti
_		8-31-09 #1	10-02	91	<u> </u>	<u>w</u>		<u> </u>	
L		=96"W.N.WOFME	LI FERE		10.8	17.5	102.5	19	77
		9-01-09					4		
	1	S. V-DITEH	215	<u></u>	145	18.9	104.	P	92
	2	=60' W. SW. OF M. W.	Je J	.	24.7	11.7	102.5)A	12
-			A ST ST ST	_				7	
	3	S. V-Ditell	1 / / 6		15.7	19.7	105,0	XP	78
_		E. SHELL OTIEM	2"20	7/	A.5	18.5	100,8	1	70
		9-01-09							
		IJO'N OF MIN.	LIFTI	9	120.8	19.0	101.5	A	91
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Reviewed By:

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Field Representative:

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	Geotechnical Engineering • En Environmental Management •	gineering Geology Water Resources	Report#:	B 58300)5		Date: § 3	-6/09
roject Nam	e:LLNL Site 300		Project Nu	mber: LAN	1265	5	Page	_ of
ield Rep:	Robert U	<06€	Project Ma	nager: Col	Duc	kermen	(\)	
cope of Work:	☐ Mass Grading ☐ Paveme	nt Utility Trench	Other	Hours Charged:	Æ	Full Time	☐ Part Time	1. 2
Contractor:	Cernedo			☑. Šunny		Windy	□ Hot	☑ Mild
Contractor Re	epresentative:	Bell	Conditions:	Cloudy		Rain	□ Cold	□ Fog
lomment/S	iketch 839	Mov Breaks #1	Oa 28	10 psi				
		# //	a 165))				
		#13 #14	a 240 a 410 a Dup.	max				
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and the second s	8/4/09	The Rock = 10b	370	Q5.				
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	and the same of th	Break #106 Sand cone noist cond sample for Wed Breaks #	91% Cylind	1 417 45 #17	@ '	9:15 An	^	
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Reviewed By:

Date:

Field Representative

	Geosphere Con. ants, inc.	1.		AILY د	FIELD REF	ORT
	Geotechnical Engineering · Engineering Geology Environmental Management · Water Resources	Report-#:	B 583005	 >	Date: 8 10 -	-13 09
Project Name	=: LLN- 5: te 3W B850 Sil R	Project Nur	mber: LAW 1	265	Page	_ of
Field Rep:	Robert Uribe	Project Mar	nager: Col	Dicker	man	
Scope of Work:	Mass Grading Pavement Utility Trench	Other	Hours Charged:	☑ Full Time	☐ Part Time	
Contractor:	Cerindo	Conditions:	☑ Sunny	□ Windy	∠ Hot	□ Mild
Contractor Re	epresentative: Anoly Bell	Conditions.	Cloudy	☐ Rain	Cold .	Fog
Comment/ S	1010109 mai		e d	2 G 15 mm	a col	sdate.
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	#161, @ 7days 410 p	of Max -	- Curve #	t 08/009-	-01 125.	2/19.0
	# 180@ Sday 340p	5. <u> </u>	moist c	out.		
	# 17@ @ 4days 350p	51				
2			Sunny	950	-	
, grypetty det fandels, gegynnes, en	Tallila I					
	8/11/91 The					
-American	Break #176@7days	410 ps. 1	*×			
	Sample @ 10:45Am For	cyl.				
	Moist cout.		•			
-	Sand come 93% com	paction	Sur	iny 99	s ^s F	
and the same of th	8/12/09 wed					-
_	- Break # 186 @ 7 days 4	10 psi Max				
	mast cut.			0.0		
	Sample @ 1:45 pm for Cy	1.	Sunni	1 90	+	
	8/13/09 Thin					
	Break #196 @ 7days	410 06i m	z)C			
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	sionals are represented on site soley to observe operations of the con-			82		
tractor identified, to form opin ions to our client. The presence from its obligation to meet co	aions about the adequacy of those operations, and to report those opin- e and activities of our field representatives do not relieve any contractor intractural requirements. No one except our client may rely on our c contractor retains sole responsibility for site safety and the methods,	it field observation was recommendations conve	preliminary report is provided performed. Observations and/ yed in the final report may vary cated in a preliminary report.		Final – A final report is an s drawn from this report sho onal involved.	
	11/16/11 d	2/79/ 000	iewed By:		Date:	
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Geosphere Con: ents, Inc.	· • • • •		AILY	FIELD REP	ORT
Geotechnical Engineering · Engineering Geology Environmental Management · Water Resources	Report#: 72	<u>, , , , , , , , , , , , , , , , , , , </u>		Date: 3/3	1/09
oject Name: LLNL Site 31) B850 Soil A.	Project Numb	er: LAIN	1245	Page	of
eld Rep: Robert War	Project Manag	ger: Cal	Dickey	man	
pe of Work: Mass Grading Pavement Utility Trench	□ Other H	ours Charged:	Full Time	☐ Part Time	
ontractor:		a Sunny	□ Windy	Hot	☐ Mild
ontractor Representative: Andy Bell	Conditions:]: Cloudy	Rain	☐ Cold	□ Fog
omment/Sketch: 3/3/39 / M	100				
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to our client. The presence and activities of our field representatives do not relieve any contractor its obligation to meet contractural requirements. No one except our client may rely on our	R is Preliminary - A pr that field observation was pe or recommendations conveye precedence over those indica	rformed. Observations and/ d in the final report may vary	This DFR is service. Any conclusion evaluated by the profess	Final – A final report is an s drawn from this report sho ional involved.	instrument of profe ould be discussed w

Project Name: LLNL Site 300 B850 Soil Project No. : LAW 1261 Location: area Ax -10ft. Sample No. : 070609-01 Visual Sample Description: Brn g 876>3/8" ToT=18098 MOLD VOLUME (CU.FT)	pravelly sandy	Silt	Calculated By: Checked By: Depth (ft): Compaction Met	hod	Date:	07/08/09 07/08/09 01557-91 0698 field
Trail No.	1,	2	3	4	5	6
Wt. Comp. Soil + Mold (gm.)	6448.3	6553.3	6569.3	6535.1		
Wt. of Mold (gm.)	4596.4	4596.4	4596.4	4596.4		
Net Wt. of Soil (gm.)	1851.9	1956.9	1972.9	1938.7		
Container No.						
Wt. of Container (gm.)	110.3	138.2	139.1	138.4		
Wet Wt. of Soil + Cont. (gm.)	451.3	665.5	474.9	493.7		
Dry Wt. of Soil + Cont. (gm.)	409.9	590.1	423	432.9		
Moisture Content (%)	13.82	16.69	18.28	20.65		
Wet Density (pcf)	122.48	129.43	130.48	128.22		
Dry Density (pcf)	107.61	110.92	110.32	106.28		
Assumed Specific Gravity = 2.65 PROCEDURE USED Procedure A Soil Passing No. 4 (4.75 mm) Sieve Mold: 4-in. (101.6 mm) diameter Layers: 5 (Five) Blows per layer: 25 (twenty-five) May be used if No.4 retained < 20% Procedure B Soil Passing 3/8-in. (9.5 mm) Sieve Mold: 4-in. (101.6 mm) diameter Layers: 5 (Five) Blows per layer: 25 (twenty-five) Use if + No.4 > 20% and - 3/8-in. < 20% Procedure C Soil Passing 3/4-in. (19.0 mm) Sieve Mold: 6-in. (152.4 mm) diameter Layers: 5 (Five) Blows per layer: 56 (fifty-six) Use if + 3/8-in. > 20% and + 3/4-in. < 30%	135 125		Optimum Mo	3324	Gs = 2.6	12.0

Project Name: LLNL Site 300 B850 Some Project No.: Project No.: LAW 1261 Location: area Ax -20ft. Sample No.: 070709-01 Visual Sample Description: redo 876>3/8" ToT=18098 MOLD VOLUME (CU.FT)	dish brn Silt wit	n sand	Tested By: Calculated By: Checked By: Depth (ft): Compaction Met Preparation Met	thod	-)1557-91
Trail No.	<u>.</u> 1	2	3	4	5	. 6
Wt. Comp. Soil + Mold (gm.)	6556.6	6603.7	6603.8			
Wt. of Mold (gm.)	4596.4	4596.4	4596.4			
Net Wt. of Soil (gm.)	1960.2	2007.3	2007.4	0		*******
Container No.						
Wt. of Container (gm.)	138.1	138.1	138.9			
Wet Wt. of Soil + Cont. (gm.)	346.9	592	582.4			
Dry Wt. of Soil + Cont. (gm.)	322	532.5	517.8			
Moisture Content (%)	13.54	15.09	17.05	#DIV/0!		
Wet Density (pcf)	129.64	132.76	132.77	0.00		
Dry Density (pcf)	114.18	115.36	113.43	#DIV/0!		
Assumed Specific Gravity = 2.65 PROCEDURE USED Procedure A Soil Passing No. 4 (4.75 mm) Sieve Mold: 4-in. (101.6 mm) diameter Layers: 5 (Five) Blows per layer: 25 (twenty-five) May be used if No.4 retained < 20% Procedure B Soil Passing 3/8-in. (9.5 mm) Sieve Mold: 4-in. (101.6 mm) diameter Layers: 5 (Five) Blows per layer: 25 (twenty-five) Use if + No.4 > 20% and - 3/8-in. < 20% Procedure C Soil Passing 3/4-in. (19.0 mm) Sieve Mold: 6-in. (152.4 mm) diameter Layers: 5 (Five) Blows per layer: 56 (fifty-six) Use if + 3/8-in. > 20% and + 3/4-in. < 3] 135 125 % 115		Optimum Mo		s = 2 G = 26	15.0

Project Name: LLNL Site 300 B850 Soi Project No.: LAW 1261 Location: area Ax -25ft. Sample No.: 070809-01 Visual Sample Description: Lt. bi	Remediation		Tested By: Calculated By: Checked By: Depth (ft):	R. Uribe R. Uribe		07/09/09 07/09/09
876>3/8" ToT=18098 MOLD VOLUME (CU.FT)	0.033333		Compaction Met		X ASTM D ASTM D X Moist Dry	
Trail No.	1	2	. 3	4	5	6
Wt. Comp. Soil + Mold (gm.)	6480	6540.5	6595.4	6553.9		
Wt. of Mold (gm.)	4596.4	4596.4	4596.4	4596.4		
Net Wt. of Soil (gm.)	1883.6	1944.1	1999	1957.5		
Container No.						
Wt. of Container (gm.)	110.7	138.3	137.8	138.7		
Wet Wt. of Soil + Cont. (gm.)	358.9	426.8	552.3	435.4		·
Dry Wt. of Soil + Cont. (gm.)	331.8	389.8	490.2	. 388.6		
Moisture Content (%)	12.26	14.71	17.62	18.73		
Wet Density (pcf)	124.58	128.58	132.21	129.47		
Dry Density (pcf)	110.98	112.09	112.40	109.04		
Maximum Dry Density (po	cf) [113.5	Optimum Mo	isture Conter	nt (%)	16.5
PROCEDURE USED Procedure A Soil Passing No. 4 (4.75 mm) Sieve Mold: 4-in. (101.6 mm) diameter Layers: 5 (Five) Blows per layer: 25 (twenty-five) May be used if No.4 retained < 20% Procedure B Soil Passing 3/8-in. (9.5 mm) Sieve Mold: 4-in. (101.6 mm) diameter Layers: 5 (Five) Blows per layer: 25 (twenty-five) Use if + No.4 > 20% and - 3/8-in. < 20% Procedure C Soil Passing 3/4-in. (19.0 mm) Sieve Mold: 6-in. (152.4 mm) diameter Layers: 5 (Five) Blows per layer: 56 (fifty-six) Use if + 3/8-in. > 20% and + 3/4-in. < 30%	125 115				G = 2.6	

Project Name: LLNL Site 300 B850 Soil Project No.: LAW 1261	Remediation		Tested By : Calculated By :	R. Uribe R. Uribe	-	07/15/09 07/15/09
stock pile Ax			Checked By:		Date:	
071409-01	J. 034		Depth (ft):			
Visual Sample Description: mix 876>3/8" ToT=18098	brn sandy Silt v	with agg.	Compaction Met		X ASTM D	698
MOLD VOLUME (CU.FT)	0.033333		Preparation Met		x Moist Dry	field
Trail No.	1	. 2	3	4	5	6
Wt. Cómp. Soil + Mold (gm.)	6425.5	6517	6576.6	6551.1		
Wt. of Mold (gm:)	4596.4	4596.4	4596.4	4596.4		
Net Wt. of Soil (gm.)	1829.1	1920.6	1980.2	1954.7		ingenerang merang mengang meng
Container No.	T. International Control of Contr					ALLAC STANLAR OF STANL
Wt. of Container (gm.)	138.9	110.7	138.6	138.3		
Wet Wt. of Soil + Cont. (gm.)	891.4	984.5	493.6	468.3	and the same of th	
Dry Wt. of Soil + Cont. (gm.)	820.4	885.4	448.4	423	E	
Moisture Content (%)	10.42	12.79	14.59	15.91		
Wet Density (pcf)	120.97	127.03	130.97	129.28		
Dry Density (pcf)	109.56	112.62	114.29	111.53	i i i i	
iviaximum Dry Density (p Assumed Specific Gravity = 2.65	±2	114.5	Optimum Mo	isture Conter	11 (%)	14.5
PROCEDURE USED Procedure A Soil Passing No. 4 (4.75 mm) Sieve Mold: 4-in. (101.6 mm) diameter Layers: 5 (Five)						
Blows per layer: 25 (twenty-five) May be used if No.4 retained < 20% Procedure B Soil Passing 3/8-in. (9.5 mm) Sieve Mold: 4-in. (101.6 mm) diameter Layers: 5 (Five) Blows per layer: 25 (twenty-five) Use if + No.4 > 20% and - 3/8-in. < 20%	125 					
Procedure C Soil Passing 3/4-in. (19.0 mm) Sieve Mold: 6-in. (152.4 mm) diameter Layers: 5 (Five) Blows per layer: 56 (fifty six) Use if + 3/8-in >20% and + 3/4-in. <3i						

Project Name: LLNL Site 300 B850 Soil Project No.: LAW 1261 Location: east of monit. Wells eleved on the second of		sandstone plu	Tested By: Calculated By: Checked By: Depth (ft): s 5% cement Compaction Met	thod	Date:	01557-91
Trail No.	1 1	. 2	3	4	5	6
Wt. Comp. Soil + Mold (gm.)	6522.1	6556.3	6608.4	6575.8		
Wt. of Mold (gm.)	4596.4	4596.4	4596.4	4596.4		
Net Wt. of Soil (gm.)	1925.7	1959.9	2012	1979.4		
Container No.						
Wt. of Container (gm.)	110.8	137.6	136.8	137.1		
Wet Wt. of Soil + Cont. (gm.)	506.5	824.2	699	579.5		
Dry Wt. of Soil + Cont. (gm.)	462.2	741	624.2	514.7		
Moisture Content (%)	12.61	13.79	15.35	17.16		
`Wet Density (pcf)	127.36	129.62	133.07	130.91		
Dry Density (pcf)	113.10	113.92	115.37	111.74		
Assumed Specific Gravity = 2.65 PROCEDURE USED Procedure A Soil Passing No. 4 (4.75 mm) Sieve Mold: 4-in. (101.6 mm) diameter Layers: 5 (Five) Blows per layer: 25 (twenty-five) May be used if No.4 retained < 20% Procedure B Soil Passing 3/8-in. (9.5 mm) Sieve Mold: 4-in. (101.6 mm) diameter Layers: 5 (Five) Blows per layer: 25 (twenty-five) Use if + No.4 > 20% and - 3/8-in. < 20% Procedure C Soil Passing 3/4-in. (19.0 mm) Sieve	135 125		Optimum Mo	isture Conte	nt (%)	15.0
Mold: 6-in. (152.4 mm) diameter Layers: 5 (Five) Blows per layer: 56 (fifty-six) Use if + 3/8-in. >20% and + 3/4-in. <30	^{0%} 105					

Project Name: LLNL Site 300 B850 So Project No.: LAW 1265 Location: Ax lift #7 elev. 1287'	il Remediation		Tested By : Calculated By : Checked By :	R. Uribe R. Uribe	•	08/04/09 08/04/09
Sample No.: 080409-01 Visual Sample Description: brn	sandy Silt with	sandstone nli	Depth (ft):			
876>3/8" ToT=18098	sandy Ont Will	salidatione pie	Compaction Met Preparation Met		X ASTM D ASTM D X Moist	01557-91 0698 field
MOLD VOLUME (CU.FT)	0.033333				Dry	
Trail No.	1	2	3	4	5	6
Wt. Comp. Soil + Mold (gm.)	6542.3	6582.1	6519.2			
Wt. of Mold (gm.)	4596.4	4596.4	4596.4			
Net Wt. of Soil (gm.)	1945.9	1985.7	1922.8	0		***********
Container No.						
Wt. of Container (gm.)	136.6	137.5	137.3			
Wet Wt. of Soil + Cont. (gm.)	475.8	401	707.5			
Dry Wt. of Soil + Cont. (gm.)	431.5	360.8	616.5			
Moisture Content (%)	15.02	18.00	18.99	#DIV/0!		
Wet Density (pcf)	128.70	131.33	127.17	0.00		
Dry Density (pcf)	111.89	111.29	106.88	#DIV/0!	المناعب	
Maximum Dry Density (p	· E	112.5	Optimum Mo	isture Conter	nt (%)	15.0
Assumed Specific Gravity = PROCEDURE USED Procedure A Soil Passing No. 4 (4.75 mm) Sieve Mold: 4-in. (101.6 mm) diameter Layers: 5 (Five) Blows per layer: 25 (twenty-five) May be used if No.4 retained < 20% Procedure B Soil Passing 3/8-in. (9.5 mm) Sieve Mold: 4-in. (101.6 mm) diameter Layers: 5 (Five) Blows per layer: 25 (twenty-five) Use if + No.4 > 20% and - 3/8-in. < 20% Procedure C Soil Passing 3/4-in. (19.0 mm) Sieve Mold: 6-in. (152.4 mm) diameter Layers: 5 (Five) Blows per layer: 56 (fifty-six) Use if + 3/8-in. > 20% and + 3/4-in. < 3/4	125 6 115				Gs = 2.5	



DATE:	8/4	109	INSPECTOR: Robert	Winbe Frony
PROJECT#:	LAN	N 1265	PROJECT NAME: <u>LULS</u>	te 300 B850 50
COMPACTIO	N SPEC:	90%	TEST LOCATION: Ax-Lift	1-#7 south sid
MOISTURE S		above opt.	of Magai Monit Wells Ele	v. 1287
		, SVND	CONE TESTING	
e e e e e e e e e e e e e e e e e e e		SAND	6788.1	and the state of the state of the
	А	WT of cone, jar, sand - Before		_ 9
	В	WT of cone, jar, sand - After	4022.4	_ 9
	С	WT of sand in cone	<u>1580</u>	_ 9
	D	WT of sand used	2765.7	_ g A-B
	E	WT of sand in hole	1185.7	_ g D-C
•	F	Density of sand	89.6	_ pcf
	G	Volume of hole	13.233 / 10292	_ cf E÷F
	Н	Gross WT of excavated soil ÷	TARE	_ lbs
	1.4	WT of TARE		_ lbs
	. J	Net WT of soil	1606.1/3541	_ lbs H-I
	K	WT Density	121.3	_ pcf J÷G
	L	Soil + TARE (Wet)	1178.6	_ lbs
	M	TARE #4	138.9	_ lbs
	N	Soil + TARE (Dry)	1036.6	_ lbs
	0	WT of Water	142-0	_ lbs L-N
	P	WT of Soil	897.7	_ lbs N-M
	Q Q	Moisture Content	15.8	_ % O÷P
	Œ	Optimum Moisture Content	iS.0	_ %
	R	Dry Density	104.7	_ pcf K÷(I+Q)
	S	Lab Maximum	133,5	_ pcf
		(Lab No. 372809 - 0	<u>'</u>	
	т	Percent Compaction	91	_ % X ÷ S
	nt = WT : Feet = cf	Pounds = lbs Gram	ns = G Pounds per Cubic Feet = pcf Conversion Grams ÷ 453.6 = lb	es.



DATE:	5/4/	09	INSPECTOR	₹:	- Poloer	+ Wribe	,
PROJECT#:	Ah) 1265	PROJECT N	NAME:		te 300 B8	
COMPACTION SPEC		90%	TEST LOCA	ATION:	Ax 61	o' North	24 M
MOISTURE SPEC:		above opt.	Elev	. 1292			
		¥	CONE T	ESTING			
and the second s		<u> </u>	CONE II	<u>LOTINO</u>			
	Α	WT of cone, jar, sand - Before	:	6746.6		g	
		WT of cone, jar, sand - After		4166.7		g	
	С	WT of sand in cone		1580		g	
	D	WT of sand used		2579.9		g A-B	
	Ε	WT of sand in hole		999.9		g D-C	
	F	Density of sand	· 	89.6		pcf	
		Volume of hole	_	11.1596	2.0246	cf E÷F	
	Н	Gross WT of excavated soil +	TARE			lbs	
		WT of TARE				lbs	
		Net WT of soil	_			lbs H-I	
				1295.6	12.856		
	K	WT Density	-	1/6./		pcf J÷G	
•	L	Soil + TARE (Wet)	_	805.5		lbs	
	M	TARE 共1	3	138.8		lbs .	,
	N	Soil + TARE (Dry)	_	701.6		lbs	•
	0	WT of Water		103,9		lbs L-N	
•	Ρ	WT of Soil	_	362.8		lbs N-M	
		Moisture Content	_	18.5		% O÷P	
		Optimum Moisture Content	-	. 19.0		%	
·	R	Dry Density	-	98.0		pcf K ÷ (I + C	!)
	S	Lab Maximum	wet -	125.5		pcf	
	_	(Lab No. 08/009-	01				
	Т	Percent Compaction		93		K % 摩÷S	
Weight = WT Cubic Feet =	cf	Pounds = lbs Gram	s = G	Pounds per Cubic Conversion Grams			



DATE:	81	19/09 INSPEC	, -	K. Mube
PROJECT#: _	4	W 1265 PROJE	CT NAME: LLNL SE	16 300 B 850 5
COMPACTION SPE	EC:	90% TEST L	OCATION: Tire-in	avea east s
MOISTURE SPEC:		aloove opt. 40	s' east of Munit. wel	ls
		SAND CONE	TESTING	
en de la compete de la comp	,		en e	en e
	Α	WT of cone, jar, sand - Before	6780.4	_ 9
	В	WT of cone, jar, sand - After	3951.0	_ 9
	С	WT of sand in cone	1580,0	_ g · · · · · ·
• •	D	WT of sand used	2829.4	_ g A-B
	E	WT of sand in hole	1247.4	_ g D-C
	F	Density of sand	89.6	_ pcf
	G	Volume of hole	13.944 10.0307	_ cf E÷F
	Н	Gross WT of excavated soil + TARE		_ lbs
	I	WT of TARE		_ lbs
	J.	Net WT of soil	1802.3/3.973	_ lbs H-I
	К	WT Density	129.4	_ pcf J÷G
	L	Soil + TARE (Wet)	968.0	ibs
		TARE #6	137.2	- Ibs
	M	Soil + TARE (Dry)	850.3	lbs
	N	WT of Water	117.7	- Ibs L - N
	0	WT of Soil	713.1	- Ibs N - M
	P	Moisture Content	16.5	% O÷P
	Q	Optimum Moisture Content	15.0	_ _ %
	_		111.1	pcf K÷(I+Q)
	R	Dry Density		
	S	Lab Maximum	± 133.5	_ pcf
		(Lab No. <u>072809-01</u>		
	Τ	Percent Compaction	97	K _ % 夙 ÷S
Weight = W ⁻ Cubic Feet =		Pounds = lbs Grams = G	Pounds per Cubic Feet = pcf Conversion Grams ÷ 453.6 = lbs	S



1	LABUR		10 11
DATE:		ISPECTOR: LONY	1 210 PUR
PROJECT#: LA		1.0020111111121	Sito 300 Blon
COMPACTION SPEC:	90% TI	EST LOCATION: AX	11+T T 16
MOISTURE SPEC:	above opt		
	SANDC	ONE TESTING	
		1812	
А	WT of cone, jar, sand - Before	<u> </u>	9
В	WT of cone, jar, sand - After	3795.8	g
С	WT of sand in cone	1580	_ 9
D	WT of sand used	3022.8	_ g A-B
E	WT of sand in hole	1442.8	_ g D-C
F	Density of sand	89.6	pcf
G	Volume of hole	16.103 / 0.0355	_ cf E÷F
н	Gross WT of excavated soil + TA	ARE	lbs
1	WT of TARE		lbs
J	Net WT of soil	<u> 2000,4/4.41</u>	lbs H-l
K	WT Density	124.2	pcf J÷G
L	Soil + TARE (Wet)	485.8	lbs
M	TARE #4	139.1	lbs
N	Soil + TARE (Dry)	612.6	lbs
. 0	WT of Water	73,2	lbs L - N
P	WT of Soil	473.5	lbs N - M
Q	Moisture Content	15.5	% O÷P
SAC	Optimum Moisture Content	DODUS	%
R	Dry Density	107.5	pcf K÷(I+Q)
S	Lab Maximum	131.5	pcf
J	(Lab No. 080409-01		
Т	Percent Compaction	94	% K÷s
.: Weight = WT	Pounds = lbs Grams =	G Pounds per Cubic Feet = pcf Conversion Grams ÷ 453.6 = 1	bs.

Cubic Feet = cf

CONSOLIDATED ENGINEERING LABORATORIES

Date	Location	Tare	Wet soil + tare	Dry soil + tare	water	Wt. of soil	Moisture Content
6/3/2009	for nuke gauge - area B1 insitu test #1	368.60	1250.6o	1238.10	12.50	869.50	1.40%
6/3/2009	for nuke gauge - area B1 insitu test #2	366.20	1283.70	1277.70	6.00	911.50	0.70%
6/3/2009	for nuke gauge - area B1 insitu test #3	365.70	1006.70	998.20	8.50	630.30	1.30%
6/3/2009	for nuke gauge - area B1 insitu test #4	367.90	1266.70	1241.90	24.80	874.0o	2.80%
6/3/2009	for nuke gauge - area B1 insitu test #5	367.20	888.80	877.9o	10.90	510.70	2.10%
6/3/2009	for nuke gauge - area B1 insitu test #6	138.70	743.40	723.50	19.90	584.80	3.40%
6/3/2009	for nuke gauge - area B1 insitu test #7	110.80	661.1o	654.50	6.60	543.70	1.20%
6/3/2009	for nuke gauge - area B1 insitu test #8	137.20	594.60	577.60	17.0o	440.40	3.90%
6/3/2009	for nuke gauge - area B1 insitu test #9	138.40	633.30	624.90	8.40	486.50	1.70%
6/29/2009	for nuke gauge - area Ax -2' insitu test #1	138.30	796.0o	746.90	49.10	608.60	8.10%
6/29/2009	for nuke gauge - area Ax -2' insitu test #2	110.9o	705.00	635.70	69.30	524.80	13.20%
6/29/2009	for nuke gauge - area Ax -2' insitu test #3	109.40	477.30	453.40	23.90	344.00	6.90%
6/29/2009	for nuke gauge - area Ax -2' insitu test #4	137.20	816.60	790.7o	25.90	653.50	4.00%
6/29/2009	for nuke gauge - area Ax -2' insitu test #5	137.50	659.60	607.0o	52.6	469.50	11.20%
6/29/2009	for nuke gauge - area Ax -2' insitu test #6	137.0o	731.80	700.5o	31.3	563.50	5.60%
							Secretary of
7/16/2009	for nuke gauge- area Ax -25' test #1	137.1o	755.0o	683.60	71.40	546.50	13.10%
7/16/2009	for nuke gauge- area Ax -25' test #2	137.2o	499.90	453.50	46.40	316.30	14.70%
7/20/2009	for nuke gauge - area Ax -24' test #1	138.50	915.50	825.90	89.60	687.40	13.00%
7/20/2009	for nuke gauge - area Ax -24' test #3	139.20	1003.0o	896.7o	106.30	757.50	14.00%
	·		_				1.
7/28/2009	for nuke gauge - area Ax - lift 1test #1	137.2o	892.40	794.8o	97.60	657.60	14.80%
7/28/2009	for nuke gauge - area Ax - lift 1test #2	138.50	1155.30	988.30	167.0o	849.80	19.70%
7/29/2009	for nuke gauge - area Ax - lift 2 test #1	137.30	486.80	436.80	50.0o	299.50	16.70%
7/29/2009	for nuke gauge - area Ax - lift 2 test #2	138.9	698.50	601.0o	97.50	462.10	21.10%
7/29/2009	for nuke gauge - area Ax - lift 3 test #3	138.60	965.30	832.1o	133.20	693.50	19.20%
8/4/2009	nuke gauge - area Ax - lift 7 test #1	138.7	982.8	826.50	156.4	687.8	22.70%
8/5/2009	nuke gauge - area Ax - lift 9 test #1	138.80	730.60	632.90	97.70	493.40	19.80%
8/6/2009	nuke gauge - area Ax - lift 10 test #1	139.0o	557.60	489.40	68.20	350.40	19.50%
	70.00						
			<u> </u>				
-							
							
							
			1		1		
L	<u></u>	I		J			

Date	Location	Tare	Wet soil + tare	Dry soil + tare	Wt. of water	Wt. of soil	Moisture Content
6/3/2009	for nuke gauge - area B1 insitu test #1	368.60	1250.6o	1238.10	12.50	869.50	1.40%
6/3/2009	for nuke gauge - area B1 insitu test #2	366.20	1283.7o	1277.7o	6.00	911.50	0.70%
6/3/2009	for nuke gauge - area B1 insitu test #3	365.7o	1006.7o	998.20	8.50	630.30	1.30%
6/3/2009	for nuke gauge - area B1 insitu test #4	367.9o	1266.70	1241.90	24.80	874.00	2.80%
6/3/2009	for nuke gauge - area B1 insitu test #5	367.20	888.8o	877.90	10.90	510.70	2.10%
6/3/2009	for nuke gauge - area B1 insitu test #6	138.70	743.40	723.50	19.90	584.80	3.40%
6/3/2009	for nuke gauge - area B1 insitu test #7	110.8o	661.10	654.50	6.60	543.70	1.20%
6/3/2009	for nuke gauge - area B1 insitu test #8	137.2o	594.60	577.60	17.0o	440.40	3.90%
6/3/2009	for nuke gauge - area B1 insitu test #9	138.40	633.30	624.9o	8.40	486.50	1.70%
6/29/2009	for nuke gauge - area Ax -2' insitu test #1	138.30	796.0o	746.90	49.10	608.60	8.10%
6/29/2009	for nuke gauge - area Ax -2' insitu test #2	110.9o	705.0o	635.70	69.30	524.8o	13.20%
6/29/2009	for nuke gauge - area Ax -2' insitu test #3	109.40	477.3o	453.40	23.90	344.0o	6.90%
6/29/2009	for nuke gauge - area Ax -2' insitu test #4	137.2o	816.60	790.7o	25.90	653.50	4.00%
6/29/2009	for nuke gauge - area Ax -2' insitu test #5	137.5o	659.60	607.0o	52.6	469.50	11.20%
6/29/2009	for nuke gauge - area Ax -2' insitu test #6	137.0o	731.8o	700.5o	31.3	563.50	5.60%
							San Say Land
7/16/2009	for nuke gauge- area Ax -25' test #1	137.10	755.0o	683.6o	71.40	546.50	13.10%
7/16/2009	for nuke gauge- area Ax -25' test #2	137.20	499.90	453.50	46.40	316.30	14.70%
17.10/200							
7/20/2009	for nuke gauge - area Ax -24' test #1	138.50	915.50	825.9o	89.60	687.40	13.00%
7/20/2009	for nuke gauge - area Ax -24' test #3	139.20	1003.0o	896.7o	106.30	757.50	14.00%
1120/2000							
7/28/2009	for nuke gauge - area Ax - lift 1test #1	137.2o	892.40	794.8o	97.60	657.60	14.80%
7/28/2009	for nuke gauge - area Ax - lift 1test #2	138.50	1155.30	988.30	167.0o	849.80	19.70%
172072000							41.1 (1)
7/29/2009	for nuke gauge - area Ax - lift 2 test #1	137.3o	486.80	436.8o	50.00	299.50	16.70%
7/29/2009	for nuke gauge - area Ax - lift 2 test #2	138.9	698.50	601.0o	97.50	462.10	21.10%
7/29/2009	for nuke gauge - area Ax - lift 3 test #3	138.60	965.30	832.10	133.20	693.50	19.20%
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8/4/2009	nuke gauge - area Ax - lift 7 test #1	138.7	982.8	826.50	156.4	687.8	22.70%
0							
8/5/2009	nuke gauge - area Ax - lift 9 test #1	138.80	730.60	632.90	97.70	493.40	19.80%
0/0/2000							
8/6/2009	nuke gauge - area Ax - lift 10 test #1	139.0o	557.6o	489.40	68.20	350.40	19.50%
0/0/2000	Hano gaage area / M. Int to 1221 //						
8/10/2009	nuke gauge - area Ax - lift 11 test #2	137.6	654.3	572.20	82.1	434.60	18.90%
0/10/2003	Hake gaage area / W III to to 12					-	77.5
8/11/2009	nuke gauge - area Ax - lift #12 test #4	137.40	671.60	579.90	91.70	442.50	20.70%
0/11/2009	Hake gauge allea / K / Mt // 12 toot // 1	1070	07 1.00	0.0.00			
8/12/2009	nuke gauge - lift #13 test #1	139.00	591.10	513.60	77.5	374.60	20.70%
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. .	Lagation	Toro	Wet soil	Dry soil +	Wt. of	Wt. of	Moisture
Date	Location	Tare	+ tare	tare	water	soil	Content
6/3/2009	for nuke gauge - area B1 insitu test #1	368.60	1250.6o	1238.10	12.50	869.50	1.40%
6/3/2009	for nuke gauge - area B1 insitu test #2	366.20	1283.7o	1277.70	6.00	911.50	0.70%
6/3/2009	for nuke gauge - area B1 insitu test #3	365.70	1006.70	998.20	8.50	630.30	1.30%
6/3/2009	for nuke gauge - area B1 insitu test #4	367.9o	1266.70	1241.90	24.80	874.00	2.80%
6/3/2009	for nuke gauge - area B1 insitu test #5	367.20	888.80	877.9o	10.90	510.70	2.10%
6/3/2009	for nuke gauge - area B1 insitu test #6	138.70	743.40	723.50	19.90	584.80	3.40%
6/3/2009	for nuke gauge - area B1 insitu test #7	110.80	661.10	654.50	6.60	543.70	1.20%
6/3/2009	for nuke gauge - area B1 insitu test #8	137.20	594.60	577.6o	17.00	440.40	3.90%
6/3/2009	for nuke gauge - area B1 insitu test #9	138.40	633.30	624.90	8.40	486.50	1.70%
							0.400/
6/29/2009	for nuke gauge - area Ax -2' insitu test #1	138.30	796.00	746.90	49.10	608.60	8.10%
6/29/2009	for nuke gauge - area Ax -2' insitu test #2	110.9o	705.0o	635.70	69.30	524.80	13.20%
6/29/2009	for nuke gauge - area Ax -2' insitu test #3	109.40	477.30	453.40	23.90	344.00	6.90%
6/29/2009	for nuke gauge - area Ax -2' insitu test #4	137.20	816.6o	790.7o	25.90	653.50	4.00%
6/29/2009	for nuke gauge - area Ax -2' insitu test #5	137.50	659.6o	607.00	52.6	469.50	11.20%
6/29/2009	for nuke gauge - area Ax -2' insitu test #6	137.00	731.80	700.50	31.3	563.50	5,60%
		407.4		200.0	74.4	E40 E	40.400/
7/16/2009	for nuke gauge- area Ax -25' test #1	137.10	755.0o	683.6o	71.40	546.50	13.10%
7/16/2009	for nuke gauge- area Ax -25' test #2	137.20	499.90	453.50	46.40	316.30	14.70%
		400 5	045.5-	005.0-	00.0-	007.4-	42 000/
7/20/2009	for nuke gauge - area Ax -24' test #1	138.50	915.50	825.90	89.60	687.40	13.00%
7/20/2009	for nuke gauge - area Ax -24' test #3	139.20	1003.0o	896.7o	106.30	757.50	14.00%
7/00/0000	for nuke gauge - area Ax - lift 1test #1	137.20	892.40	794.8o	97.6o	657.60	14.80%
7/28/2009	for nuke gauge - area Ax - lift 1test #1	137.20	1155.3o	988.30	167.0o	849.80	19.70%
7/28/2009	101 Huke gauge - area Ax - IIIt Trest #2	100.00	. 1100,00	300.00	107.00	040.00	71037070
7/29/2009	for nuke gauge - area Ax - lift 2 test #1	137.30	486.80	436.80	50.0o	299.50	16.70%
7/29/2009	for nuke gauge - area Ax - lift 2 test #2	138.9	698.50	601.0o	97.50	462.10	21.10%
7/29/2009	for nuke gauge - area Ax - lift 3 test #3	138.60	965.30	832.1o	133.20	693.50	19.20%
8/4/2009	nuke gauge - area Ax - lift 7 test #1	138.7	982.8	826.50	156.4	687.8	22.70%
0, 112000							
8/5/2009	nuke gauge - area Ax - lift 9 test #1	138.80	730.60	632.90	97.70	493.40	19.80%
							7.5
8/6/2009	nuke gauge - area Ax - lift 10 test #1	139.0o	557.6o	489.40	68.20	350.40	19.50%
			1,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
8/10/2009	nuke gauge - area Ax - lift 11 test #2	137.6	654.3	572.20	82.1	434.60	18.90%
							Taylor Salar
8/11/2009	nuke gauge - area Ax - lift 12 test #4	137.40	671.60	579.90	91.70	442.50	20.70%
8/12/2009	nuke gauge - lift #13 test #1	139.00	591.1o	513.60	77.5	374.6o	20.70%
8/17/2009	nuke gauge - tie-in area test #1	137.70	609.40	536.1o	73.30	398.40	18.40%
8/17/2009	nuke gauge - tie-in area test #4	136.70	631.2o	565.6o	65.6o	428.90	15.30%
8/18/2009	nuke gauge - tie-in area test #4	137.20	541.30	478.9o	62.40	341.70	18.30%
8/20/2009	nuke gauge - tie-in area test #1	138.1	731.5	641.8o	89.70	503.70	17.80%

Date	Location	Tare	Wet soil + tare	Dry soil + tare	Wt. of water	Wt. of soil	Moisture Content
8/25/2009	nuke guage - area Ax - lift 15 test #1	137.20	614.70	545.60	6 9.10	408.40	16.90%
8/27/2009	nuke guage - east side shell - test #2	137.20	520.60	453.30	67.30	316.10	21.30%
8/27/2009	nuke guage - area Ax - lift 16 test #4	137.50	740.70				
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7/28/2009	Date	Density Designation for Cement Treated. Fill in area Ax	Location: Northing / Easting	Elevation MSL	Wet Den.	Dry Den.	% Moist	90% min.
7/28/2009 lift #1 north of monit. Wells DUPLICATE 1281 124.1 103.7 19.7 93.00 7/29/2009 lift #2 west of monit. Wells 1282 120.8 103.5 16.7 90.00 7/29/2009 lift #3 NE of monit. Wells 1283 125.4 103.6 21.1 94.00 7/30/2009 lift #4 or east of west wall of pit 1283 123.7 103.8 19.2 93.00 7/30/2009 lift #4 T' east of west wall of pit 1284 121 103.4 17 91.00 7/30/2009 lift #5 east of monit wells 1285 121.8 103.3 18.2 92.00 7/30/2009 lift #5 south of monit. Wells 1285 121.8 103.4 17.8 91.00 7/30/2009 lift #5 set of monit. Wells 1285 121.8 102.2 21.1 92.00 8/3/2009 lift #6 45' NW of monit. Wells 1286 123 103.7 16.4 91.00 8/3/2009 lift #6 27' west of monit. Wells 1286 122.4 103.7 18 <								
7/29/2009 lift #2 west of monit. Wells 1282 120.8 103.5 16.7 90.00 7/29/2009 lift #3 NE of monit. Wells 1283 125.4 103.6 21.1 94.00 7/29/2009 lift #3 east of monit. Wells DUPLICATE 1283 123.7 103.8 19.2 93.00 7/30/2009 lift #4 T' east of west wall of pit 1284 121 103.4 17 91.00 7/30/2009 lift #4 DUPLICATE 1284 123.3 104.3 18.2 92.00 7/30/2009 lift #5 east of monit wells 1285 121.8 103.4 17.8 91.00 7/30/2009 lift #5 south of monit. Wells 1285 121.8 103.4 17.8 91.00 8/3/2009 lift #5 SE of monit. Wells DUPLICATE 1285 121.9 104.7 16.4 91.00 8/3/2009 lift #6 27' west of monit. Wells 1286 122.4 103.7 18.6 92 8/3/2009 lift #7 20' east of monit. Wells 1286 122.4 103.7 18 92					 			
1283 125.4 103.6 21.1 94.00 17/29/2009 lift #3 NE of monit. Wells DUPLICATE 1283 123.7 103.8 19.2 93.00 17/30/2009 lift #4 7' east of west wall of pit 1284 121 103.4 17 91.00 17/30/2009 lift #4 DUPLICATE 1284 123.3 104.3 18.2 92.00 17/30/2009 lift #5 east of monit wells 1285 121.8 103.4 17.8 91.00 17/30/2009 lift #5 south of monit. Wells 1285 121.8 103.4 17.8 91.00 17/30/2009 lift #5 Se of monit. Wells 1285 121.8 102.2 21.1 92.00 17/30/2009 lift #5 SE of monit. Wells DUPLICATE 1285 121.9 104.7 16.4 91.00	7/28/2009	lift #1 north of monit. Wells DUPLICATE		1281	124.1	103.7	19.7	93.00
1283 125.4 103.6 21.1 94.00 17/29/2009 lift #3 NE of monit. Wells DUPLICATE 1283 123.7 103.8 19.2 93.00 17/30/2009 lift #4 7' east of west wall of pit 1284 121 103.4 17 91.00 17/30/2009 lift #4 DUPLICATE 1284 123.3 104.3 18.2 92.00 17/30/2009 lift #5 east of monit wells 1285 121.8 103.4 17.8 91.00 17/30/2009 lift #5 south of monit. Wells 1285 121.8 103.4 17.8 91.00 17/30/2009 lift #5 Se of monit. Wells 1285 121.8 102.2 21.1 92.00 17/30/2009 lift #5 SE of monit. Wells DUPLICATE 1285 121.9 104.7 16.4 91.00	7/20/2009	lift #2 west of monit Wells		1282	120.8	103.5	16.7	90.00
7/29/2009								
7/30/2009 lift #4 7' east of west wall of pit 1284 121 103.4 17 91.00 7/30/2009 lift #4 DUPLICATE 1284 123.3 104.3 18.2 92.00 7/30/2009 lift #5 east of monit wells 1285 121.8 103.4 17.8 91.00 7/30/2009 lift #5 south of monit. Wells 1285 123.8 102.2 21.1 92.00 7/30/2009 lift #5 SE of monit. Wells DUPLICATE 1285 121.9 104.7 16.4 91.00 8/3/2009 lift #6 45' NW of monit. Wells 1286 123 103.7 18.6 92 8/3/2009 lift #6 27' west of monit. Wells 1286 122.4 103.7 18 92 8/3/2009 lift #7 20' east of monit. Wells 1287 121.9 101.2 20.4 91.00 8/4/2009 lift #7 60' north of monit. Wells 1287 121.4 98.9 22.7 92 8/4/2009 lift #7 74' west SW of monit. Wells 1287 122.9 104.2 18 93.00 8/5/2009 lift #9 50' north of monit. Wells 1289 122.9								
1284 123.3 104.3 18.2 92.00 17/30/2009 1iff #4 DUPLICATE 1285 121.8 103.4 17.8 91.00 17/30/2009 1iff #5 east of monit wells 1285 121.8 103.4 17.8 91.00 17/30/2009 1iff #5 south of monit. Wells 1285 123.8 102.2 21.1 92.00 17/30/2009 1iff #5 SE of monit. Wells DUPLICATE 1285 121.9 104.7 16.4 91.00	112912009	IIII #5 east of Monie. Wens Bot Elorate		1200	120.1	100.0	10.2	
1284 123.3 104.3 18.2 92.00 17/30/2009 1iff #4 DUPLICATE 1285 121.8 103.4 17.8 91.00 17/30/2009 1iff #5 east of monit wells 1285 121.8 103.4 17.8 91.00 17/30/2009 1iff #5 south of monit. Wells 1285 123.8 102.2 21.1 92.00 17/30/2009 1iff #5 SE of monit. Wells DUPLICATE 1285 121.9 104.7 16.4 91.00	7/30/2009	lift #4 7' east of west wall of pit		1284	121	103.4	17	91.00
1285 121.8 103.4 17.8 91.00 17/30/2009 18 18 18 18 18 18 18 1								
7/30/2009 lift #5 south of monit. Wells 1285 123.8 102.2 21.1 92.00 7/30/2009 lift #5 SE of monit. Wells DUPLICATE 1285 121.9 104.7 16.4 91.00 8/3/2009 lift #6 45' NW of monit. Wells 1286 123 103.7 18.6 92 8/3/2009 lift #6 35' south monit. Wells DUPLICATE 1286 124.7 105.8 17.9 94.00 8/3/2009 lift #6 27' west of monit. Wells 1286 122.4 103.7 18 92 8/3/2009 lift #7 20' east of monit. Wells 1287 121.9 101.2 20.4 91.00 8/4/2009 lift #7 60' north of monit. wells DUPLICATE 1287 121.4 98.9 22.7 92 8/4/2009 lift #7 74' west SW of monit. Wells 1287 122.9 104.2 18 93.00 8/5/2009 lift #9 50' north of monit. Wells 1289 122.9 102.6 19.8 93 8/6/2009 lift #10 30' south of monit. Wells 1290 122.4 102.4 19.5 93.00								
7/30/2009 lift #5 SE of monit. Wells DUPLICATE 1285 121.9 104.7 16.4 91.00 8/3/2009 lift #6 45' NW of monit. Wells 1286 123 103.7 18.6 92 8/3/2009 lift #6 35' south monit. Wells DUPLICATE 1286 124.7 105.8 17.9 94.00 8/3/2009 lift #7 20' west of monit. Wells 1286 122.4 103.7 18 92 8/3/2009 lift #7 20' east of monit. Wells 1287 121.9 101.2 20.4 91.00 8/4/2009 lift #7 60' north of monit. wells DUPLICATE 1287 121.4 98.9 22.7 92 8/4/2009 lift #7 33' east NE of monit. W. DUPLICATE 1287 122.9 104.2 18 93.00 8/5/2009 lift #9 50' north of monit. Wells 1289 122.9 102.6 19.8 93 8/6/2009 lift #10 30' south of monit. Wells 1290 122.4 102.4 19.5 93.00								
8/3/2009 lift #6 45' NW of monit. Wells 1286 123 103.7 18.6 92 8/3/2009 lift #6 35' south monit. Wells DUPLICATE 1286 124.7 105.8 17.9 94.00 8/3/2009 lift #6 27' west of monit. Wells 1286 122.4 103.7 18 92 8/3/2009 lift #7 20' east of monit. Wells 1287 121.9 101.2 20.4 91.00 8/4/2009 lift #7 60' north of monit. wells DUPLICATE 1287 121.4 98.9 22.7 92 8/4/2009 lift #7 74' west SW of monit. Wells 1287 122.9 104.2 18 93.00 8/5/2009 lift #9 50' north of monit. Wells 1289 122.9 102.6 19.8 93 8/5/2009 lift #9 40' SW of monit. Wells DUPLICATE 1289 121.6 102.7 18.4 92.00 8/6/2009 lift #10 30' south of monit. Wells 1290 122.4 102.4 19.5 93.00								
8/3/2009 lift #6 35' south monit. Wells DUPLICATE 1286 124.7 105.8 17.9 94.00 8/3/2009 lift #6 27' west of monit. Wells 1286 122.4 103.7 18 92 8/3/2009 lift #7 20' east of monit. Wells 1287 121.9 101.2 20.4 91.00 8/4/2009 lift #7 60' north of monit. wells DUPLICATE 1287 121.4 98.9 22.7 92 8/4/2009 lift #7 74' west SW of monit. Wells 1287 122.9 104.2 18 93.00 8/4/2009 lift #7 33' east NE of monit. W. DUPLICATE 1287 121 100.3 20.6 92.00 8/5/2009 lift #9 50' north of monit. Wells 1289 122.9 102.6 19.8 93 8/6/2009 lift #9 40' SW of monit. Wells DUPLICATE 1289 121.6 102.7 18.4 92.00 8/6/2009 lift #10 30' south of monit. Wells 1290 122.4 102.4 19.5 93.00	173072003	Int 40 CE of thomas World Do. 210.112						
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8/3/2009 lift #6 27' west of monit. Wells 1286 122.4 103.7 18 92 8/3/2009 lift #7 20' east of monit. Wells 1287 121.9 101.2 20.4 91.00 8/4/2009 lift #7 60' north of monit. wells DUPLICATE 1287 121.4 98.9 22.7 92 8/4/2009 lift #7 74' west SW of monit. Wells 1287 122.9 104.2 18 93.00 8/4/2009 lift #7 33' east NE of monit. W. DUPLICATE 1287 121 100.3 20.6 92.00 8/5/2009 lift #9 50' north of monit. Wells 1289 122.9 102.6 19.8 93 8/5/2009 lift #9 40' SW of monit. Wells DUPLICATE 1289 121.6 102.7 18.4 92.00 8/6/2009 lift #10 30' south of monit. Wells 1290 122.4 102.4 19.5 93.00								
8/3/2009 lift #7 20' east of monit. Wells 1287 121.9 101.2 20.4 91.00 8/4/2009 lift #7 60' north of monit. wells DUPLICATE 1287 121.4 98.9 22.7 92 8/4/2009 lift #7 74' west SW of monit. Wells 1287 122.9 104.2 18 93.00 8/4/2009 lift #7 33' east NE of monit. W. DUPLICATE 1287 121 100.3 20.6 92.00 8/5/2009 lift #9 50' north of monit. Wells 1289 122.9 102.6 19.8 93 8/6/2009 lift #9 40' SW of monit. Wells DUPLICATE 1289 121.6 102.7 18.4 92.00 8/6/2009 lift #10 30' south of monit. Wells 1290 122.4 102.4 19.5 93.00								92
8/4/2009 lift #7 60' north of monit. wells DUPLICATE 1287 121.4 98.9 22.7 92 8/4/2009 lift #7 74' west SW of monit. Wells 1287 122.9 104.2 18 93.00 8/4/2009 lift #7 33' east NE of monit. W. DUPLICATE 1287 121 100.3 20.6 92.00 8/5/2009 lift #9 50' north of monit. Wells 1289 122.9 102.6 19.8 93 8/5/2009 lift #9 40' SW of monit. Wells DUPLICATE 1289 121.6 102.7 18.4 92.00 8/6/2009 lift #10 30' south of monit. Wells 1290 122.4 102.4 19.5 93.00							20.4	91.00
8/4/2009 lift #7 74' west SW of monit. Wells 1287 122.9 104.2 18 93.00 8/4/2009 lift #7 33' east NE of monit. W. DUPLICATE 1287 121 100.3 20.6 92.00 8/5/2009 lift #9 50' north of monit. Wells 1289 122.9 102.6 19.8 93 8/5/2009 lift #9 40' SW of monit. Wells DUPLICATE 1289 121.6 102.7 18.4 92.00 8/6/2009 lift #10 30' south of monit. Wells 1290 122.4 102.4 19.5 93.00	0/3/2003	ment to edge of morne from						
8/4/2009 lift #7 74' west SW of monit. Wells 1287 122.9 104.2 18 93.00 8/4/2009 lift #7 33' east NE of monit. W. DUPLICATE 1287 121 100.3 20.6 92.00 8/5/2009 lift #9 50' north of monit. Wells 1289 122.9 102.6 19.8 93 8/5/2009 lift #9 40' SW of monit. Wells DUPLICATE 1289 121.6 102.7 18.4 92.00 8/6/2009 lift #10 30' south of monit. Wells 1290 122.4 102.4 19.5 93.00	8/4/2009	lift #7 60' porth of monit wells DUPLICATE		1287	121.4	98.9	22.7	92
8/4/2009 lift #7 33' east NE of monit. W. DUPLICATE 1287 121 100.3 20.6 92.00 8/5/2009 lift #9 50' north of monit. Wells 1289 122.9 102.6 19.8 93 8/5/2009 lift #9 40' SW of monit. Wells DUPLICATE 1289 121.6 102.7 18.4 92.00 8/6/2009 lift #10 30' south of monit. Wells 1290 122.4 102.4 19.5 93.00								93.00
8/5/2009 lift #9 50' north of monit. Wells 1289 122.9 102.6 19.8 93 8/5/2009 lift #9 40' SW of monit. Wells DUPLICATE 1289 121.6 102.7 18.4 92.00 8/6/2009 lift #10 30' south of monit. Wells 1290 122.4 102.4 19.5 93.00								
8/5/2009 lift #9 40' SW of monit. Wells DUPLICATE 1289 121.6 102.7 18.4 92.00 8/6/2009 lift #10 30' south of monit. Wells 1290 122.4 102.4 19.5 93.00	0/4/2003	men / do duct it 2 di manu it i 2 di						
8/5/2009 lift #9 40' SW of monit. Wells DUPLICATE 1289 121.6 102.7 18.4 92.00 8/6/2009 lift #10 30' south of monit. Wells 1290 122.4 102.4 19.5 93.00	8/5/2009	lift #9 50' porth of monit. Wells		1289	122.9	102.6	19.8	93
8/6/2009 lift #10 30' south of monit. Wells 1290 122.4 102.4 19.5 93.00							18.4	92.00
GOZZOG MENTO GO GOZZO GOZZO	0,0,200							
	8/6/2009	lift #10 30' south of monit. Wells		1290	122.4	102.4	19.5	93.00
		lift #10 90' w NW of monit. W. DUPLICATE		1290	122.3	101.8	20.1	93
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	Density Designation for Cement	Location: Northing /	Elevation	Wet	Dry	%	90%
Date	Treated. Fill in area Ax	Easting	MSL	Den.	Den.	Moist	min.
7/28/2009	lift #1west of monit. Wells		1281	125.2	109.1	14.8	94.00
7/28/2009	lift #1 north of monit. Wells DUPLICATE		1281	124.1	103.7	19.7	93.00
7/29/2009	lift #2 west of monit. Wells		1282	120.8	103.5	16.7	90.00
7/29/2009	lift #3 NE of monit. Wells		1283	125.4	103.6	21.1	94.00
7/29/2009	lift #3 east of monit. Wells DUPLICATE		1283	123.7	103.8	19.2	93.00
						4 55	
7/30/2009	lift #4 7' east of west wall of pit		1284	121	103.4	17	91.00
7/30/2009	lift #4 DUPLICATE	Marine Color of the William	1284	123.3	104.3	18.2	92.00
7/30/2009	lift #5 east of monit wells		1285	121.8	103.4	17.8	91.00
7/30/2009	lift #5 south of monit. Wells		1285	123.8	102.2	21.1	92.00
7/30/2009	lift #5 SE of monit. Wells DUPLICATE		1285	121.9	104.7	16.4	91.00
			1000	100	100 7	40.0	
8/3/2009	lift #6 45' NW of monit. Wells		1286	123	103.7	18.6	92
8/3/2009	lift #6 35' south monit. Wells DUPLICATE		1286	124.7	105.8	17.9	94.00
8/3/2009	lift #6 27' west of monit. Wells		1286	122.4	103.7	18	92
8/3/2009	lift #7 20' east of monit. Wells		1287	121.9	101.2	20.4	91.00
			1007	101.1	00.0	20.7	
8/4/2009	lift #7 60' north of monit. wells DUPLICATE		1287	121.4	98.9	22.7	92 93.00
8/4/2009	lift #7 74' west SW of monit. Wells		1287	122.9	104.2	18	
8/4/2009	lift #7 33' east NE of monit. W. DUPLICATE		1287	121	100.3	20.6	92.00
			1000	400.0	100.0	40.0	93
8/5/2009	lift #9 50' north of monit. Wells		1289	122.9	102.6	19.8	
8/5/2009	lift #9 40' SW of monit. Wells DUPLICATE		1289	121.6	102.7	18.4	92.00
			4000	122.4	102.4	19.5	93.00
8/6/2009	lift #10 30' south of monit. Wells		1290 1290	122.4	102.4	20.1	93.00
8/6/2009	lift #10 90' w NW of monit. W. DUPLICATE		1290	122.3	101.6	20.1	33
	110 114 1 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1		1291	120.8	101.6	18.9	96.00
8/10/2009	lift #11 30' south of monit. Wells		1291	119.5	96.3	20	95.00
8/10/2009	lift #11 60' NW of monit. Wells DUPLICATE		1291	119.5	90.5		33.00
			1292	117.8	96.6	21.9	94.00
8/11/2009			1292	120.4	99.8	20.7	96
8/11/2009	lift #12 60' north of monit.Wells DUPLICATE		1232	120.4	33.0	20.1	
0/40/0000	and side tip in		1288	121	100.2	20.7	92.00
8/12/2009	east side tie-in east side tie-in		1289	115.9	97.7	18.6	92
8/12/2009	lift #13 45' south of monit. Wells		1293	118.5	97.5	21.6	94.00
8/12/2009	mit #15 45 South of monit, vvens		1200	1 .0.0			
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	Density Designation for Cement	Location: Northing /	Elevation	Wet	Dry	%	90%
Date	Treated. Fill in area Ax	Easting	MSL	Den.	Den.	Moist	min.
7/28/2009	lift #1west of monit. Wells		1281	125.2	109.1	14.8	94.00
7/28/2009	lift #1 north of monit. Wells DUPLICATE		1281	124.1	103.7	19.7	93.00
7/29/2009	lift #2 west of monit. Wells		1282	120.8		16.7	90.00
7/29/2009	lift #3 NE of monit. Wells		1283	125.4		21.1	94.00
7/29/2009	lift #3 east of monit. Wells DUPLICATE		1283	123.7	103.8	19.2	93.00
						4=7	
7/30/2009	lift #4 7' east of west wall of pit		1284	121	103.4	17	91.00
7/30/2009	lift #4 DUPLICATE	tan aran and the same of the s	1284	123.3	104.3	18.2	92.00
7/30/2009	lift #5 east of monit wells		1285	121.8		17.8	91.00
7/30/2009	lift #5 south of monit. Wells		1285	123.8	102.2	21.1	92.00
7/30/2009	lift #5 SE of monit. Wells DUPLICATE		1285	121.9	104.7	16.4	91.00
			4000	400	102.7	10.6	92
8/3/2009	lift #6 45' NW of monit. Wells		1286	123	103.7 105.8	18.6 17.9	94.00
8/3/2009	lift #6 35' south monit. Wells DUPLICATE		1286	124.7		17.9	94.00
8/3/2009	lift #6 27' west of monit. Wells		1286	122.4	103.7 101.2	20.4	91.00
8/3/2009	lift #7 20' east of monit. Wells		1287	121.9	101.2	20.4	91.00
	The second of th		1287	121.4	98.9	22.7	92
8/4/2009	lift #7 60' north of monit. wells DUPLICATE		1287	122.9		18	93.00
8/4/2009	lift #7 74' west SW of monit. Wells		1287	121	100.3	20.6	92.00
8/4/2009	lift #7 33' east NE of monit. W. DUPLICATE		1201	121	100.3	20.0	32.00
2/5/2222	ist 40 col and at monit Walle		1289	122.9	102.6	19.8	93
8/5/2009	lift #9 50' north of monit. Wells lift #9 40' SW of monit. Wells DUPLICATE		1289	121.6	102.7	18.4	92.00
8/5/2009	III #9 40 SVV of Highlit. VVelis DOFEICATE		1203	121.0	102.7	10.7	02.00
8/6/2009	lift #10 30' south of monit. Wells		1290	122.4	102.4	19.5	93.00
8/6/2009	lift #10 90' w NW of monit. W. DUPLICATE		1290	122.3	101.8	20.1	93
0/0/2009	WILL #10 30 W INV OF MONE. VV. BOT ELOTTE						
8/10/2009	lift #11 30' south of monit. Wells	,	1291	120.8	101.6	18.9	96.00
8/10/2009	lift #11 60' NW of monit. Wells DUPLICATE		1291	119.5	96.3	20	95.00
0/10/2000							
8/11/2009	lift #12 70' west of monit. Wells		1292	117.8	96.6	21.9	94.00
8/11/2009	lift #12 60' north of monit, Wells DUPLICATE		1292	120.4	99.8	20.7	96
0/11/2000							
8/12/2009	east side tie-in		1288	121	100.2	20.7	92.00
8/12/2009	east side tie-in		1289	115.9	97.7	18.6	92
8/12/2009	lift #13 45' south of monit. Wells		1293	118.5	97.5	21.6	94.00
8/18/2009	lift #3 east side tie-in		1290	118.8	100.7	18	95.00
8/18/2009	lift #4 east side tie-in		1291	122.3	103.4	18.3	92.00
8/19/2009	lift #5 east side tie-in		1292	116.2	98.1	18.4	93
8/19/2009	lift #6 east side tie-in		1293	119.7	99.6	20.2	95.00
					ļ		
8/20/2009	east side tie-in		1293	118.8	100.8	17.8	90.00
8/20/2009	lift #13 12' north of monit. wells		1293	119.4	100.7	18.6	91
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				<u>L</u>			

CONSOLIDATED ENGINEERING LLNL Site 300 B-850 Soil Remediation LABORATORIES

Date	Density Designation for Cement Treated. Fill in area Ax	Location: Northing / Easting	Elevation MSL	Wet Den.	Dry Den.	% Moist	90% min.
8/24/2009	lift #14 51' east of MW 11:10am		1294	116.4	95.6	21.7	93.00
8/24/2009	lift #14 70' west of MW 4:15pm		1294	119.3	99.4	20	95.00
0/24/2000							
8/25/2009	lift #15 35' east of MW 11:10am		1295	119.4	102.1	16.9	95.00
	monit. Wells (MW) 1:30pm		1295	116.8	99.5	17.4	93.00
8/25/2009	lift #15 50' north of MW 4:30pm		1295	119.5	101	18.3	95.00
8/25/2009	111 #15 50 HORRI OF WWW 4.30pm		1233	110.0	101	10.0	50.00
	151 #40 001 th of BANA 0.25	-leveliers based on CDC	1293				
8/27/2009	lift #16 80' north of MW 9:35am	elevations based on GPS					
8/27/2009	60' east of MW - 10% shell - 10:35am	and the second of the second o	-1288				
8/27/2009	at MW 1pm		1293				
8/27/2009	lift #16 45' south MW 2:50pm		1293				
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Reviewed By:

Date:

Field Representative

	Geosphere Con: Ints, Inc.					AILY	FIEL	D REP	ORT	
	Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	Rep	ort#:	B	583005	. >	Date	: 811	09	-
Project Nam	e: LLUC Site 300 B850 Soil R	Pro	ect Nu	mber:	1 AW 12	65	Page		of	
Field Rep:	Pobort Virlac	Pro	ect Ma	nager:	<u>Cal</u> D	ickermo	<u>~</u>			
Scope of Work:	Mass Grading Pavement Utility Trench	□ o	her	Hours (Charged:	,☑ Full Time		Part Time		
Contractor:	Cessudo			□ ′s	unny	□ Windy	ĮΖ	l Hot	□ №	fild
Contractor R	epresentative: Awdy Bell	Conc	litions:		lloudy	☐ Rain	, E] Cold	☐ ☐	og 🦩
Equipment	Туре	基基	Numb	er .		☐ Nuclear	Ty	/pe:		
Compaction	Rex		-		Density Testing Equipment	☐ Tube		•		
Moving						Sand Co الكارم	one			
Water	Truck		1	•		/ Native	261	site		
Support					Fill Source	☐ Import				
Plan	Engineer		Date		Fill Location:					
Civil										
Structural								· ·	•	
Geotech Curve#	Description		, M-	x Density	/ Opt. Moistu	re Required Con	naction	Pomi	red Moist	uro de a f
	B 1 6 14 160		CONTRACTOR OF THE PARTY OF THE	رادانان ک. خ			ipaction.	LENGTH PROPERTY	ter are versioned th	in graduit
181902H9T	Jan Sandy Jan W/ 3	<u> </u>	1 2	٠ ، قمدس	<u> </u>	/ <u>吳 90%</u> □ 95%		_	. + 2%	504
	DIUS 31. CONENT					Other		☐ Opt		
						- Outer	•	aloxe		<i>F.</i>
								,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1	
Test#	Location	Elevatio	in V	Vet Densi (pcf)	ty Moisture Content	Dry Density (pcf)	Curve		cent action	Pass/ Fail
	H. 13 11 Can	179	7	ШЬ.		98.0	08100	3667327 023 2330	3	
	Ax-60 worth of MW	121		11D.	1 18.5	10.0	VOICE	Lot 1	>	

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Comment/ Sketch:	MW= mait wells	ر الداد الدر	· 2200 m	1:	a la	1	1	1 8		
	MW = monit wells,	محقط محباسي	perc	ir Lanca (/ Dara	ea on	We	it. De	345	• .
Lev	and L. of SCS W	15	not) fie	of of	moist.	be	low ,	pt.	
	en de la composition de la resultación de la composition de la composition de la composition de la composition La composition de la						.*.	;		
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tractor identified, to form opinions to our client. The present	ce and activities of our field representatives do not relieve any contractor /solely as evidence i	hat field obs	ervation was	performed.		service. Any conclusion	ns drawn fro			
	ontractural requirements. No one except our client may rely on our or conclusions and/ se contractor retains sole responsibility for site safety and the methods, from and shall take	or recommen	dations conve	yed in the fi	nai report may vary	evaluated by the profes	sional involve	ed.		
	1//////////////////////////////////////	1/29				<u>.</u>				
Field Representa	tive: Date: 011	11/	_ Rev	iewed By	·		<u> </u>	Date:		<u> </u>

	AN ETS COMPANY			• • •	JAILY	FIELD R	EŖORT
	Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	Repor	t# B 58	3205		Date: 8	939
Project Name	=LUNLS:t=300 B 850 Soil &	Projec	t Number:		265	Page	of
Field Rep:	Robert Live		t Manager:	Cal	Dicker	Mount	
Scope of Work:	Mass Grading Pavement Utility Trench.	Other	Hours Char	ged:	Full Time	☐ Part Ti	me .
Contractor:	Cerrindo		□ Sun	ıy	□ Windy	ј⊿′ н₀:	□ Mild
Contractor Re	epresentative: Andy Rell	Conditi	ons: Clou	ıdy .	Rain	Cold	□ Fog
Equipment	Туре	100000	Number =		☐ Nuclear	Туре:	76, 15 <u>1</u> 634
Compaction			Ď	ensity Testing Equipment	☐ Tube		
Moving				Equipment	Sand Co	one	
Water				THE	☑ Native	on six	6
Support				Fill Source	☐ Import		
Plan	Engineer		Date Fil	l Location:			
Civil					Tie-in	oven	
Structural					east	side	
Geotech			ا_نن_ا	لبيا	-+ # 1		
Curve #	Description		Max Density	Opt, Moistu			equired Moisture
77 <i>25</i> 67-०।	Bon sandy Silt WISS	1	133.5	15.0	90%		Opt. + 2%
	Plus 15% Cemen	+			95%		Opt. + 2% to 5%
			•		☐ Other		Other:
						20	ove upt.
			Wet Density	Moisture	Dry Density		Percent Pass/
Test#	Location	Elevation	(pcf)	Content	(pcf)	Curve# (ompaction Fail
1	45 east of Monit welk	1294	129.4	16.5	101.1	<i>जारहरा</i> श	97
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Comment/ Sketch:	GPS carected ele	2174:	A 120	73			
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	$(A_{ij}, A_{ij}, A_{$			·	ta e tracal	17 1	
						. 	
ractor identified, to form opini	ionals are represented on site soley to observe operations of the con- ions about the adequacy of those operations, and to report those opin-	FR is Prelimin	ary - A preliminary repo	ort is provided	This DFR is	Final - A final report	is an instrument of profession
ions to our client. The presence from its obligation to meet con findings and opinions. The	e and activities of our field representatives do not relieve any contractor society as evident or intractural requirements. No one except our client may rely on our or conclusions an contractor retains sole responsibility for site safety and the methods, from and shall ta	ıd/or recommendatio	tion was performed. Obse ons conveyed in the final re those indicated in a prelim	eport may vary	service. Any conclusion evaluated by the profess	ns drawn from this repor sional involved.	t should be discussed with a
perations, and sequences of o		/ /	To morace in a premi			-	
Field Representat	ive Date: 8/	19/29	Reviewed By:			Date:	

	Geosphere Con: Ints, Inc		÷			∠ AILY	FIELD	REPOR1	Γ ' . '
	Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	_ [Report #	· B-	583205		Date: 8	र्गाम्	
Project Name	e: LLNL Site 30, BOSU SU	12.	Project N		LAW126	5	Page	of	
Field Rep:	Robert Wilbe		Project N	/lanager:	Cal Di	ckeima			
Scope of Work:	Mass Grading Pavement Utility Tren	ch [Other	Hours C	harged:	Full Time	☐ Part	:Time	
Contractor:	Cernido			□ -sı	inny	□ Windy	ДΉ	ot 🔲 1	Mild
Contractor R	epresentative: Andy Bell		Condition:		loudy	Rain .	□ c	old 🔲 I	гog
Equipment	Type		Nu	mber		√ Nuclear	Туре:	XOY	
Compaction	sleep fost roller WIA	humatic	. 1	'	Density Testing Equipment	☐ Tube		•	
Moving						☐ Sand Cor	ne	-	
Water		•			Fill Source	☑ Native。	n 51	te	
Support					Fill Source	☐ Import			
Plan	Engineer		. D	ate .	Fill Location:		1.1		
Civil					N	E V a	lifeb		
Structural		•	-						
Geotech Curve#	Description :			Max Density	Opt: Moistur	e Required Comp	action	Required Mois	sture
Welley Designed	2 / / < / /	1		131.5	14.5				SVA KOTOF NA RE
271429-21	DIN SCHOLY WIT	W/5	> .	131.3	((()) 3	□ 95%		Opt. + 2%	
			- 1		1 1 1 1	Other:		•	10 3%
		•				Other:		,	191.
							. ا	2000	1
Test#	Location	E	levation	Wet Densit (pcf)	y Moisture Content	Dry Density (pcf)	€Curve#	Percent Compaction	. Pass/ Fail
	100'E and 100'N of MW 84	m -4	AC	122.1	18.4	103.4	771437 s	93	
2	100 Earl 100N 11 1 9:3) -3	SAC	118.4	15.8	103.0	and a section of	90	
3	100's and 90'N " " 10:3	3) -Z.	5'AC	122.0		103.1	Approximation of the second of	93	
4	10) Earl 95 N 11 1/2 181	× -1:	s'AK	118.8		103.0		90	
5	WE and 100'N 11 1 39	m -	S'AC	123.0		124.4		94	
			- /(
			· · · · · · · · · · · · · · · · · · ·						
Comment/ Sketch:		11-							
	MW - Monit. We	.115				•			
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NOTICE: Our firm's profes	ssionals are represented on site soley to observe operations of the con-	This DED in	Preliminar	/ - A preliminan	report is provided	This DER is t	Final - A final re	port is an instrument	t of professional
ions to our client. The present from its obligation to meet co findings and opinions. Th	ce and activities of our field representatives do not relieve any contractor ontractural requirements. No one except our client may rely on one of COCOCIO the contractor retains sole responsibility-for site safety and the methods.	s evidence that i usions and/or re	field observation commendations	was performed.	Observations and/ nal report may vary	service. Any conclusions evaluated by the profession	drawn from this r	eport should be disc	ussed with and
operations, and sequences of	construction.	u snan cake prec	evence over thos	e muicateu in a pr	еннинату тероге.		- - 		
Field Representa	tive Date:	8/17/	139	Reviewed By:			Date:		
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	Geosphere Cont ints,		ï			ÄILY	FIELD	ŖEPQR'	T
	Geotechnical Engineering • Engineering Geol Environmental Management • Water Resour	ogy ces	-Report	# 7 <	583D	5	Date: 5	3/12/39	7
Project Name	e:LLNL Site 300 B850	Soil	Project		AW 12		Page _	of	
Field Rep:	Robert Mibe		Project	Manager:	Cal I	Dickern	now		
Scope of Work:	☐ Mass Grading ☐ Pavement ☐ Util	ity Trench l	Other	Hours Ch	arged:	Full Time	☐ Pa	art Time	
Contractor:	Cersudo			JZ Su	nny	□ Windy	_ ∠	Hot 🔲	Mild
Contractor R	Λ 3 1	. \	Conditio		oudy	☐ Rain	. D	Cold D	Fog
Equipment	Type		:: N	umber		☑ Nuclear	Туре	TVY	3, 30,030,000,000
Compaction	slear fort rolled	/Humate	,		Density Testing Equipment	☐ Tube			
Moving					- Lyuipiireiic	☐ Sand C	one		
Water					Fill Source	☐ Native	Jn 5	ine	
Support					, riii 30urte	☐ Import			
Plan	Engineer.			Date I	Fill Location:				
Civil			<u> </u>			ditel	^		
Structural					v	Cortor	1		
Geotech Curve#	Description			Max Density	Opt. Moistu	re Required Con	npaction	Required Moi	sture
7140901	Ros Cardy Git	1166		114.5	14.5	and the second	- Дата Макей (191) Г	Opt. + 2%	gerta t ejuntajingen
<u> </u>	MY GELOUIS JUL	WISS		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	111	D 95%		Opt. + 2%	
		*			4.4	Other	. [Other:	
						Lan Other	-	1	olpt.
									Ÿ
Test#	Location	E	levation	Wet Density (pcf)	Moisture Content	Dry Density (pcf)	Curve#	Percent Compaction	Pass/
1	NE V ditch	<u>+7</u>	'AC	118.9	15.Z	103.Z	071409.	90	6. 10-21-17-sept.01-poet
	ne varien			1.04.			4	7. 7.9	<u> </u>
· .		:	* * **						
			<u> </u>						
		· ·	·		*-				-
				-					
					1				
Comment/ Sketch:	1 /	/	<u></u>	1	1	.]] ;			j
	partial am	ount.	of.	Marte	wies (Luill &	20 50	emoved	i.
	at a lat	rel o	loch	0					
								÷	
		*							
tractor identified, to form opin ions to our client. The presence from its obligation to meet co	e and activities of our field representatives do not relieve any contractor ntractural requirements. No one except our client may rely on our e contractor retains sole responsibility for site safety and the methods,	This DFR is solely as evidence that to conclusions and/or refrom and shall take prec	field observation	s conveyed in the fina	bservations and/ I report may vary	This DFR is service. Any conclusion evaluated by the profes	ns drawn from thi	report is an instrumen s report should be dis	nt of professional cussed with and
		do	/_						
Field Representa	tive: U.M.F.	Date: <u>8/20</u>	109	Reviewed By: _			Dat	e:	

	Geosphere Con ants, Inc.			S.	AILYد	FIELD	REPORT	Γ
	Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	-Report	H: 13-5	ष्ट्रकार	į	Date: 8	524/39	-
Project Name	ELLNUSTE 300 B850 Soil A	Projec	t Number: 📜	AW 12	45	Page	of	
Field Rep:	Robert Linha	Project	t Manager: (Callia	accima,	\wedge		
Scope of Work:	Mass Grading Pavement Utility Trench	☐ Other	Hours Char	ged:	Full Time	☐ Par	t Time	
Contractor:	Cerrnalo		☑ Sunn	ıy	Windy	П н	ot 🖊 1	Mild
Contractor Re	epresentative: Andy Bell	.Conditio	ons: Diclou	ıdy	Rain -	- □ c	old 🖟 🗖 1	Fog
Equipment	Type.	-1	Number		☐ Nuclear	Туре:	TIX	
Compaction	theer foot when while	waic		ensity Testing Equipment	☐ Tube			
Moving			}	- Lyupincit.	☐ Sand Co	one		
Water				Fill Source	✓ Native	نېرځ ۲۷	0	
Support				riii.Jource	☐ Import			
Plan	Engineer		Date Fil	l Location:	ie-in	m. co.	<u></u>	
`Civil			-		NE S		1	
Structural				1660	NE S			
Geotech Curve#			Max Density	Opt. Moisture	Required Com	inaction	Required Mois	rturá
			131.5	14.5		ipaction:		DECLERATION CONTRACTOR
)7H09-01_	Bun soudy silt w/55)	101.2	17.7			Opt. + 2%	
					95%		Opt. + 2%	to 5%
					Other:		Other:	<u>L</u>
				<u> </u>	•	يعد:	sove jp	<u> </u>
т		Elon-tro-	Wet Density	Moisture	Dry Density	Curve #	Percent	Pass/
Test#	Location	Elevation	(pcf)	Content	(pcf)		Compaction	: Fail
-	NE tie-in 90 Earl 100 NOFM					<u>07149931</u>	96	pre Dix
2	NE Tie - in 100% and 90'N YM	M th AC	- 117.7	14.6	102.7	4	90	CAR)
		-			-			
1								
						*	-	
*								
Comment/ Sketch:				<u> </u>	<u> </u>		L	<u> </u>
		•						,
	and the second of the second o		e e e e e e e e e e e e e e e e e e e			. ,		* .
		•						•
NOTICE: Our firm's profess	ionals are represented on site soley to observe operations of the con-	DER is Prolimin	ary - A preliminary repo	nrt is provided	☐ This DFR is	Final - 4 final m	port is an instrument	of professions
ions to our client. The presence from its obligation to meet co	e and activities of our field representatives do not relieve any contractor scolely as evidi mractural requirements. No one except our client may rely on our or conclusions contractor retains sole responsibility for site safety, and the methods from and chal	ence that held observat sand/or recommendatio	ary – A preliminary repo ion was performed. Obse ns conveyed in the final re hose indicated in a prelim	ervations and/ eport may vary	service. Any conclusion evaluated by the profess	s drawn from this r	eport should be disc	ussed with and
		douba						
Field Representa	tive: Date: Date: D	124159	Reviewed By:			Date:	·	

Geosphere Cont ints, Inc. AILY FIELD REPORT AN ETS COMPANY Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources Report-#: Stroot s Date: Project Name: LLNL Site 300 B.850 Soil K. 26 **Project Number:** Page Unibe Field Rep: Project Manager: Dickermen Mass Grading Pavement Utility Trench Other Hours Charged: ☑ Full Time ☐ Part Time Scope of Work: Shower Sunny Windy ☑′ Hor П мій Contractor: Conditions: Bell Cloudy Rain Cold ☐ Fog -Contractor Representative: ☑/Nuclear Number Type: - Equipment Type Density Testing ☐ Tube Compaction Equipment Sand Cone Moving / Dative つん Water Fill Source ☐ Import Support Plan Fill Location: Civil Structural Geotech Max Density Opt. Moisture Required Compaction Required Moisture Curve # 17.5 131.5 **2** 90% ☐ Opt. + 2% 18040F **5**95% Opt. + 2% to 5% Other: Other: Dry Density - (pcf) Wet Density Moisture Percent Pass/ Location Elevation Curve # Test # Compaction (pcf) Content Fail 124.2 15.5 94 107.5 804090 Comment/ Sketch:

		 Market 1	* * * · ·	 		
		. (· · · · · · · · · · · · · · · · · · ·	 		
CD D 4'/	24.00\	 		 		

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This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

This DFR is Final - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opin

AND LOT.

*Test stopped due to limit of machine 100psi min.

CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation B-583005

Test Max Sample Location/ Time/ unit wt. Sample Date Sample Break Date Load Strength moist. C. time molded 4" diam. %cement wet time (lbs) (psi) 125.20 3507 14.80% 8/3/09 8am Ax - lift #1/ 9:50am/ 5% 280 10a 7/28/2009 10:50am 125.20 4641 370 14.80% Ax - lift #1/ 9:50am/ 5% 10b 8/4/09 9am 7/28/2009 11am 16.70% Ax - lift #2/ 8:10am/ 5% 120.80 2025 160 8/3/09 8:15am 11a 7/29/09 9:10am 16.70% 120.80 2025 160 Ax - lift #2/ 8:10am/ 5% 11b 8/5/09 10:15am 7/29/09 9:20am Ax - lift #3/ 11:40am/ 5% 124.40 3014 240 21.10% 12a 8/3/09 8:30am 7/29/09 12:40pm 410* 21.10% 124.40 5104 8/5/09 10:25am Ax - lift #3/ 11:40am/ 5% 12b 7/29/09 12:50pm Ax - lift #4/ 9:15am/ 5% 123,30 5104 410* 18.20% 13a 8/3/09 8:45am 7/30/09 10:15am 18.20% Ax - lift #4/ 9:15am/ 5% 123.30 5104 410* 8/6/09 8AM 13b 7/30/09 10:25am 5104 410* 17.80% Ax - lift #5/ 1pm/ 5% 121.80 8/3/09 9am 7/30/09 2pm 14a 17.80% Ax - lift #5/ 1pm/ 5% DUPLICATE 121.80 5104 410* 14b 8/3/09 9:15am 7/30/09 2:10pm 410* 17.80% 5104 Ax - lift #5/ 1pm/ 5% 121.80 7/30/09 2:20pm 14c 8/6/09 8:20AM 3179 250 21.70% Ax - lift #6/ 9am/ 5% 123 8/6/09 8:40AM 8/3/2009 10am 15a 21.70% Ax - lift #6/ 9am/ 5% 123.00 15b 8/3/2009 10:10am 121.90 4533 360 20.50% 8/6/09 9AM Ax - lift #7/ 4pm/ 5% 16a 8/3/09 5pm 121.90 20.50% Ax - lift #7/ 4pm/ 5% 8/3/09 5:20pm 16b 4171 330 15.60% 121.40 17a 8/6/09 9:20AM Ax - lift #7/ 9:15am/ 5% 8/4/09 10:15am 15.60% 121.40 Ax - lift #7/ 9:15am/ 5% 17b 8/4/09 10:25am 18.00% Ax - lift #9/ 12pm/ 5% 122.90 18a 8/5/09 12:45AM 18.00% 122.90 Ax - lift #9/ 12pm/ 5% 18b 8/5/09 1PM 122.40 Ax - lift #10/ 9am/ 5% 19a 8/6/09 9:45am Ax - lift #10/ 9am/ 5% 122.4 19b 8/6/09 10am

Sample Date time molded	Sample 4" diam.	Break Date time	Sample Location/ Time/ %cement	unit wt.	Max Load (lbs)	Test Strength (psi)	moist. C.
7/28/2009 10:50am	10a	8/3/09 8am	Ax - lift #1/ 9:50am/ 5%	125.20	3507	280	14.80%
7/28/2009 11am	10b	8/4/09 9am	Ax - lift #1/ 9:50am/ 5%	125.20	4641	370	14.80%
7/29/09 9:10am	11a	8/3/09 8:15am	Ax - lift #2/ 8:10am/ 5%	120.80	2025	160	16.70%
7/29/09 9:20am	11b	8/5/09 10:15am	Ax - lift #2/ 8:10am/ 5%	120.80	2025	160	16.70%
7/29/09 12:40pm	12a	8/3/09 8:30am	Ax - lift #3/ 11:40am/ 5%	124.40	3014	240	21.10%
7/29/09 12:50pm	12b	8/5/09 10:25am	Ax - lift #3/ 11:40am/ 5%	124.40	5104	410*	21.10%
7/30/09 10:15am	13a	8/3/09 8:45am	Ax - lift #4/ 9:15am/ 5%	123.30	5104	410*	18.20%
7/30/09 10:25am	13b	8/6/09 8AM	Ax - lift #4/ 9:15am/ 5%	123.30	5104	410*	18.20%
7/30/09 2pm	14a	8/3/09 9am	Ax - lift #5/ 1pm/ 5%	121.80	5104	410*	17.80%
7/30/09 2:10pm	14b	8/3/09 9:15am	Ax - lift #5/ 1pm/ 5% DUPLICATE	121.80	5104	410*	17.80%
7/30/09 2:20pm	14c	8/6/09 8:20AM	Ax - lift #5/ 1pm/ 5%	121.80	5104	410*	17.80%
8/3/2009 10am	15a	8/6/09 8:40AM	Ax - lift #6/ 9am/ 5%	123	3179	250	21.70%
8/3/2009 10:10am	15b	8/10/09 8am	Ax - lift #6/ 9am/ 5%	123.00	4793	380	21.70%
8/3/09 5pm	16a	8/6/09 9AM	Ax - lift #7/ 4pm/ 5%	121.90	4533	360	20.50%
8/3/09 5:20pm	16b	8/10/09 8:20am	Ax - lift #7/ 4pm/ 5%	121.90	5104	410*	20.50%
8/4/09 10:15am	17a	8/6/09 9:20AM	Ax - lift #7/ 9:15am/ 5%	121.40	4171	330	15.60%
8/4/09 10:25am	17b	8/11/09 8am	Ax - lift #7/ 9:15am/ 5%	121.40	5104	410*	15.60%
8/5/09 12:45AM	18a	8/10/09 8:40am	Ax - lift #9/ 12pm/ 5%	122.90	4272	340	18.00%
8/5/09 1PM	18b	8/12/09 8:30AM	Ax - lift #9/ 12pm/ 5%	122.90	5104	410*	18.00%
8/6/09 9:45am	19a	8/10/09 9am	Ax - lift #10/ 9am/ 5%	122.40	4424	350	16.10%
8/6/09 10am	19b	8/13/09 8:10am	Ax - lift #10/ 9am/ 5%	122.4	5104	410*	16.10%
8/10/09 9:40am	20a	8/13/09 8:30am	Ax - lift #11/ 9:15am/ 5%	120.80	3995	310	19.40%
8/10/09 10am	20b		Ax - lift #11/ 9:15am/ 5%	120.80			19.40%
8/11/09 11:30am	21a	8/13/09 9am	Ax - lift #12/ 10:45am/ 5%	117.80	3761	300	18.20%
8/11/09 11:50am	21b		Ax - lift #12/ 10:45am/ 5%	117.80			18.20%
8/12/09 2pm	22a		Ax - lift #13/ 1:45pm/ 5%	118.50			17.90%
8/12/09 2:20pm	22b		Ax - lift #13/ 1:45pm/ 5%	118.50			17.90%
	L	<u></u>	<u> </u>			L	<u> </u>

100psi min.					Max	Test	
Sample Date		Break Date	Sample Location/ Time/	unit wt.	Load	Strength	moist. C
time molded	4" diam.	time	%cement	wet	(lbs)	(psi)	1110101.
7/28/2009 10:50am	10a	8/3/09 8am	Ax - lift #1/ 9:50am/ 5%	125.20	3507	280	14.80%
7/28/2009 10:30am	10b	8/4/09 9am	Ax - lift #1/ 9:50am/ 5%	125.20	4641	370	14.80%
7720/2000 1741							
7/29/09 9:10am	11a	8/3/09 8:15am	Ax - lift #2/ 8:10am/ 5%	120.80	2025	160	16.70%
7/29/09 9:20am.	11b	8/5/09 10:15am	Ax - lift #2/ 8:10am/ 5%	120.80	2025	160	16.70%
7/29/09 12:40pm	12a	8/3/09 8:30am	Ax - lift #3/ 11:40am/ 5%	124.40	3014	240	21.10%
7/29/09 12:50pm	12b	8/5/09 10:25am	Ax - lift #3/ 11:40am/ 5%	124.40	5104	410*.	21.10%
			and the second s	<u> </u>			
7/30/09 10:15am	13a	8/3/09 8:45am	Ax - lift #4/ 9:15am/ 5%	123.30	5104	410*	18.20%
7/30/09 10:25am	13b	8/6/09 8AM	Ax - lift #4/ 9:15am/ 5%	123.30	5104	410*	18.20%
7/30/09 2pm	14a	8/3/09 9am	Ax - lift #5/ 1pm/ 5%	121.80	5104	410*	17.80%
7/30/09 2:10pm	14b	8/3/09 9:15am	Ax - lift #5/ 1pm/ 5% DUPLICATE	121.80	5104	410*	17.80%
7/30/09 2:20pm	14c	8/6/09 8:20AM	Ax - lift #5/ 1pm/ 5%	121.80	5104	410*	17.80%
01010000 40	150	8/6/09 8:40AM	Ax - lift #6/ 9am/ 5%	123	3179	250	21.70%
8/3/2009 10am	15a 15b	8/10/09 8am	Ax - lift #6/ 9am/ 5%	123.00	4793	380	21.70%
8/3/2009 10:10am	16a	8/6/09 9AM	Ax - lift #7/ 4pm/ 5%	121.90	4533	360	20.50%
8/3/09 5pm	16b	8/10/09 8:20am	Ax - lift #7/ 4pm/ 5% Ax - lift #7/ 4pm/ 5%	121.90	5104	410*	20.50%
8/3/09 5:20pm	001	8/10/09 6.203/11	AX - IIII #11 4piii 376	121.50	3104	710	20.0070
8/4/09 10:15am	17a	8/6/09 9:20AM	Ax - lift #7/ 9:15am/ 5%	121.40	4171	330	15.60%
8/4/09 10:25am	17b	8/11/09 8am	Ax - lift #7/ 9:15am/ 5%	121.40	5104	410*	15.60%
0/5/00 40 454 M	100	9/40/00 9:40om	Ax - lift #9/ 12pm/ 5%	122.90	4272	340	18.00%
8/5/09 12:45AM	18a 18b	8/10/09 8:40am 8/12/09 8:30AM	Ax - lift #9/ 12pm/ 5%	122.90	5104	410*	18.00%
8/5/09 1PM	100	6/12/09 6.30AM	700 - III #97 12piii 376	122.50	3104	710	10.0070
8/6/09 9:45am	19a	8/10/09 9am	Ax - lift #10/ 9am/ 5%	122.40	4424	350	16.10%
8/6/09 10am	19b	8/13/09 8:10am	Ax - lift #10/ 9am/ 5%	122.4	5104	410*	16.10%
		0.440,000,000	A. 155 #444 O.45 / 59/	100.00	3995	310	19.40%
8/10/09 9:40am	20a	8/13/09 8:30am	Ax - lift #11/ 9:15am/ 5%	120.80 120.80	5104	410*	19.40%
8/10/09 10am	20b	8/17/09 8am	Ax - lift #11/ 9:15am/ 5%	120.00	5104	410	19.4070
8/11/09 11:30am	21a	8/13/09 9am	Ax - lift #12/ 10:45am/ 5%	117.80	3761	300	18.20%
8/11/09 11:50am	21b	8/18/09 8am	Ax - lift #12/ 10:45am/ 5%	117.80	4764	380	18.20%
0/40/00 0	22-	0/47/00 0:300=	Av. 1:ft #12/ 1:45pm/ 50/	119.50	5104	410*	17.90%
8/12/09 2pm	22a	8/17/09 8:30am	Ax - lift #13/ 1:45pm/ 5% Ax - lift #13/ 1:45pm/ 5%	118.50 118.50	5104	410*	17.90%
8/12/09 2:20pm	22b	8/19/09 8am	AX - IIII # 13/ 1.43pi ii/ 376	110.50	3104	410	17.5070
8/18/09 8:40am	23a	8/20/09 8:40am	Tie-in lift #3/ 8:10am/ 5%	118.80	3507	280	17.30%
8/18/09 9am	23b	8/20/09 9am	Tie-in lift #3/ 8:10/ 5% DUPLICATE	118.80	3959	320	17.30%
8/18/09 9:10am	23c		Tie-in lift #3/ 8:10am/ 5%	118.80			17.30%
8/20/09 9:40am	24a		tie-in lift #4/ 9am/ 5%	118.80			
8/20/09 10am	24b		tie-in lift #4/ 9am/ 5%	118.80			
						<u> </u>	

100psi min.					May	Test	
Sample Date	Sample	Break Date	Sample Location/ Time/	unit wt.	Max Load	Strength	moist C
time molded	4" diam.	time	%cement	wet	(lbs)	(psi)	1110101. 0
7/28/2009 10:50am	10a	8/3/09 8am	Ax - lift #1/ 9:50am/ 5%	125.20	3507	280	14.80%
7/28/2009 10:50am	10b	8/4/09 9am	Ax - lift #1/ 9:50am/ 5%	125.20	4641	370	14.80%
7/20/2009 114/11	100	3. ,, 3			·		
7/29/09 9:10am	11a	8/3/09 8:15am	Ax - lift #2/ 8:10am/ 5%	120.80	2025	160	16.70%
7/29/09 9:20am	11b	8/5/09 10:15am	Ax - lift #2/ 8:10am/ 5%	120.80	2025	160	16.70%
		201000000	150 404 44 40 1504	104.40	2044	240	21.10%
7/29/09 12:40pm	12a	8/3/09 8:30am	Ax - lift #3/ 11:40am/ 5%	124.40 124.40	3014 5104	240 410*	21.10%
7/29/09 12:50pm	12b	8/5/09 10:25am	Ax - lift #3/ 11:40am/ 5%	124.40	5104	410	21.107
	13a	8/3/09 8:45am	Ax - lift #4/ 9:15am/ 5%	123.30	5104	410*	18.20%
7/30/09 10:15am 7/30/09 10:25am	13b	8/6/09 8AM	Ax - lift #4/ 9:15am/ 5%	123.30	5104	410*	18.20%
7/30/09 10:25am	130	GOOG GAIN	AX - III	120.00	0 10-7	 	13.237
7/30/09 2pm	14a	8/3/09 9am	Ax - lift #5/ 1pm/ 5%	121.80	5104	410*	17.80%
7/30/09 2:10pm	14b	8/3/09 9:15am	Ax - lift #5/ 1pm/ 5% DUPLICATE	121.80	5104	410*	17.80%
7/30/09 2:20pm	14c	8/6/09 8:20AM	Ax - lift #5/ 1pm/ 5%	121.80	5104	410*	17.80%
			150, 110, 100, 100, 100, 100, 100, 100,	400	2470	250	21.70%
8/3/2009 10am	15a	8/6/09 8:40AM	Ax - lift #6/ 9am/ 5%	123 123.00	3179 4793	250 380	21.70%
8/3/2009 10:10am	15b	8/10/09 8am	Ax - lift #6/ 9am/ 5%		4533	360	20.50%
8/3/09 5pm	16a	8/6/09 9AM	Ax - lift #7/ 4pm/ 5%	121.90 121.90	5104	410*	20.50%
8/3/09 5:20pm	16b	8/10/09 8:20am	Ax - lift #7/ 4pm/ 5%	121.90	5104	410	20.30 /
8/4/09 10:15am	17a	8/6/09 9:20AM	Ax - lift #7/ 9:15am/ 5%	121.40	4171	330	15.60%
8/4/09 10:25am	17b	8/11/09 8am	Ax - lift #7/ 9:15am/ 5%	121.40	5104	410*	15.60%
0,-1,00 10.202							
8/5/09 12:45AM	18a	8/10/09 8:40am	Ax - lift #9/ 12pm/ 5%	122.90	4272	340	18.00%
8/5/09 1PM	18b	8/12/09 8:30AM	Ax - lift #9/ 12pm/ 5%	122.90	5104	410*	18.00%
							10 100/
8/6/09 9:45am	19a	8/10/09 9am	Ax - lift #10/ 9am/ 5%	122.40	4424	350	16.10%
8/6/09 10am	19b	8/13/09 8:10am	Ax - lift #10/ 9am/ 5%	122.4	5104	410*	16.10%
8/10/09 9:40am	20a	8/13/09 8:30am	Ax - lift #11/ 9:15am/ 5%	120.80	3995	310	19.40%
8/10/09 9.40am	20a 20b	8/17/09 8am	Ax - lift #11/ 9:15am/ 5%	120.80	5104	410*	19.40%
6/10/09 TOalii	200	0/1/703 Gaill	7X - III 11 11 0. TOUR 11 0.70	120.00			
8/11/09 11:30am	21a	8/13/09 9am	Ax - lift #12/ 10:45am/ 5%	117.80	3761	300	18.20%
8/11/09 11:50am	21b	8/18/09 8am	Ax - lift #12/ 10:45am/ 5%	117.80	4764	380	18.20%
8/12/09 2pm	22a	8/17/09 8:30am	Ax - lift #13/ 1:45pm/ 5%	118.50	5104	410*	17.90%
8/12/09 2:20pm	22b	8/19/09 8am	Ax - lift #13/ 1:45pm/ 5%	118.50	5104	410*	17.90%
				110.00	0507	200	17.30%
8/18/09 8:40am	23a	8/20/09 8:40am	Tie-in lift #3/ 8:10am/ 5%	118.80	3507	280	17.30%
8/18/09 9am	23b	8/20/09 9am	Tie-in lift #3/ 8:10/ 5% DUPLICATE	118.80	3959	320 410*	17.30%
8/18/09 9:10am	23c	8/25/09 8am	Tie-in lift #3/ 8:10am/ 5%	118.80	5104	410	17.3076
8/20/09 9:40am	24a	8/24/09 8am	tie-in lift #4/ 9am/ 5%	118.80	5104	410*	18.70%
8/20/09 10am	24b	8/27/09 8:15am	tie-in lift #4/ 9am/ 5%	118.80	5104	410*	18.70%
0/20/00 /04/11	~75	5.2,700 G. 10dill			i	1	
8/24/09 11:30am	25a	8/27/09 8:30am	Ax - lift #14/ 11am/ 5%	116.40	4134	330	16.60%
8/24/09 11:50am	 		Ax - lift #14/ 11am/ 5%	116.4		İ	16.60%

*Test stopped due to limit of machine 100psi min.

CONSOLIDATED ENGINEERING LABORATORIES

100psi min.					Max	Test	
Sample Date time molded	Sample 4" diam.	Break Date time	Sample Location/ %cement	unit wt. wet	Load (lbs)	Strength (psi)	
8/25/09 11:30am	26a	8/27/09 8:45am	Ax - lift #15/ 10:50am/ 5%	119.40	3768	300	15.70%
8/25/09 11:50am	26b		Ax - lift #15/ 10:50am/ 5%	119.40			15.70%
0.20.00							
8/25/09 4:10pm	27a	.8/27/09 9am	Ax - lift #15/ 3:30pm/ 5%	119.50	3014	240	15.10%
8/25/09 4:30pm	27b		Ax - lift #15/ 3:30pm/ 5%	119.50		0	15.10%
8/27/09 9:40am	28a		Ax - lift #16/ 9am/ 5%	121.50			
8/27/09 10am	28b		Ax - lift #16/ 9am/ 5%	121.50			
	A. 2. 2. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.						
8/27/09 10:40am	29a		east side shell/ 10:20am/ 10%	121.00			
8/27/09 11am	29b		east side shell/ 10:20am/ 10%	121.00			
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"Partners in Quality"

October 13, 2009

Mr. Steve Ellis Lawrence Livermore National Laboratory P.O. Box 808; L-651 Livermore, California 94551-0808

Subject:

LLNL B-850 Soil Remediation

B850-S300 Livermore, CA

CEL Project #10-01268-LAW & 10-01269-LAW

EARTHWORK AND LABORATORY TESTING SUMMARY September 1, 2009 thru September 30, 2009

CEL representatives observed site operations and/or performed nuclear gauge moisture and density determinations on compacted soils at the above project from September 1, 2009 thru September 30, 2009. Laboratory testing was performed on soil samples from the site. Enclosed are the results of the field and laboratory testing.

We note that some low moisture tests were measured as presented by these test results. We recommend that the Project Engineer, SCS Engineers, evaluate the low moisture results observed in these tests. It is the responsibility of LLNL to review and after consulting with SCS Engineers, approve these test results.

Exp. 12/201

Eric J. Swenson, PE, GE

Principal Geotechnical Engineer

Respectfully submitted,

CONSOLIDATED ENGINEERING LABORATORIES

Michael Wissink Project Manager

Enclosures: Daily Field Reports

Moisture/Density Curves Sand Cone Testing

Moisture Content Summary

Break Log Summary

Distribution:

1 to Addressee

MW/EJS: pmf

R:\Geotech Projects by Number\LLNL\LLNL Bldg 850 Excavation and Remediation Plan - 95% Submittal\Monthly Summary Reports\September Summary (Steve Ellis).doc

Geosphere Constants, Inc.

	Geotechnical En Environmental N	ranagement - water nest	Re	port #:			Date: 9-01-e	99
roject Name	:B-850	SOIL DEMEDI	Alian Pro	oject Numb	per: 1AW136	5	Page	of
ield Rep:	Tong Ph	Megs	Pro	oject Manag	ger:		-1	
		Pavement	الله Utility Trench	Her H	ours Charged:	☐ Mull Time	☐ Part Time	5 82 84
	CEARU			<u>گل</u> ditions:	Z Sunny	M indy .	Hot .	☐ Mild
Contractor Re	presentative:	9MBY	- CON		Cloudy	☐ Rain	Cold	□ Fog
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	Environmental Mar	nagement • Water Res	sources	Report	#:			Date: 9-6	24-09	593.€
Project Name	Z-850	Soll No	ENTELY H.	Project	Number:	A416	168	Page	_ of	
Field Rep:	Ton	Daslly	D Ş	Project	Manager:					<u> </u>
Scope of Work:	Mass Grading	Pavement: 🔲	Útility Trênch	Other	Hours Char		Full Time	☐ Part Time		<u> </u>
Contractor:	CER	HUDO		Condition	all Sunr	ıy	Windy	H Ot	□ Mild	
Contractor Re	presentative:	ANDY	/		Clou	dy.	□ Rain	□ Cold	□ Fog	T
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from its obligation to meet contra	actural requirements. No one exc ontractor retains sole responsibility	tives do not relieve any contractor tept our client may rely on our for lite safety and the methods,	solely as evidence that or conclusions and/or re from and shall take prec	field observation commendations o	was performed. Obse onveyed in the final re	rvations and/ port may vary	service. Any conclusions dra evaluated by the professiona		uid be discussed with and	ı
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Field Representation	Lef 11/2		Date:	1	Reviewed By:			Date:		
/	- E	6								

	Geotechnical En Environmental M	igineering • Engineering Management • Water Re	Geology sources	Report #:		Date: 9-8 70 9-1		
Project Name	Project Name: 8-850 Soil AEMESIATION				mber: LAW/X		Page of	
Field Rep:	Tong 1	DAILLAS	Santage Colored in the col	Project Mai	nager:			_
Scope of Work:	Mass Grading	Pavement	J Utility Trench	Ø Other	Hours Charged:	Full Time	☐ Part Time	
Contractor:	CEPA	WAD SERV		Conditions:	Sunny.	Windy	Hot Mild	
Contractor Re	presentative:	ANDY	REII	Conditions	Cloudy	□ Rain	☐ Cold ☐ Fog	
Comment/Sh EXC EXC EXT PIT ON SE ANE WELL N. MON	COMPAINALOADS	SOIL NO SOIL NO SOPO TENUES PITO POTO	7-8- 7-8- 7-8- 9-8- 9-8- 9-9- 7-2, 10NE 6 10NE 6 10NE 6 10NE 6 10NE 6 10NE 6	SITE. SIDES SIDES ONES ONES ONES ONES ONES ONES ONES ON	SCS CO SECTOR WELLOFD POUTER POUR DIL PLSO TO PASON PASON	C FROM TO BOLL	570	
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ndings and opinions. The operations, and sequences of co ————————————————————————————————————		sibility for site safety and the methods			cated in a preliminary report.	,		\neg
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Environmental Management · Water Resources	Report #:	Date: 9-14/49-15-
Project Name: B-850 Souh REMEDIATION	Project Number: LAW 1268	Page of
Field Rep: Tony Phillips	Project Manager:	
Scope of Work: Mass Grading Pavement Utility Trench	Other Hours Charged: Full Time	☐ Part Time
Contractor: CERUDO SERV.	Sunny. Windy	A Hot □ Mild
Contractor Representative: ANDY BEIL	Conditions: Cloudy	☐ Cold ☐ Fog
Comment/ Sketch:	14-09	
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ions to our client. The presence and activities of our field representatives do not relieve any contractor solely as evidence that		nal – A final report is an instrument of professional rawn from this report should be discussed with and
from its obligation to meet contractural requirements. No one except our client may rely on our or conclusions and/or re	commendations conveyed in the final report may vary evaluated by the profession edence over those indicated in a preliminary report.	
Field Representative: 1 Pull Pull Date: 1-17.	Reviewed By:	Date:
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	Geotechnical Engineering • Engineering Ge Environmental Management • Water Reso	urces	Report #:			Date: 9-16	49-17-2	
Project Name:	B-850 SOIL REMEL	IN Thomas	Project Nu	mber: LAWIA		Page of		
	Joney Philly		Project Ma	nager:				
	Mass Grading □ Pavement □ □ Pavement □ □ □ Pavement □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □		2 Other	Hours Charged:	Full Time	☐ Part Time		
Contractor:	ERAUDO SEAU		Conditions:	☑(Sunny	☑ Windy	Hot.	□ Mild	
Contractor Rep	presentative: ANDY IS	E11	condidons.	Cloudy	Rain	□ Cold	-□ Fog	
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Field Representatiy	Juliffic.	Date: 2-/	Da	iewed By:		Date:		
icia nebiesemani	THE STATE OF THE S	Date.	- c- / nev	icrrcu by.		— I Date. ——		

Geosphere Cons ants, Inc. AN ETS COMPANY Geotechnical Engineering • Engineering Geology

Geotechnical Engineering • Engineering Geolog Environmental Management • Water Resource	Report	:#:		Date: 9-11
Project Name; 8-850 Soch NEMEDIA TA	Project	Number: 194/12 6	8 P	age of
Field Rep: Tony Phillips	Project	: Manager:		
Scope of Work: A Mass Grading Pavement Utility	Trench Differ	Hours Charged:	Ek full Time	PartTime
	Conditio	ns.	Æ Windy □	Hot : Mild
Contractor Representative: ANDY SEA		Cloudy	Rain 💮	☐ Cold ☐ Fog
Contractor: PAPOND SEAW. Contractor Representative: ANDY SEA Comment/Sketch: GRIFFIN 301 = NOT LEAST 3 WEEKS, WHILE SC SOSTERED CON THE	Condition 9-21-6 0N 517 5 INSTA 5 INSTA 5 INSTA 5 INSTA 5 INSTA 5 INSTA 6 INSTA 6 INSTA 7-22-6 17-19 9-23- 17-24-09 7-24-09 7-24-09 7-24-09 7-24-09	Sunny Ins Cloudy If ADDATE ROAD IN THE THIS. THE ATTE ACK FILL OF EXCAVATE AND ACK AND AND AND FROM DANG FROM DANG FORD WAY.	Rain BE BACHS A-1 Sacus A-1 Sa	Deflot Mild Cold Fog.
from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.	ly as evidence that field observatio onclusions and/or recommendations n and shall take precedence over tho	s conveyed in the final report may vary see indicated in a preliminary report.		
Field Representative: Dat	te:	Reviewed By:		Date:

Geotechnical Engineering - Engineering Geology Environmental Management - Water Resources	Report #:			Date: 918 To 10-
Project Name: 3-850 Soil REMEDINGUAL	Project Nur	mber: <i>LAW1268</i>		
ield Rep: Tony Phillys 5	Project Mai	nager:		
	Other	Hours Charged:	Full Time	☐ Part Time
ontractor: CERRODO SERVICES	Conditions:	Sunny	W indy	Hot D Mild
entractor Representative: ANDY BEIL	Conditions.	Cloudy	Rain Rain	Cold Fog
SCS = CREW STARTE 9 FINISHED COMPACTION OF TRAINERS DIMY & B-	SEC	TOP A-1	TUST SE	vajor-
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SES= STADIS EXCAVA	19-00	0E V-D.	Ten A	10N6 B-850
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SCS = CONTINUE EXE + INSTAIL WADDLES S UREW ALSO FIXED 4 E	, SIDE	SLOPE	of SECT	TOR A-R.
FENCE IN SECTOR A-3 A3-0 4 IN SECTOR A-	70 1	N COMPU	S' NEW	SECTOR
	-el -		- V De 7	ecr +
SCS = CONTINUE TO EXC CLEAN UP SEDIMENT AP. WATER HINSIDES & REPR	EA C AIR CH	N. END OF	FIEE 9	Police
JOB SITE FOR SHOTE	e 13ec	18.		
ur dient. The presence and activities of our field representatives do not relieve any contractor solely as evidence that obligation to meet contractural requirements. No one except our dient may rely on our or conclusions and/or re	field observation was ecommendations conve	preliminary report is provided performed. Observations and/ yed in the final report may vary cated in a preliminary report.		al – A final report is an instrument of profession wan from this report should be discussed with an involved.
d Representative: Date:	Revi	ewed By:		Date:

Geosphere Cont ants, Inc. JAILY FIELD REPORT AN ETS COMPANY Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources Date: (3) 10 9-3-09 Report #: Project Number: 1401268 Field Rep: Project Manager: **F**ull Time Scope of Work: Other Hours Charged: ☐ Part Time Windy Hot ☐ Mild Contractor: Sunny Conditions: ☐ Cold Contractor Representative: ☐ Cloudy Rain ☐ Fog Description Max Density Curve # Opt. Moisture Required Compaction Required Moisture 131,5 A= 030409.01 BANSOY SLTW/SS PLUS STO CEMENT 111,5 ☐ Opt. + 2% 17,5 27 90% B = 07409-01 MIX BAN SAY SIT W/55 114,5 14,5 Opt. + 2% to 5% □ 95% C= 681009-01 BAN SDYSILT W/SS PLUS 590 CMT. 105.5 Other: Other: Wet Density Moisture Dry Density Percent Test # Location Elevation Curve # (pcf) Content (pcf) Compaction 8-31-09 +96'W.N.W. DFMW LIPT#7110.8 17.5 102.8 19 9-01-09 S. V-DITEH 160 D. SW. DE M. 41. S. V-DITCH E. SHELL & TIEINI 9-01-09 1.30'N OF M.W. 91 LIFT 18 120.8 19.0 101.5 @M.W. (CENTER) 115.5 18.4 97.6 +40'S. OFM.W. UFT18 1199 21.2 98.9 1/FG 19,6 16.7 10217 S. V-NITCH NOTICE: Our firm's professionals are represented on site soley to observe operations of the contactor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No ene except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of constructions.

Field Representative: Reviewed By: Date:

This DFR is Preliminary - A preliminary report is provided of colely as evidence that field observation was performed. Observations and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

This DFR is Final - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Geosphere Consents, Inc.

	Geotechnical Engineering • Engineering Ge Environmental Management • Water Reso	urces	Report #:				Date: 9	19 49	7-10	
Project I	lame: B-840 Sail Seinte	DA THON	Project Number: 1AW1868			68	Page of			
Field Re	Field Rep: Tory And 15			Project Manager:						
Scope of W	ork: Mass Grading Pavement U	Jtility Trench	D COther	Hours Charg	jed:	Full Time	☐ Pa	rt Time		
Contract	an contract		Conditions:	Sunn	у	Windy Windy	421 F	lot 🔲 N	Aild	
Contract	or Representative: AND C		Conditions.	Clou	dy	☐ Rain		Cold 🗆 F	og	
Curve #	Description		M	ax Density	Opt. Moisture	Required Com	paction	Required Mois	ture	
A= 090109	-018RN SILT. SAND W/SS	3 PLUS A	76Cm7	107.0	18.5	4 21 90%		Opt. + 2%		
	•					□ 95%	· [2	Opt. + 2%	to 5%	
B=080409	ON BLANSANDY SULTWYSS .	+ 5% En	11	1.5	17.5	Other:		Other:		
Test#	· 9. 9. 9. 09	1	Elevation	Wet Density (pcf)	Moisture Content	Dry Density (pcf)	Curve#	Percent Compaction	Pass/ Fail	
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À	780'W. SW. OF M.	W. W.	FTIG	1192	18.8	10Q.B	<u></u>	90		
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	9-10-09									
	9-10-09 © CTR. M.W.	211	E J & 1	119,5	18.9	100.5	XI	90		
_2	10 10 10				18.1	10093	P	91		
3			- 1"				2/			
3	E, SIDE SHELL 10	0 /0 /11	F151	2819	22,4	100,0	14	93	_	
					-0	-				
								1		
tractor identified, to ions to our client. Th from its obligation to findings and opin	's professionals are represented on site soley to observe operations of the con- orm opinions about the adequacy of those operations, and to report those opin- presence and activities of our field representatives for onc	This DFR is solely as evidence that or conclusions and/or re from and shall take prec	neid observation was commendations conv	eyed in the final rep	vations and/ ort may vary	This DFR is F service. Any conclusions evaluated by the profession	drawn from this	eport is an instrument of report should be discu	of professiona ssed with and	
									_	
Field Repre	entative:	Date:	Rev	riewed By:			Date	:		

Geosphere Con. ants, Inc. AN ETS COMPANY Geotechnical Engineering · Engineering Geology

	Geotechnical Eng Environmental M	A	eering Geology ter Resources	Repo	rt #:				Date:	9-154
Project Nam	ne:75-850_	SOLL KE	MD 19/101	Proje	ct Nu	mber: 🎝 🌶	941126	18	Page	of _
Field Rep:	Ford	Philler	05	Proje	ct Ma	nager:				
Scope of Work:	Mass Grading	Pavement	Utility Trench	Æ Othe	r .	Hours Char	ged:	Full Time		Part Time
Contractor:	Ĉĕ.	PRUSE	9			Ø-Sunn	у Д	Windy	12	Hot 🔲
Contractor F	Representative:	AND	if	Condit	ions:	☐ Clou	dy	□ Rain		Cold -
Curve#		the transfer of the second	iption	u a viene en 1674 Lette Frank Defina	Ma	ax Density	Opt. Moisture	Required Con	paction	Required Mo
1009-01	BAN SAYS	1.T m/33	+590 C	MI	10	95,5	19%	A _90%		Opt. + 2%
		,						□ 95%		Opt. + 2%
10109-c	BAN SOY:	6h.T. ry/33	4-10% 0	MI	10	7.0	18.5%	Other	:]	Other:
				A market are						
Test #		Location		Elevation		Vet Density (pcf)	Moisture Content	Dry Density (pcf)	Curve#	Percent Compaction
1	±60'5,	Sie OF	mul	21470	10	116.7	21.2	96.3	A	91
2	Wind wit	: N.M	W. NC.7-	7/ 10	1	159	21.9	95.1	14	90
	E. SIDA	7-16-					4.	2611	<i>5</i> -7	31
	E. 3100	S G S H E		21770		19,4	21.4	98.4	_&J	92
					-					
						•				
	-				+					
	1									1

Conditions:	Т	D REPORT	FIELD F	ا AILY				N ETS COMPAN	
Field Rep: Asbest 1/4 by Project Manager: Cal Pickaman Super Worl Place auto Deliny freed Dobs Nour Charged Pfull line Part line Contractor: CAMON Scorditions Dissure	207	9/1-3/0	Date: 9	5	B 58300				Gestechnical Environmental
Sope Work		of	Page	1269	mber: LAW	Project Nur	385) Silk	-5ite,300	Project Name: LLUL
Contractor: Cescualo Contractor Representative: Anoly Bell Conditions: County Change Cold Cold Cold Comment Sketch 2/1/09 Twe Break # 266@7 days 340 ps. # 276@7 days 340 ps. # 276@7 days 340 ps. - Sample @ 11:50 pan #31a 12:50 #31b 1:05 - Chive 090109-01 126:5/107.0/18.5 Skinny 85° f 9/2/09 wed Break # 296@7 days 110 pm, # 336 1:50 pm - moist cont. Break # 296@7 days 110 ps. Max # 286@7 days 110 ps. Max			nen	Dicker	nager: Cal J	Project Mai	ga, ngamada lk yan da neumanga	t Wibe	ield Rep: Koleet
Contractor Representative: And Bell Cold Goods Goods Rain Goods Go	we so to	recolumnation of the residence of	or at the first law.	Full Time	Hours Charged:	Other	Utility Trench	ng Pavement	cope of Work: Mass Gradin
Comment Sketch 2/1/09 Twe Break # 26 b@ 7 days 340 ps. # 27 b@ 7 days 340 ps. - Sample @ 11:50 jayn # 31a 12:50 # 31b 1:05 - Curve 090109-01 126.5 / 107.0 / 18.5 5/4 my 85° f 9/2/09 wed - Sample @ 9 Am # 32 a 9:40 Am # 32b 10 Am 2 12 pm # 33a 1:10 pm # 33b 1:30 pm - moust cont. 3 2 pm # 33a 1:10 pm # 33b 1:30 pm - moust cont. 3 2 my 85° f	Mild	. Hot 🔲 N	. 🔼 но	□ Windy	Sunny	Candinana		would	Contractor:
Comment/Sketch 2/1/09 Twe Break # 266@ 7 days 340 ps. # 276@ 7 days 340 ps. - Sample @ 11:50 pm # 31a 12:50, #31b 1:05 _ come 090109-01 126:5/107.0/18.5 Sching 85° f 9/2/09/ west - Sample @ 9Am #32a 9:40Am, #32b 10Am @ 12pm #33a 1:10pm, # 33b 1:30pm - moust cont. Surry 85° f 9/3/09/ Thu Break # 296@ 7days 40 ps. Max # 286@ 7days 260 ps.	Fog	Cold D F	: П с.	Rain	☐ Cloudy	Conditions.	Bell	Andy	Contractor Representative:
Sample @ 9Am #32a 9:40Am, #32b 10Am — 12pm #33a 1:10pm, # 33b 1:30pm — moist cont. Sumy 85° f [9/3/07/Thn Break # 29 b @ 7days 410 psi Max # 28 b @ 7days 260 ps		S	ነጽ.\$	10 ps. .#31b 07.0 /	days 34 #31a 12:50	76@7 50gm -	# 22 # 27 = @ 11:	Ji/09 Brea Sampl	
# 28b@ 7days 260 ps.		:30 pm	b 1:3	- ,# 33 <i>l</i>			le@9A @1Z	. Sermpl	
NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form collidors about the adequacy of those operations, and to report is an instrument. This DFR is Preliminary - A preliminary report is provided. This DFR is Final - A final report is an instrument.	t of profession	O C al report is an instrument	v∞°	This DFR is Fi	60 psw psu ps.	days z days z days z	286 7 300 3 3100 z	site soley to observe operations of th	or identified, to form opinions about the adequacy of t
ions to our dent. The presence and activities of our field representatives on our felic way contractor from this freport should be discuted in the final report may vary findings and opinions. The contractor retains sole responsibility for site service and shall take precedence over those indicated in a preliminary report. Field Representative: Date: Date: Discussion device that field observation was performed. Observations and/ or recommendations conveyed in the final report may vary form and shall take precedence over those indicated in a preliminary report. Field Representative: Date: Date: Date: Date: Date: Date: Discussion deventions and/or recommendations conveyed in the final report may vary form and shall take precedence over those indicated in a preliminary report.	cussed with an	this report should be discu	drawn from this rep nal involved.	service. Any conclusions d	performed. Observations and/ yed in the final report may vary cated in a preliminary report.	it field observation was recommendations conve ecedence over those indi	opinious of a solely as evidence that opinious of and/or from and shall take pr	representatives do not relieve any cont lo one except our cliens may rely o	to our client. The presence and activities of our field rep list obligation to meet contractural requirements. No lings and opinions. The contractor retains sole resp ations, and sequences of construction.

Geosphere Constants, Inc.			AILY F	IELD ŖEP	ORŢ
Geotechnical Engineering - Engineering Geology Environmental Management - Water Resources	Report #:	B 58300	5	Date: 9 14-	-17/09
Project Name: LLNU Site, 300		nber: L-AW 17	269	Page	of
Field Rep: Propert Links	Project Man	ager: Cal J	Pickerina	<u> </u>	
Scope of Work: Mass Grading Pavement Utility Trench	Other	Hours Charged:	Full Time	☐ Part Time	- Committee Table (Committee
Contractor: Centudo	Conditions:	☑ Sunny	□ Windy	☑ Hot.	□ Mild
Contractor Representative: Audy Bell	COLOR	Cloudy	Rain	Cold	□ Fog
althor was Perale Ho	Part	e Solay 2 Solay 7 Charly S	350 337 337 F		
NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of inuse operations, and or report those opinions to our client. The presence and activities of our field representative do not relieve any contractor or conclusions not one contractor identified, no new confirmations and/or re	F Preliminary - A p field observation was p commendations conveyed cedênce over those indicated to the control of the control		Sumy	85°F	nstrument of professional

	Geosphere Constants, Inc.			AILY F	IELD REPORT
	Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	Report #:	B 583003	1	Date: 9/21-24/09
Project Name	e: LLN Site 300 B850 501 k	Project N	umber: LAW 17	269	Page of
Field Rep:		Project M	anager: Cal	Dielan	non
Scope of Work:	☑ Mass Grading ☐ Pavement ☐ Utility Trench	Other	Hours Charged:	Full Time	☐ Part Time
Contractor:	Carrido		Sunny	□ Windy	☑ Hot □ Mild
Contractor Re	epresentative: Andy Bell	Conditions:	Cloudy	Rain	☐ Cold ☐ Fog
Comment/S	8/22/09 mor 3/22/09 mor 3/22/09 rive 5/23/09/we	sta Ce	Slugs Jun	3 60 pg	
NOTICE: Our firm's profess	sionals are represented on site saley to observe operations of the con-		Australian consent la provided		al – A final report is an instrument of profession
from its obligation to meet cor findings and opinions. The	e and activities of our field representatives do not relieve any contractor solely as evidence intractural requirements. No one except our dient may fell on our or conclusions and die contractor retains sole responsibility of site selective for the methods, from and chall take	that field observation w 'or recommendations cor	 A preliminary report is provided has performed. Observations and/ haveyed in the final report may vary andicated in a preliminary report. 	service. Any conclusions draw evaluated by the professional	wn from this report should be discussed with an
operations, and sequences of o	construction.	/ / / I I I I I I I I I I I I I I I I I			T
Field Representa	tive. Date: 9/1	24/09 R	eviewed By:		Date:
	, , _ ,	V			

Geosphere Con.				AILY F	IELD REPOR	T
Geotechnical Engineering • Eng Environmental Management • V	ineering Geology Vater Resources	Report #s	B-58300	5	Date: 9	
Project Name: LLUL Site 300	8850 Silk	Project Nur		-69	Page of	
Field Rep:		Project Mar	nager: Cal	Dickosmo	<u> </u>	
Scope of Work: Mass Grading: Pavemen	t Utility Trench	Other	Hours Charged:	Full Time	☐ Part Time	
Contractor: Cervial	0	Conditions:	Sunny	□ Windy	右 Hot 口	Mild
Contractor Representative:	Bell	Conditions.	Cloudy .	☐ Rain	Cold	Fog-
NOTICE: Our firm's professionals are represented on site sety to observe operation particular distributed for firm and to proper the second of	softe contribution of This DFR		2 V-2	This DFR is Fin	exavef	nt of professional cussed with and
ons to our client. The presence and activities of our field representatives do not relieve a rom its obligation to meet contractural requirements. No one except our client ma- indings and opinions. The contractor retains sole responsibility for standed uper perations, and sequences of construction.	y rely on our or conclusions and/or	recommendations convey	erformed. Observations and/ red in the final report may vary cated in a preliminary report.	service. Any conclusions dra evaluated by the professional	wn nom uns report snould be di involved.	rcussed With and
Field Representative:	Date: 9/3	Revie	ewed By:		Date:	



CONSOLIDATED ENGINEERING

DATE:	9/10/	D9	INSPECTOR	₹:	Tony P.	J.R. W.
PROJECT#:	LAU	0 1269	PROJECT	NAME:	LLNL Sit	e 300 B 850 S
COMPACTION SI		90	TEST LOCA	ATION:	ead side	shell 10/.a
MOISTURE SPEC	D: _	above opt.				
		SAN	D CONE TI	ESTING	•	
	А	WT of cone, jar, sand - Befo	ore	6904.	4	g
	В	WT of cone, jar, sand - After		3957.6	5	g
	C ·	WT of sand in cone		1580		g
	D	WT of sand used		2946	-8	g A-B
	E	WT of sand in hole		1366		g D-C
•	F	Density of sand	·	89.	6	pcf
	G	Volume of hole	15.254	1 .033	<u> </u>	cf E÷F
	. Н	Gross WT of excavated soil	+TARE _			lbs
•	1	WT of TARE				lbs
	· J.	Net WT of soil		1855.8	4.091	lbs H-I
	К	WT Density		121.	7	pcf J÷G
	L	Soil + TARE (Wet)		973.3		lbs
	М	TARE	#5 <u> </u>	136,5		lbs
	N .	Soil + TARE (Dry)	-	<u>857.</u>	7	lbs
	7.0	WT of Water	· -	120,7		lbs L-N
	Ρ	WT of Soil	_	716.2		lbs N-M
	Q	Moisture Content	•	16.8		% O÷P
		Optimum Moisture Content	-	18.5		%
	R	Dry Density		104.7	• .	pcf K ÷ (I + Q)
	S	Lab Maximum		107.0		pcf
		(Lab No. 090109-0	<u>ì</u>	,		
	T	Percent Compaction		97		% R÷S
Weight = \ Cubic Fee		Pounds = lbs Gra	ıms = G	Pounds per Cubic Conversion Gram		

CONSOLIDATED ENGINEERING LLNL Site 300 B-850 Soil Remediation LABORATORIES

8/25/2009	Date	Location	Tare	Wet soil + tare	Dry soil + tare	Wt. of water	Wt. of soil	Content
8/27/2009 nuke guage - area Ax - lift 16 test #4	8/25/2009	nuke guage - area Ax - lift 15 test #1	137.20	614.70	545.60	69.10	408.40	16.90%
8/27/2009 nuke guage - area Ax - lift 16 test #4								
9/2/2009 nuke gauge - area Ax - lift 18 test #3 137.20 665.8 573.40 92.40 436.20 21.20%								21.30%
	8/27/2009	nuke guage - area Ax - lift 16 test #4	137.50	740.70	659.80	80.90	522.30	15.50%
	0/2/2000	nuke gauge - area Av - lift 18 test #3	137.20	665.9	572.40	02.40	426.26	21 20%
	9/2/2009	Huke gauge - area Ax - IIIt 10 test #3	137.20	005.6	5/3.40	92.40	430.20	21.20%
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CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation B-583005

Date	Density Designation for Cement Treated. Fill in area Ax	Location: Northing / Easting	Elevation MSL	Wet Den.	Dry Den.	% Moist	90% min.
8/24/2009	lift #14 51' east of MW 11:10am		1294	116.4	95.6	21.7	93.00
8/24/2009	lift #14 70' west of MW 4:15pm		1294	119.3	99.4	20	95.00
						<u> </u>	
8/25/2009	lift #15 35' east of MW 11:10am		1295	119.4	102.1	16.9	95.00
8/25/2009	monit. Wells (MW) 1:30pm		1295	116.8	99.5	17.4	93.00
8/25/2009	lift #15 50' north of MW 4:30pm		1295	119.5	101	18.3	95.00
8/27/2009	lift #16 80' north of MW 9:35am	elevations based on GPS	1293	121.5	101.8	19.4	92.00
8/27/2009	60' east of MW - 10% shell - 10:35am		1288	121	99.8	21.3	92.00
8/27/2009	at MW 1pm		1293	121.4	105.4	15.2	91.00
8/27/2009	lift #16 45' south MW 2:50pm		1293	119.9	103.8	15.5	90.00
8/31/2009	lift #17 96' west NW of MW 12:40pm			120.8	102.8	17.5	92.00
9/1/2009	lift #17 60' west SW of MW 11am	1		124.7	102.5	21.7	95.00
9/1/2009	lift #2 east side shell 10% cement 12:40pm			119.5	100.8	18.5	91
9/2/2009	lift #18 30' north NW of MW 9:30am			120.8	101.5	19	92.00
9/2/2009	at Monit. Wells 10:10am			115.5	97.6	18.4	92
9/2/2009	lift #18 40' south of MW 1pm			119.9	98.9	21.2	96.00
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CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation B-583005

Date	Density Designation for Cement Treated. Fill in area Ax	Location: Northing / Easting	Elevation MSL	Wet Den.	Dry Den.	% Moist	90% min.
8/24/2009	lift #14 51' east of MW 11:10am		1294	116.4	95.6	21.7	93.00
8/24/2009	lift #14 70' west of MW 4:15pm		1294	119.3	99.4	20	95.00
8/25/2009	lift #15 35' east of MW 11:10am		1295	119.4	102.1	16.9	95.00
8/25/2009	monit. Wells (MW) 1:30pm		1295	116.8	99.5	17.4	93.00
8/25/2009	lift #15 50' north of MW 4:30pm		1295	119.5	101	18.3	95.00
8/27/2009	lift #16 80' north of MW 9:35am	elevations based on GPS	1293	121.5	101.8	19.4	92.00
8/27/2009	60' east of MW - 10% shell - 10:35am		1288	121	99.8	21.3	92.00
8/27/2009	at MW 1pm	n	1293	121.4	105.4	15.2	91.00
8/27/2009	lift #16 45' south MW 2:50pm		1293	119.9	103.8	15.5	90.00
8/31/2009	lift #17 96' west NW of MW 12:40pm			120.8	102.8	17.5	92.00
0///0000	"" "4- 001 101 101						
9/1/2009	lift #17 60' west SW of MW 11am			124.7	102.5	21.7	95.00
9/1/2009	lift #2 east side shell 10% cement 12:40pm			119.5	100.8	18.5	91
0/0/0000	100 4440 000	*****			**		
9/2/2009	lift #18 30' north NW of MW 9:30am			120.8	101.5	19	92.00
9/2/2009	at Monit. Wells 10:10am			115.5	97.6	18.4	92
9/2/2009	lift #18 40' south of MW 1pm			119.9	98.9	21.2	96.00
9/9/2009	1155 #4			100.1	400	00.4	
9/9/2009	lift #4 east side shell 10% cement 9:10am			120.1	100	20.1	95.00
9/9/2009	lift #19 80' west SW of MW 2:25pm			119	100.2	18.8	90
							
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Date	Density Designation for Cement Treated. Fill in area Ax	Location: Northing / Easting	Elevation MSL	Wet Den.	Dry	%	90%
		Lasting	IVIOL		Den.	Moist	min.
8/24/2009	lift #14 51' east of MW 11:10am	***************************************	1294	116.4	95.6	21.7	93.00
8/24/2009	lift #14 70' west of MW 4:15pm		1294	119.3	99.4	20	95.00
21221222	10. (145, 05)		4005	 		40.0	
8/25/2009	lift #15 35' east of MW 11:10am		1295	119.4	102.1	16.9	95.00
8/25/2009	monit. Wells (MW) 1:30pm		1295	116.8	99.5	17.4	93.00
8/25/2009	lift #15 50' north of MW 4:30pm	,	1295	119.5	101	18.3	95.00
8/27/2009	lift #16 80' north of MW 9:35am	elevations based on GPS	1293	121.5	101.8	19.4	92.00
8/27/2009	60' east of MW - 10% shell - 10:35am	elevations based on GPS	1288	121.5	99.8	21.3	92.00
8/27/2009	at MW 1pm		1293	121.4	105.4	15.2	91.00
8/27/2009	lift #16 45' south MW 2:50pm		1293	119.9	103.8	15.5	90.00
GZVZGGG	mento lo occurianti zicopini		1200	7 10.0	100.0	10.0	00.00
8/31/2009	lift #17 96' west NW of MW 12:40pm			120.8	102.8	17.5	92.00

9/1/2009	lift #17 60' west SW of MW 11am			124.7	102.5	21.7	95.00
9/1/2009	lift #2 east side shell 10% cement 12:40pm			119.5	100.8	18.5	91
		· ·					
9/2/2009	lift #18 30' north NW of MW 9:30am			120.8	101.5	19	92.00
9/2/2009	at Monit. Wells 10:10am			115.5	97.6	18.4	92
9/2/2009	lift #18 40' south of MW 1pm	, ,		119.9	98.9	21.2	96.00
9/9/2009	lift #4 east side shell 10% cement 9:10am			120.1	100	20.1	95.00
9/9/2009	lift #19 80' west SW of MW 2:25pm	· · · · · · · · · · · · · · · · · · ·	·	119	100.2	18.8	90
		 					
9/10/2009	at MW lift #4 10:35am		***************************************	119.5	100.5	18.9	91.00
9/10/2009	at MW lift #5 12:15pm			119.2	100.9	18.1	91.00
9/10/2009	east side shell 10% cement 4:15pm		· · · · · · · · · · · · · · · · · · ·	122.4	100	22.4	97
9/15/2009	60' south SW of MW 3:15pm			116.7	96.3	21.2	93.00
9/15/2009	4' N of N monit. Well 3:30pm		·	115.7	95.1	21.9	92.00
9/15/2009	4 N Of N filotifit. Well 3.30piti			110.9	90.1	21.3	92.00
9/16/2009	41' east of MW at east side shell 10:15am			119.4	98.4	21.4	94.00
3/10/2003	41 cast of lavy at east side sites 10.10am	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		110.4	30.7	21.7	34.00
		,					

	Geosphere	e Cons	ints, Inc.				AILYد	FIELD	RĘPO,R'	Т
	Geotechnical Eng Environmental Ma	anagement • Wa	er Resources	Report #	BS	58300	5	Date:	2/17/0	e
Project Nam	e:41NL36	1 - 1	4850 Soil A	Project N	Number:	LAW.	12-69	Page _	of _	 .
Field Rep:	Rober	4 Will	~	Project N	Manager:	Cal -	Dicker	non		
Scope of Work:	Mass Grading	Pavement	Utility Trench	Other	Hours C	harged:	Full Time	☐ F	art Time	
Contractor:				Condition	. S	ınny	□ Windy		Hot 🗷	Mild
Contractor R	epresentative:			Condition	[*] □ c	loudy	☐ Rain		Cold 🔲	Fog
Equipment		Туре		Nu	mber		Nuclear	Туре	Trax	
Compaction	Sheep	s foo	<u>t </u>	<u> </u>	,	Density Testing Equipment	☐ Tube			
Moving							☐ Sand Co	one	.1	
Water	Truc	& W	hose	1		Fill Source	Native	on 50	46	
Support						illouice	☐ Import			
Plan		Engine	2Tr. or element of the	D	ate	Fill Location:	•			
Civil						for a	south:	secti	or of	A.
Structural Geotech						-			r	, , ,
Curve#		Descr	iption		Max Density	Opt. Moistur	e Required Con	npaction	Required Mo	isture
263000-0	Buns	moly	Galt	PEN DOKE SKIDS BLAKE	PEDAZ	o anto	2 90%		☐ Opt. + 2%	6
	- SWV S	·	2000		112.0	15.5			Opt. + 2%	
							☐ Other	: Æ	1 Other:	,
								<	above	opt.
			TO THE PERSON AND A PROPERTY OF THE PARTY OF		a San Salat or Suita de la	man for some and Cons	- C			dis-Körksiyes
Test#		Location		Elevation	Wet Densit (pcf)	y Moisture Content	Dry Density (pcf)	Curve #	Percent Compaction	Pass/ Fail
j	90'E and	5661	167-09 MW	1 FSA	117.2	15,3	103.4	0630a	i 97	
Z	- 1	10'5 N		F565	124.		106.7		95	1.
	10200	10 5 1	7	1 00 1			1.00.		12	
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Comment/ Sketch:										
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NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any outractor from its obligation to meet contractor requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility are site safety-end the methods, operations, and expenses of constructions.	This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.	This DFR is Final - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.
Field Representative	Date: 9721/09 Reviewed By:	Date:
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from its obligation to meet con findings and opinions. The operations, and sequences of o	stractural requirements. No one contractor retains sole responsit	except our client may rely	on our or conclusions and/	or recommendation precedence over the	ns conveye	d in the final re	port may vary	evaluated by the profession	onal inv	olved.	se usti	mai ulli
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Field Representat	ive	The	Date:	-001	Revie	wed By:				Date:		

CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation B-583005

*Test stopped due to limit of machine 100psi min.

882509 11:30am 268 827/09 8:45am Ax - Inf #15/ 10:50am/ 5% 119.40 3788 300 15.70% 15.70% 15.70% 15.70% 175.70%	Sample Date time molded		Break Date time	Sample Location/ %cement	unit wt. wet	Max Load (lbs)	Test Strength (psi)	moist. C.
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CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation B-583005

Test Max unit wt. Sample Date Sample **Break Date** Sample Location/ %cement Load Strenath moist. C. time molded 4" diam. time wet (lbs) (psi) 3768 15.70% 8/27/09 8:45am Ax - lift #15/ 10:50am/ 5% 119.40 300 8/25/09 11:30am 26a 9/1/09 7:45am Ax - lift #15/ 10:50am/ 5% 119.40 4323 340 15.70% 26b 8/25/09 11:50am 8/27/09 9am Ax - lift #15/ 3:30pm/ 5% 119.50 3014 240 15.10% 8/25/09 4:10pm 27a 119.50 4258 340 15.10% 9/1/09 8am Ax - lift #15/ 3:30pm/ 5% 8/25/09 4:30pm 27b Ax - lift #16/ 9am/ 5% 121.50 3229 260 17.00% 8/27/09 9:40am 28a 8/31/09 8:50am 17.00% Ax - lift #16/ 9am/ 5% 121.50 3264 260 28b 9/3/09 10:20am 8/27/09 10am 280 21.70% 8/31/09 9:10am east side shell/ 10:20am/ 10% 121.00 3486 8/27/09 10:40am 29a 21.70% 9/3/09 10am east side shell/ 10:20am/ 10% 121.00 5104 410* 8/27/09 11am 29b 14.40% 30a 9/3/09 10:40am Ax - lift #17/ 12:10pm/ 5% 120.80 2615 210 8/31/09 12:50pm Ax - lift #17/ 12:10pm/ 5% 120.80 2770 220 14.40% 9/8/09 12pm 30b 8/31/09 1:10pm 21.20% 9/1/09 12:50pm 31a 9/3/09 11am east side shell/ 11:50am/ 10% 119.50 3050 240 119.50 2852 230 21.20% 9/8/09 12:20pm east side shell/ 11:50am/ 10% 9/1/09 1:05pm 31b Ax - lift #18/ 9am/ 5% 120.80 2807 220 18.70% 9/2/09 9:40am 32a 9/8/09 1:15pm 120.80 2130 170 18.70% 32b 9/9/9 10am Ax - lift #18/ 9am/ 5% 9/2/09 10am 190 20.10% 33a Ax - lift #18/ 12pm/ 5% 119.90 2422 9/2/09 1:10pm 9/8/09 2:20pm 33b 9/9/9 10:20am Ax - lift #18/ 12pm/ 5% 119.9 3264 260 20.10% 9/2/09 1:30pm 18.20% east side shell/ 8:45am/ 10% 120.10 9/9/9 9:45am 34a 18.20% 34b east side shell/ 8:45am/ 10% 120.10 9/9/9 10am 21.70% 35a Ax - lift #19/ 1:45pm/ 5% 119 9/9/9 2:45pm 21.70% 35b Ax - lift #19/ 1:45pm/ 5% 119.00 9/9/9 3pm

CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation B-583005

8/25/09 11:50am 26b 9/1/09 7:45am Ax - lift #15/ 10:50am/ 5% 119.40 4323 340 15.70% 8/25/09 4:10pm 27a 8/27/09 9am Ax - lift #15/ 3:30pm/ 5% 119.50 3014 240 15.10% 8/25/09 4:30pm 27b 9/1/09 8am Ax - lift #16/ 9am/ 5% 119.50 4258 340 15.10% 8/27/09 9:40am 28a 8/31/09 8:50am Ax - lift #16/ 9am/ 5% 121.50 3229 260 17.00% 8/27/09 10am 28b 9/3/09 10:20am Ax - lift #16/ 9am/ 5% 121.50 3229 260 17.00% 8/27/09 10:40am 28b 9/3/09 10:20am Ax - lift #16/ 9am/ 5% 121.50 3264 260 17.00% 8/27/09 11am 29a 8/31/09 9:10am east side shell/ 10:20am/ 10% 121.00 3486 280 21.70% 8/27/09 11am 29b 9/3/09 10:40am Ax - lift #17/ 12:10pm/ 5% 120.80 2615 210 14.40% 8/31/09 1:250pm 30a 9/3/09 10:40am Ax - lift #17/ 12:10pm/ 5% 120.80<	Sample Date time molded	Sample 4" diam.	Break Date time	Sample Location/ %cement	unit wt. wet	Max Load (lbs)	Test Strength (psi)	moist. C.
8/25/09 11:50am 26b 9/1/09 7:45am Ax - lift #15/ 10:50am/ 5% 119.40 4323 340 15.70% 8/25/09 4:10pm 27a 8/27/09 9am Ax - lift #15/ 3:30pm/ 5% 119.50 3014 240 15.10% 8/25/09 4:30pm 27b 9/1/09 8am Ax - lift #16/ 3:30pm/ 5% 119.50 4258 340 15.10% 8/27/09 9:40am 28a 8/31/09 8:50am Ax - lift #16/ 9am/ 5% 121.50 3229 260 17.00% 8/27/09 10am 28b 9/3/09 10:20am Ax - lift #16/ 9am/ 5% 121.50 3229 260 17.00% 8/27/09 10am 28b 9/3/09 10:20am Ax - lift #16/ 9am/ 5% 121.50 3264 260 17.00% 8/27/09 10am 29a 8/31/09 9:10am east side shell/ 10:20am/ 10% 121.00 3486 280 21.70% 8/27/09 11am 29b 9/3/09 10:40am Ax - lift #17/ 12:10pm/ 5% 120.80 2615 210 14.40% 8/31/09 12:50pm 30a 9/3/09 10:40am Ax - lift #17/ 12:10pm/ 5% 120.80<	8/25/09 11:30am	26a	8/27/09 8:45am	Ax - lift #15/ 10:50am/ 5%	119.40	3768		15.70%
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8/25/09 4:30pm 27b 9/1/09 8am Ax - lift #15/ 3:30pm/ 5% 119.50 4258 340 15.10% 8/27/09 9:40am 28a 8/31/09 8:50am Ax - lift #16/ 9am/ 5% 121.50 3229 260 17.00% 8/27/09 10am 28b 9/3/09 10am Ax - lift #16/ 9am/ 5% 121.50 3264 260 17.00% 8/27/09 10:40am 29a 8/31/09 9:10am east side shell/ 10:20am/ 10% 121.00 3486 280 21.70% 8/27/09 11am 29b 9/3/09 10am east side shell/ 10:20am/ 10% 121.00 5104 410* 21.70% 8/31/09 12:50pm 30a 9/3/09 10:40am Ax - lift #17/ 12:10pm/ 5% 120.80 2615 210 14.40% 8/31/09 12:50pm 30b 9/8/09 12pm Ax - lift #17/ 12:10pm/ 5% 120.80 2615 210 14.40% 8/31/09 12:50pm 31a 9/3/09 11am east side shell/ 11:50am/ 10% 119.50 3050 240 21.20% 9/1/09 1:05pm 31b 9/8/09 12:20pm Ax - lift #18/ 9am/ 5% 12			8/27/09 9am	Ax - lift #15/ 3:30pm/ 5%	119.50	3014	240	15.10%
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8/27/09 10:40am 29a 8/31/09 9:10am east side shell/ 10:20am/ 10% 121.00 3486 280 21.70% 8/27/09 11am 29b 9/3/09 10am east side shell/ 10:20am/ 10% 121.00 5104 410* 21.70% 8/31/09 12:50pm 30a 9/3/09 10:40am Ax - lift #17/ 12:10pm/ 5% 120.80 2615 210 14.40% 8/31/09 1:10pm 30b 9/8/09 12pm Ax - lift #17/ 12:10pm/ 5% 120.80 2770 220 14.40% 9/1/09 1:05pm 31a 9/3/09 11am east side shell/ 11:50am/ 10% 119.50 3050 240 21.20% 9/2/09 1:05pm 31b 9/8/09 12:20pm east side shell/ 11:50am/ 10% 119.50 2852 230 21.20% 9/2/09 9:40am 32a 9/8/09 1:15pm Ax - lift #18/ 9am/ 5% 120.80 2807 220 18.70% 9/2/09 10am 32a 9/8/09 1:15pm Ax - lift #18/ 9am/ 5% 120.80 2130 170 18.70% 9/2/09 1:10pm 33a 9/8/09 2:20pm Ax - lift #18/ 9am/ 5%		28b	9/3/09 10:20am	Ax - lift #16/ 9am/ 5%	121.50	3264	260	17.00%
8/27/09 11am 29b 9/3/09 10am east side shell/ 10:20am/ 10% 121.00 5104 410* 21.70% 8/31/09 12:50pm 30a 9/3/09 10:40am Ax - lift #17/ 12:10pm/ 5% 120.80 2615 210 14.40% 8/31/09 1:10pm 30b 9/8/09 12pm Ax - lift #17/ 12:10pm/ 5% 120.80 2770 220 14.40% 9/1/09 12:50pm 31a 9/3/09 11am east side shell/ 11:50am/ 10% 119.50 3050 240 21.20% 9/1/09 1:05pm 31b 9/8/09 12:20pm east side shell/ 11:50am/ 10% 119.50 2852 230 21.20% 9/2/09 9:40am 32a 9/8/09 1:15pm Ax - lift #18/ 9am/ 5% 120.80 2807 220 18.70% 9/2/09 10am 32b 9/9/9 10am Ax - lift #18/ 9am/ 5% 120.80 2130 170 18.70% 9/2/09 1:10pm 33a 9/8/09 2:20pm Ax - lift #18/ 12pm/ 5% 119.90 2422 190 20.10% 9/2/09 1:30pm 33b 9/9/9 10:20am Ax - lift #18/ 12pm/ 5% 119.90 3264 260 20.10% 9/9/9 9:45am 34a 9/14/09 8:30am east side shell/ 8:45am/ 10% 120.10 4439 350 18.20% 9/9/9 10am 34b 9/16/09 8am east side shell/ 8:45am/ 10% 120.10 5104 410* 18.20% 9/9/9 3pm 35b 9/16/09 8:30am Ax - lift #19/ 1:45pm/ 5% 119.00 3143 250 21.70% 9/16/09 10:30am 36a east side shell/ 9:30am/ 10% 119.40 16.60%		29a	8/31/09 9:10am	east side shell/ 10:20am/ 10%	121.00	3486	280	21.70%
8/31/09 12:50pm 30a 9/3/09 10:40am Ax - lift #17/ 12:10pm/ 5% 120.80 2615 210 14.40% 8/31/09 1:10pm 30b 9/8/09 12pm Ax - lift #17/ 12:10pm/ 5% 120.80 2770 220 14.40% 9/1/09 12:50pm 31a 9/3/09 11am east side shell/ 11:50am/ 10% 119.50 3050 240 21.20% 9/1/09 1:05pm 31b 9/8/09 12:20pm east side shell/ 11:50am/ 10% 119.50 2852 230 21.20% 9/2/09 9:40am 32a 9/8/09 1:15pm Ax - lift #18/ 9am/ 5% 120.80 2807 220 18.70% 9/2/09 10am 32b 9/9/9 10am Ax - lift #18/ 9am/ 5% 120.80 2130 170 18.70% 9/2/09 1:10pm 33a 9/8/09 2:20pm Ax - lift #18/ 12pm/ 5% 119.90 2422 190 20.10% 9/2/09 1:30pm 33b 9/9/9 10:20am Ax - lift #18/ 12pm/ 5% 119.9 3264 260 20.10% 9/9/9 9:45am 34a 9/14/09 8:30am east side shell/ 8:45am/ 10% 120.10 4439 350 18.20% 9/9/9 10am 34b 9/16/09 8am east side shell/ 8:45am/ 10% 120.10 5104 410* 18.20% 9/9/9 2:45pm 35a 9/14/09 9am Ax - lift #19/ 1:45pm/ 5% 119.00 3143 250 21.70% 9/9/9 3pm 35b 9/16/09 8:30am Ax - lift #19/ 1:45pm/ 5% 119.00 3143 250 21.70% 9/9/9 3pm 35b 9/16/09 8:30am Ax - lift #19/ 1:45pm/ 5% 119.00 3143 250 21.70% 9/16/09 10:30am 36a east side shell/ 9:30am/ 10% 119.40 16.60%		29b	9/3/09 10am	east side shell/ 10:20am/ 10%	121.00	5104	410*	21.70%
8/31/09 1:10pm 30b 9/8/09 12pm Ax - lift #17/ 12:10pm/ 5% 120.80 2770 220 14.40% 9/1/09 12:50pm 31a 9/3/09 11am east side shell/ 11:50am/ 10% 119.50 3050 240 21.20% 9/1/09 1:05pm 31b 9/8/09 12:20pm east side shell/ 11:50am/ 10% 119.50 2852 230 21.20% 9/2/09 9:40am 32a 9/8/09 1:15pm Ax - lift #18/ 9am/ 5% 120.80 2807 220 18.70% 9/2/09 10am 32b 9/9/9 10am Ax - lift #18/ 9am/ 5% 120.80 2130 170 18.70% 9/2/09 1:10pm 33a 9/8/09 2:20pm Ax - lift #18/ 12pm/ 5% 119.90 2422 190 20.10% 9/2/09 1:30pm 33b 9/9/9 10:20am Ax - lift #18/ 12pm/ 5% 119.90 2422 190 20.10% 9/9/9 9:45am 34a 9/14/09 8:30am east side shell/ 8:45am/ 10% 120.10 4439 350 18.20% 9/9/9 10am 34b 9/16/09 8:30am east side shell/ 8:45am/ 10% 120.10								
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9/1/09 12:50pm 31a 9/3/09 11am east side shell/ 11:50am/ 10% 119.50 3050 240 21.20% 9/1/09 1:05pm 31b 9/8/09 12:20pm east side shell/ 11:50am/ 10% 119.50 2852 230 21.20% 9/2/09 9:40am 32a 9/8/09 1:15pm Ax - lift #18/ 9am/ 5% 120.80 2807 220 18.70% 9/2/09 10am 32b 9/9/9 10am Ax - lift #18/ 9am/ 5% 120.80 2130 170 18.70% 9/2/09 1:10pm 33a 9/8/09 2:20pm Ax - lift #18/ 12pm/ 5% 119.90 2422 190 20.10% 9/2/09 1:30pm 33b 9/9/9 10:20am Ax - lift #18/ 12pm/ 5% 119.90 3264 260 20.10% 9/9/9 9:45am 34a 9/14/09 8:30am east side shell/ 8:45am/ 10% 120.10 4439 350 18.20% 9/9/9 10am 34b 9/16/09 8am east side shell/ 8:45am/ 10% 120.10 5104 410* 18.20% 9/9/9 2:45pm 35a 9/14/09 9am Ax - lift #19/ 1:45pm/ 5% 119 1556 120 21.70% 9/9/9 3pm 35b 9/16/09 8:30am Ax - lift #19/ 1:45pm/ 5% 119.00 3143 250 21.70% 9/16/09 10:30am 36a east side shell/ 9:30am/ 10% 119.40			9/8/09 12pm	Ax - lift #17/ 12:10pm/ 5%	120.80	2770	220	14.40%
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3/10/03/10:00am	<u> </u>							
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CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation B-583005

Sample Date time molded		Break Date time	Sample Location/ %cement	unit wt. wet	Max Load (lbs)	Test Strength (psi)	moist. C.
8/25/09 11:30am	26a	8/27/09 8:45am	Ax - lift #15/ 10:50am/ 5%	119.40	3768	300	15.70%
8/25/09 11:50am	26b	9/1/09 7:45am	Ax - lift #15/ 10:50am/ 5%	119.40	4323	340	15.70%
8/25/09 4:10pm	27a	8/27/09 9am	Ax - lift #15/ 3:30pm/ 5%	119.50	3014	240	15.10%
8/25/09 4:30pm	27b	9/1/09 8am	Ax - lift #15/ 3:30pm/ 5%	119.50	4258	340	15.10%
8/27/09 9:40am	28a	8/31/09 8:50am	Ax - lift #16/ 9am/ 5%	121.50	3229	260	17.00%
8/27/09 10am	28b	9/3/09 10:20am	Ax - lift #16/ 9am/ 5%	121.50	3264	260	17.00%
8/27/09 10:40am	29a	8/31/09 9:10am	east side shell/ 10:20am/ 10%	121.00	3486	280	21.70%
8/27/09 11am	29b	9/3/09 10am	east side shell/ 10:20am/ 10%	- 121.00	5104	410*	21.70%
8/31/09 12:50pm	30a	9/3/09 10:40am	Ax - lift #17/ 12:10pm/ 5%	120.80	2615	210	14.40%
8/31/09 1:10pm	30b	9/8/09 12pm	Ax - lift #17/ 12:10pm/ 5%	120.80	2770	220	14.40%
1							
9/1/09 12:50pm	31a	9/3/09 11am	east side shell/ 11:50am/ 10%	119.50	3050	240	21.20%
9/1/09 1:05pm	31b	9/8/09 12:20pm	east side shell/ 11:50am/ 10%	119.50	2852	230	21.20%
слись мосрии							
9/2/09 9:40am	32a	9/8/09 1:15pm	Ax - lift #18/ 9am/ 5%	120.80	2807	220	18.70%
9/2/09 10am	32b	9/9/9 10am	Ax - lift #18/ 9am/ 5%	120.80	2130	170	18.70%
9/2/09 1:10pm	33a	9/8/09 2:20pm	Ax - lift #18/ 12pm/ 5%	119.90	2422	190	20.10%
9/2/09 1:30pm	33b	9/9/9 10:20am	Ax - lift #18/ 12pm/ 5%	119.9	3264	260	20.10%
3/2/03 1.00pm		0/0/0 10:200:::	7.00 11(7.7.0) (1.2)(7.7.0)				
9/9/9 9:45am	34a	9/14/09 8:30am	east side shell/ 8:45am/ 10%	120.10	4439	350	18.20%
9/9/9 10am	34b	9/16/09 8am	east side shell/ 8:45am/ 10%	120.10	5104	410*	18.20%
9/9/9 2:45pm	35a	9/14/09 9am	Ax - lift #19/ 1:45pm/ 5%	119	1556	120	21.70%
9/9/9 3pm	35b	9/16/09 8:30am	Ax - lift #19/ 1:45pm/ 5%	119.00	3143	250	21.70%
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9/16/09 10:30am	36a	9/21/09 8:45am	east side shell/ 9:30am/ 10%	119.40	3951	310	16.60%
9/16/09 11am	36b	9/23/09 9am	east side shell/ 9:30am/ 10%	119.4	5104	410*	16.60%
3/10/03 114111	000	0/20/00 00/11	Sast side offening stockhills 1070				
 							
							
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"Partners in Quality"

November 11, 2009

Mr. Steve Ellis Lawrence Livermore National Laboratory P.O. Box 808; L-871 Livermore. California 94551-0808

Subject:

LLNL B-850 Soil Remediation

B850-S300 Livermore, CA

CEL Project #10-01272-LAW & 10-01274-LAW

EARTHWORK AND LABORATORY TESTING SUMMARY October 1, 2009 thru October 31, 2009

CEL representatives observed site operations and/or performed nuclear gauge moisture and density determinations on compacted soils at the above project from October 1, 2009 thru October 31, 2009. Laboratory testing was performed on soil samples from the site. Enclosed are the results of the field and laboratory testing.

An engineered fabric was not placed per the manufactures recommendations. We recommend that you confirm compliance with the intent of the system with the Project Engineer, SCS Engineers, to resolve this deviation from the manufacturer's recommendations. It is the responsibility of LLNL to review and after consulting with SCS Engineers, approve these methods.

No. 2474

Eric J. Swenson, PE, GE

Principal Geotechnical Engineer

Respectfully submitted,

CONSOLIDATED ENGINEERING LABORATORIES

Michael Wissink Project Manager

Enclosures: Daily Field Reports

Distribution: 1

1 to Addressee

MW/EJS: pmf

R:\Geotech Projects by Number\LLNL\LLNL Bldg 850 Excavation and Remediation Plan - 95% Submittal\Monthly Summary Reports\October Summary (Steve Ellis).doc

Geosphere Cons ants, Inc. AN ETS COMPANY Geotechnical Engineering Engineering Geology

AN ETS COMPANY Geotechnical Engineering - Engineering Geology Environmental Management - Water Resources	Report #:			Date Cor Aura 7
		mbou I As a I A Pa	21 0000	Date 9 18 70 10-1.
Project Name: 3-850 Suf AtmoDifton	ı	mber: 1A611268	7/1/4	Page of
Field Rep: Tony Phillips	Project Ma	inager:	T .	
Scope of Work: Ass Grading . Pavement Utility Irench	4 ⊇€ Other	Hours Charged:	Full Time	☐ Part Time
Contractor: Ciffusio Sefurcis	Conditions:	Sunny:	Æ windy⊧	Æ Hot □ Mild
Contractor Representative: ANDY BELL		Cloudy	□ Rain	.□ Cold □ Fog
Comment/ Sketch:	18-00	7		
SCS = CREW STARTE	EJ EXC	AVATION	OFSEL	INENT THAP
9 FINISHED COMPACTION O	FSEC	Tel A-1	JUST SE	W7401=
TRAILERE STAY & B	-850 ,	ACCESS,	COAD IN	TEA SECTION.
FURTHER EXCAVATION	IN SE	CTOR A-	4000	ENDOF
ASTN-DITCH W. SIDE OF A	7. de			
	29-0			
SES= STARTS EXCAVI			TEH A	10NE 3-850
ACCESS ROAD (SWIH 1	1-01-10	1) 4 F	AND EAS	TV-DITCH
CREW ALSO STARTS	nst TA	Jationi e	ه لادر سند	DALES
S. SLOPE HILSIEVE IN	CEN.	TO A 1- 4	1 PAFE	2 1:27 OUT
ROAD PROSSING ON R.	7440	i names	- 11	12.00
			> PA - 7	00-350
	7.30-			- in the second
SCS = CONTINUE EX				
4 INSTALL WADDLES S	5. 51DE	SLOPE	or SECT	TOR A-R.
CREW ALSO FIXED 4.	EXTER	VDED SIL	T CCAI	TTER)
FENCE IN SECTER AN	9 70 1	N COMPU	S NEW	SECTOR
A3-0 4 IN SECTOR A	-4 70	IN CEMPL	IS NEW	Section
A4-A, B, 40.		ž		
16	0-01-	09	i i i i i i i i i i i i i i i i i i i	
SCS = CONTINUE TO EX CLEAN UP SEDIMENT AL	CAVAT	E E. SIDE	- V-DOT	Cly 4
CLEAN UP SEDIMENT A	FA C	N. END OF	- E. V-E	ren
WATER HIMSIDES & REP	Mik ek	UTTER F	ENEE 9	· Dollar
JOB SITE FOR SHOT	ce 13cc	s uda	,	reace
1 2112 122 2112 1		MASC		·
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NOTICE Or first successful annual state of the state of t		 :		
from its obligation to meet contractural requirements. No one except our client may rely on our or conclusions and/o	ir recommendations conv	A preliminary report is provided performed. Observations and/eyed in the final report may vary	This DFR is Fin service. Any conclusions dra evaluated by the professiona	al – A final report is an instrument of professional own from this report should be discussed with and linvolved.
		licated in a preliminary report.	·	
Field Representative: Date:	· Rev	riewed By:		Date:
The fire of the fi	100			

Geotechnical Engineering - Engineering Geology Environmental Management - Water Resources	Report #:			Date: 10-5	TO 10-8-
Project Name: B-850 SOIL REMEDIATION	Project Nu	mber: <i>LAW 13</i>	74	Page	
Field Rep: Tony Phillips	Project Ma				
Scope of Work: Mass Grading. Pavement Utility Trench	Other.	Hours Charged:	Full Time	☐ Part Time	
Contractor: CERRUDO SERV.	Conditions:	Sunny	Windy	☑ Hot	□ Mild
· ·	Conditions:	Cloudy	☐ Rain	□-Cold	□ Fog
SCS = STARYS EXCAULT OF B-850 ACCESS ROAD METHOD OF BACK F, 11 CREW ALSO USED EXC BREAK UP ROCK FACE PROPER ELEVATION OF E. V-DITCH CONTINUE SCS = CREW CONTINUE TABRICA PROCEMENT MANUFACTORS PEQ. 5 CONTINUES 1.3' CUT 1. GADION & S. V-DITCH.	TO PULL IN SER DE SOIL OF BARA	OF 1.3'CO DRAINAGE CTOR A-R PACTION OF DITC. TON YEX BRIC NOT KED BY OF RATED SU N SEDIMEN OF SECTOR CK 4 E CAVAT C	XCANA XC	94-2 105 100 100 100 100 100 100 100	
ions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our or conclusions and/or	at field observation was recommendations convi	preliminary report is provided performed. Observations and/ eyed in the final report may vary icated in a preliminary report.		nal – A final report is an in rawn from this report shoul al involved.	
Field Representative with the Date:	Rev	iewed By:		Date:	

Geosphere Cons ints, Inc. **JAILY FIELD REPORT** Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources Report #: Project Name: B-850 Sout NEMEDIA TION Project Number: 1AW1274 TONY PAILLES Field Rep: Project Manager: Utility Trench Scope of Work: Mass Grading Pavement Other Hours Charged: Full Time ☐ Part Time Windy ☐ Mild Contractor: Sunny Hot Conditions: Contractor Representative: ANDY BEH ☐ Cloudy ☐ Rain ☐ Fog ☐ Cold Type Number Nuclear Nuclear Equipment Type: TROXIER **Density Testing** Compaction ☐ Tube " SOMAG Equipment ☐ Sand Cone Moving Water Native Native Fill Source ☐ Import Support Fill Location: Al. END OF E. V-DITCH. @ CMP CROSSING RT. 44 - Plan Engineer Date Civil Structural LENGRA LONG Geotech Max Density Opt. Moisture Required Compaction Required Moisture MIX BEN. SANDY SILT W/ SANDS TONE **2**90% Opt. + 2% □ 95% Opt. + 2% to 5% Other: Other: Wet Density Moisture Dry Density Percent Pass/ Curve # Test# Location Elevation -(pcf) (pcf) Compaction Fail OF EMPCROSS PTY -1 106.0 95 Comment/ Sketch:

Geosphere Cons ants, Inc. AN ETS COMPANY Geotechnical Engineering - Engineering Geology

Geotechnical Engineering - Engineering Geology Environmental Management - Water Resources	Report #:			Date: 10-12 To 10.
roject Name: 7-850 SELL AEMEDIA TIE	Project Nu	imber: <i>2AW 12</i>	74	Page of
eld Rep: Tony Phillips	Project Ma	anager:		
ppe of Work: Abass Grading Pavement Utility Tre	nch 🛭 Other	Hours Charged:	Full Time	☐ Part Time
ontractor:		Sunny	Windy.	Hot Mild
entractor Representative:	Conditions:	22 Cloudy	(A) Rain	☐ Cold ☐ Fog
SCS= CREW MAI JOBSITE DURING SHUT DOWN DUE	DYKES A PARATION PARATION PARATION PARATION PARATION PARATION PARAMATION PARAMATIO	SWPPPC LONG ALL VILLOPE OF WA OP WA OP WA OP WA OP WA	ROAD ES THR ATER RO THROUGH OB SIT	WAYS, oved OUT ON OFF SHOUT TE WAS JIM,
FIX ANY BMP- RAIN STORM, All JOB SITE SHU	5 TAAT 6 BMP'S 1, T DOWN 10-15- 4ED N. E. Y W/MIK	WERE DA NSTAILE TOO MUL OP NO OF E. NATI 140	MACEO DDY TO V-SITCA	DURING D. WORK.
CE: Our firm's professionals are represented on site soley to observe operations of the condesitied, to form opinions about the adequacy of those operations, and to report those opinions.	This DFR is Preliminary -	A preliminary report is provided	This DFR is Fin	al - A final report is an instrument of professional
obligation to meet contractural requirements. No one except our client may rely on our or conc	is evidence that field observation wa lusions and/or recommendations con id shall take precedence over those in	veyed in the final report may vary	service. Any conclusions dra evaluated by the professiona	awn from this report should be discussed with and involved.
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	Geotechnical Er Environmental I	ngineering • Engineering Ge Management • Water Resou	ology urces	Report #:			Date: 10-19 10 10
oject Nam	FWork: Amass Grading Pavement Utility Trend actor: actor Representative: ment/ Sketch: \$\sigma = PLACED WAPPA	9/1001	Project Nur	mber: ZAW 1	274	Page of	
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pe of Work:	Mass Grading	Pavement U	tility Trench	Other Other	Hours Charged:	Full Time	☐ Part Time
ntractor:					Sunny	□ Windy	Hot Mild
ntractor Re	epresentative:		· .	Conditions:	Cloudy	Rain .	Cold Fog
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lentified, to form opir ur client. The presenc	nions about the adequacy of the e and activities of our field repr ntractural requirements. No o	soley to observe operations of the con- see operations, and to report those opin- seentatives do not relieve any contractor ne except our client may rely on our	solely as evidence that f	field observation was	preliminary report is provided performed. Observations and/ yed in the final report may vary	This DFR is Fit service. Any conclusions devaluated by the profession	nal – A final report is an instrument of profession rawn from this report should be discussed with an al involved.
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oungation to meet co is and opinions. Th ons, and sequences of	construction.	ssibility for site safety and the methods,	from and shall take prece	edence over those indi	tated in a premimary report.		

Geosphere Consants, Inc. AN ETS COMPANY Geotechnical Engineering - Engineering Geology

Geotechnical Engineering - Engineering Geology Environmental Management - Water Resources	Report #:	Date: 10-21 + 10-				
roject Name: 13-850 Soil REMEDIATION	Project Number: LAW 12	74	Page of			
eld Rep: Tony Phillips	Project Manager:					
pe of Work: Ass Grading Pavement Utility Trench	Other Hours Charged:	Full Time	☐ Part Time			
ontractor:	Sunny.	□ Windy	Hot Mild			
ntractor Representative:	Gloudy ⊒	☐ Rain	Cold D Fog			
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E: Our firm's professionals are represented on site soley to observe operations of the con- entifiest, to form opinions about the adequacy of those operations, and to report those opin- rider. The presence and artifults of our field experientatives do not relieve any contractor or conclusions and or contractural requirements. No one except our client may rely on our and opinions. The contractor retains sole responsibility for site safety and the methods, s, and sequences of construction.	t is Preliminary – A preliminary report is provided that field observation was performed. Observations and/or recommendations conveyed in the final report may vary precedence over those indicated in a preliminary report.		inal – A final report is an instrument of profession frawn from this report should be discussed with nal involved.			
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eld Representative: Date:	Reviewed By:		Date:			

Geosphere Consaints, Inc.	Gestechnical Engineering Engineering Geology Environmental Management - Water Resources Report #: Date Repor	FIELD REPORT	
Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	Report #:		Date: (0)26-29/09
Project Name: LLNL Suber 300 B 850 Goil L.	Project Number: LAW [Page of
Field Rep: Robert Wibc	Project Manager: Cal	Dickern	non
Scape of Work: Mass Grading Pavement : Utility Trench	Other Hours Charged:	Full Time	☐ Part Time
Contractor: Contracto		□ Windy	☐ Hot : ☐ Mild
Contractor Representative: Andy Bel		□ Rain	Cold D Fog
Tol27 for the form of profusions are represented on site soley to observe operations of the constant of the co	50 AB @ 5. 15, no cened 137 10:45 Am #38a 1:30 pm; 5hnv	D-131 - trest my 54 #386 7 500	munty A F A M A pim A final report is an instrument of professionar and from this report should be discussed with an analysis.
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Field Representative: Date:	Reviewed By:		Date:

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	Geotechnical Eng Environmental N	gineering • Enginee lanagement • Wat	ering Geology er Resources	Repor	t #:			Date:	10/2	7/09
Project Nam	eNL Si	te 300 B	1550 Soil #	Projec	t Number:	LAW	272	Page		of
Field Rep:	Report	Wibo		Projec	t Manager	<u> </u>				 .
Scope of Work:	Mass Grading	Pavement	Utility Trench	☐ Other	Hours	Charged:	Full Time		Part Time	
Contractor:	Carri	who				Sunny	Windy		Hot	☐ Mild
Contractor R	epresentative:	Andy	Bell	Condition		Cloudy	☐ Rain	Ø	Cold	☐ Fog
Equipment		Type			Number	alian en	Nuclea	т Ту	pe: Too	7K
Compaction	ULL	ser plan	te heave	4		Density Testing Equipment	☐ Tube			
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Curve#		Descri	otion :		Max Densi	Market at Matagan Al-Wale	re Required Co	mpaction	Requi	red Moisture
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	(m)		2 //				95%			. + 2% to 5%
X 3007-01	Bin:	sunshy	Silt		112 1) /5.5	Othe	r:	☐ Oth	er:
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			26,21	1 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	. Wet Den	sity Moisture	Dry Density	18.2197	. Per	cent Pass/
Test #		Location		Elevation	(pcf)		(pcf)	Curve	Comp	action Fail
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2	20 1		"	ZFAG	5	10.4	126.8		97	2 1
3	50' "		11	F		17.3	102.3	083009	701 91	/ -
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findings and opinions. The operations, and sequences of	ntractural requirements. No one e contractor retains sole responsi construction.	iblity for site safety and the r		or recommenuacio	ns conveyed in the	illiai report illay vary	evaluated by the profe	essional involved		
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Geosphere Consants, Inc.

AN ETS COMPANY

Geotechnical Engineering • Engineering Geology

	Geotechnical Engineering • Engineering Geo Environmental Management • Water Resou	Report	:#:	Date: 10-16	To 10-2	
Project Name	B850 Soil REMEDER	Teary Project	t Number: LA lul 12 7	Tif	Page of	
Field Rep:	Ton Theugs	Project	t Manager:			
Scope of Work:	Mass Grading Pavement Ut		Hours Charged:	Full Time	☐ Part Time	
Contractor:	CERPUDO S.	ERU,	Sunny	Windy	□ Hot □ Z	Mild
Contractor Re	epresentative: ANDY 13	-Condition	ons: Cloudy	☐ Rain	□-Cold □	Fog
Contractor: Contractor Re Comment/ SI A A A A A A A A A A A A A	CERRIDO S. presentative: ANDY BE ketch: CS = CREW E INSTAILED EN SECTOR A 3- IN IN 8, V-D, 7 SES = START IN LASS IT N OWER SECTION CONDER SECTION COMENTADO SO - SPREADIO SO	THU, Condition 10-26 XIAUATE 12. CONT 1, A3-2 TEN. 10-27 SACK 15. 4 CONT 15. 10-10 15	Cloudy -09 JAENER INVES OF B-1, BL: -09 INVES INVES SPECIE SP	Rain Rain Proportion Propor	Cold D I J " en CAMTE CAMTE DED PLAN ROMPA S, CRIP TELECT TELECT TOTAL 108 250 W 15 W 2 V 7	
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1430	- mix & com.	PACT 10%	1 400 %			
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ield Representati	ive: / m//////////////////////////////////	Date:	Reviewed By:		Date:	



"Partners in Quality"

December 8, 2009

Mr. Steve Ellis Lawrence Livermore National Laboratory P.O. Box 808; L-871 Livermore, California 94551-0808

Subject:

LLNL B-850 Soil Remediation

B850-S300 Livermore, CA

CEL Project #10-01276-LAW & 10-01278-LAW

EARTHWORK AND LABORATORY TESTING SUMMARY November 2, 2009 thru November 30, 2009

CEL representatives observed site operations and/or performed nuclear gauge moisture and density determinations on compacted soils at the above project from November 2nd thru November 30th, 2009. Laboratory testing was performed on soil samples from the site. Enclosed are the results of the field and laboratory testing.

We note that some low density tests were measured as presented by these test results. We recommend that you confirm acceptance with the Project Engineer, SCS Engineers, to resolve the low density results observed in these tests. It is the responsibility of LLNL to review and after consulting with SCS Engineers, approve these test results.

Eric J. Swenson, PE, GE

Principal Geotechnical Engineer

No. 2474 Exp. 12/2010

Respectfully submitted,

CONSOLIDATED ENGINEERING LABORATORIES

Michael ₩issink Project Manager

Enclosures: Daily Field Reports

Moisture/Density Curves
Sand Cone Testing

Moisture Content Summary

Break Log Summary

Distribution:

1 to Addressee

MW/EJS: pmf

R:\Geotech Projects by Number\LLNL\LLNL Bldg 850 Excavation and Remediation Plan - 95% Submittal\Monthly Summary Reports\11 - November Summary.doc

	Environmental Management - Water Reso		Report #:			Date: / l - j	· + D	1
Project Name	B-850 SOIL REMEDIA	Tans	Project Nu	mber: LAW 137	The state of the s	Page		
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TENED THE TENED	Mass Grading Pavement D (Itility Trench	2 Other	Hours Charged:	≇ Full Time	☐ Part Time		
Contractor:	CERACOO SE	ev.		Sunny	□ Windy	□Hot	Mild Mild	i 🥻
Contractor Re	presentative: ANDY BELL		Conditions:	Cloudy	Rain	□ c₀id -	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
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Field Representati	ve:	Date:	Rev	iewed By:		Date:		

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Project Nan	ne: 5-850	Soif	KOMEOU	1/			44 1 g	76	Pa	ge	of _	
Field Rep:	19/	ni(y).			34.4	nager:	-	_				
Scope of Work:	Mass Grading	Pavement	Utility Trench	☐ Othe	er	Hours Cha	rged:	Full Time		☐ Pa	rt Time	
Contractor:	CERI	RUSO		Condit	ions	☐ Sun	ny	□ Windy		<u>П</u>	Tot 🔲	Mild
Contractor I	Representative:			Contain	.10115.	☐ Cloc	ıdy	□ Rain			Cold D	Fog
Curve #		Descri	ption		Ma	x Density	Opt. Moistur	e Required Co	mpactio	n	Required Moi	sture
96409-	Of BRN SDY	Sh.T W/	55 5%	emt	11.	1.5	17.5	2 -90%		드	Opt. + 2%)
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10109-0	1 1 1 .		1 10%	em7	10	7.0	18.5	Othe	r:	ᆜᄃ	Other:	
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Test#		Location	24 A. J. J. S. S. S. S. Ale Protect & B	Elevation	N	et Density (pcf)	Moisture Content	Dry Density (pcf)	Cù	rve#	Percent Compaction	Pass/ Fail
ena Diskribaja (Variation)	6 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	11-0	1-09		South Bulley	**		a magazi Variyaning saga	562.81	77 (78 <u>22 - 14 (8)</u>		
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<u>'/</u>			MW	1304		18.9	248	95.3	10		01	*
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	Environmental Management • Water Resou	Report	#:		Date:] [- 4	4 11-5-0
Project Name	R-850 SOIL REMITED	Project	Number: LAW 12	16	Page	of 🚜
Field Rep:	10 / hillings	Project	Manager:			
Scope of Work:	✓ Pavement Ut	tility Trench III Other	Hours Charged:	Full Time	☐ Part Time	
Contractor:	CERRUNO SERI	<i>/</i> ,	Sunny	□ Windy	□ Hot	Mild Mild
Contractor Re	presentative: ANDA BELL	Condition	ns: ——Cloudy	Rain	\ □ Cold	□ Fog
Comment/ Sk		11-4-6				
0800	- SPAD 10 % CM7	OUTER SHO	=1/ ne) T 32"			
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1130 -	DENSITY TEST	10%		1.		+++++
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	a SIDE OF ONE	T. DAN				
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1510-	DENSITY TEST	59	Cyl. SINK			
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1600	- CLEAN UD	108 87=	o g comp	ACTED	1 1 1 1 1	
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Field Representat	ive:	Date:	Reviewed By:		Date:	

	Geotechnical Engineering • Engineering Environmental Management • Water R	esources	Report #	t: .			Date	11-970	11-
Project Nam	e:B-850 SOIL NEM	DIATERA		Number:	10/137	6	Page	of	·
Field Rep:	Torghhilly-		Project I	Manager:	[
Scope of Work:	Mass Grading Pavement	Utility Trench	☐ Other	Hours Char	ged:	☐ Full Time		Part Time	
Contractor:	LERAUDO		Condition	Sunn	y	□ Windy		Hot C	Mild
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Curve#	Description	1		Max Density	Opt. Moisture	The Market established	paction	Required	Moisture
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91009-01		<u> </u>		105,5	19.0	95%		Opt. +:	2% to 5%
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Test#	Location //- 9		Elevation	(pcf)	Content	(pcf)	Curve	# Compacti	
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from its oblination to meet o	intractural requirements. No one except our client may rely on ou e contractor retains sole responsiblity for site safety and the method	r or conclusions and/or	r recommendations o	was performed. Obse onveyed in the final rep indicated in a prelimi	port may vary	evaluated by the professi			. шэсцээсч ЖИН с

Englighting Managemant , Agrain Perio	Re	port #:	Date: // - 4 76 //-						
Project Name: 3-850 Cark REMER	A TION Pro	oject Num	ber: LAW 19.	76	Page Of 2				
Field Rep: Yorky Philys	Pro	oject Man	ager:						
Scope of Work: Amass Grading Pavement L	Jtility Trench	Other	Hours Charged:	45 Full Time	☐ Part Time				
Contractor: CEARODO		6	Sunny .	□ Windy	□ Hot	Mild.			
Contractor Representative: ANDY B	Con	ditions:	Cloudy	Rain	Cold	□ Fög			
Comment/Sketch: 0845 - SARD 1040 CLUST WT. 178 F. 0915 - 191 X 30 9 4 1000 - RETNIX 9 COM 1045 - SOIL SHOWNE 10 1130 - SENSING TES 1230 - SPAD 570 CM 1300 - MIX 9 REMIX	CMT WORD OF STREET 1070 TO T	733 234 243 243	31 715,	1/2		5 %			
1345 - SPOT CHECK 57, 1445 - DENSITY TENT 1500 - SAND CONE 1515 - LONTINUE CO. 1600 - 1490ROSEED SC	e con Ta)	ر بدر در در						
0830- SPAB 10% en FOR OUTER SH 0930- MIX & REMI 1000 - COMPACT 1030 - DENSITY 1035 - SOLL SAMI 1230 - SPAD 5% O	1322 4 7 K 1020 F 1035 T 165 T 165 T 17 3 F	10 90 10 90 10 90	nr. Ele Cur No Tie.	v 12e	06 ±				
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OTICE: Our firm's professionals are represented on site soley to observe operations of the con- tor identified, to form opinions about the adequacy of those operations, and to report those opin-			reliminary report is provided						
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Geosphere Contants, Inc. AN ETS COMPANY Geotechnical Engineering - Engineering Geology

Environmental Management · Water Resor	Report	#:		Date: []-[4 1/-12-0				
Project Name: A 850 SOLL NEWEDIA	Trans Project	Number: 2 400 137	6	Page				
Field Rep: Jonny Phillips	Project	Manager:						
Scope of Work: Amass Grading Pavement U	tility Trench 0ther	Hours Charged:	Full Time	☐ Part Time				
Contractor: LERRUDO		Sunny	□_ Windy	☐ Hot Æ Mild				
Contractor Representative:	Conditio	ns: Cloudy	Rain.	☐ Cold ☐ Fog				
Comment/ Sketch:	1/-11	1-09						
0730 - SPAD 5%			MARKERS					
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OBOO - MIX & REN	11 X 5 % En							
0930 - 590 em7	SOIL SAM	LE FOR CHL	BAH &	5144-5				
1015 - DENSITY								
1772 0000	7 4530							
1336 - SPAD 10%	CMT OUTE	A SHELL W	7310					
1430 - SPAD 5 %	em TTE	1N WT 16						
1450- 574AT MIX	A REMIX	OF 10 45%	Com T					
1313 COMPACT	5910% L							
1545 DENS1747	TEST.							
SCS CREW CON	THUES TO	OVER EXC	AUATE	SECTOR A3-0				
9 B-1 9 11157A11	WADDLES	IN SECTOR	A-3					
	11-12	-09						
0730-57ART 500 0	Tien of SAA	10 - 1700	11 000					
6110 MIX 57 KM	1 T		1415102	o cm. Mas.				
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0930 + SOIL SAMPLE S'ON	641. BRN							
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tractor flexified, to form ophinos about the adequacy of hose operations, and to report those opin- ions to our client. The presence and exhibits of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of constructions.	solely as evidence that field observation or conclusions and/or recommendation from and shall take precedence over the	n was performed. Observations and/ conveyed in the final report may vary		on from this report should be discussed with and				
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Field Representative:	Date:	Reviewed By:		Date:				

Geosphere Consants, Inc. AN ETS COMPANY Geotechnical Engineering • Engineering Geology

Field Rep: Jany William Projection Scope of Work: Amass Grading Pavement Utility Trench Active Contractor: JERRUND Cond Contractor Representative: ANDY SELL Comment/ Sketch: 11-16 0845 START 1076 3LIFTS EFF 0850 START MY DAD SEED HILL 0920 MIX 4-REPIX OUTER SHELL THE 0930 SES PLACED INSTALL FOR CUPUS ALL 1036 END CONDUCTOR CONDU	Itions A Cloudy. The system of the system	Full Time Windy Rain SHEP 1 +	Part Time Hiot Cold	
Scope of Work: Amas Grading Pavement Utility Trench Dot Contractor: LEARLY SELL Contractor Representative: ANDY SELL Comment/ Sketch: 11-16 0845 START 1076 3LIFFS EF 0845 START 1076 3LIFFS EF 0845 START HYDRO SEED HILL 0920 MIX & REMIX OUTER SHELL THE 0930 SES PLACED/INSTALL SEXTER 1015 SOLL BAMPLE FOR CURVES	Hours Charged: Hours Charged: Cloudy Cloudy Cloudy CLEAN SO TEA	□ Windy □ Rain (1) E SHE! +	Hot Cold	Fog
Contractor: CERAUDO Contractor Representative: ANDY BEI/ Comment/Sketch: 0340 SPND 1070 CM T WT. 31 00 0845 START 1070 3LIFTS EF 0450 START 1070 SLIFTS EF 0750 START MY BAD SEED HILL 0720 MIX 4 REMIX OUTER SHELL THE 0730 SES PLACED/INSTMIED EXTE	Itions A Cloudy. The system of the system	□ Windy □ Rain (1) E SHE! +	Hot Cold	Fog
Contractor Representative: ANDY BELL Comment/Sketch: 0840 START 1070 CANT WT. 31 00 0845 START 1070 BLIFFS EF 0845 START 1070 BLIFFS EF 0850 START MY BAD SEED HILL 0920 MIX 4 REMIX OUTER SHELL THE 0930 SES PLACED/INSTALL VERS 1015 SOIL SAMPLE FOR CURVE A	itions A Cloudy TER SHEWS. S CLEAN OUTER SIDE IN SEET	□ Rain 10 E 54811 +	Cold	Fog
Contractor Representative: ANDY SELL Comment/Sketch: 0800 3PND 10 10 cm 7 w7, 31 00 0845 START 10 9 3LIFTS OF 0845 START 10 9 3LIFTS OF 0850 START MYDAO SEED HILL 0920 MIX 4 REMIX OUTER SHELL TO 0930 SES PLACED (INSTMILE) EXTERNAL 1015 SOIL BAMPLE FOR CURVE A	Cloudy. TER SHELL S.S CLEAN OUTER WT. 304 SIDE IN SEET	10E 54E114 TOA A-3		
Comment/Sketch: 0840 STADIOTOCONT WT. 31 00 0845 START 1070 BLIFTS OF 0845 START 1070 BLIFTS OF 0850 START MY DAD SEED HILL 0920 MIX 4 REMIX OUTER SHELL THE 0930 SES PLACED/INSTMED EXTE	CLEAN OUTER LLEAN OUTER LUT, 304 SIOE IN SEET	84811 4 TOA A-3		
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Geosphere Cons. ants, Inc. AN ETS COMPANY Geotechnical Engineering - Engineering Geology Engineering - Lighteering Geology

Environmental Management • Water Resource	es Report #	! :		Date: //-/8	4 11-19-
Project Name: 7-850 Soil DEMESHOTA	Project N	Number: LAUI/ATA	Page 2	_ of	
ield Rep: Jony Ddillefs	Project I	Manager:			
cope of Work: Mass Grading Pavement Utility	y Trench De-Other	Hours Charged:	Full Time	☐ Part Time	
Contractor: LEADUNG SEA		Sunny [□ Windy .	1 Hot	Mild
		s: Cloudy [☐ Rain	Z -Cold	□ Fog
Contractor: CERPUSO SERICONTRACTOR Representative: ANDY SELICOMMENT SKETCH: O 815 SLS CREW CONTRACTOR WILL ST. O 825 SARD 100 90 CM TW. 1000 MIX & REMIX N. 1500 SPAEAD 1090 CM TW. 1500 SPAEAD 1090 CM TW. O 800 SES PLACED 9 MIX O	Condition 11-18-0 NUES OVER NUES OVER DE OF 3-1 TO CONCER LIFT 10 LIFT 10 LIFT 07 LI	SEXCAVATION N.E. CORNOT N.E. CORNOT N.E. CORNOT NO LIFT ONLY ONLY OF CAST NOTO CAST NEED HAD DENING OF CAST NEE	Rain PAJO STANO ASAT ECTON SECTO SOLL O SOLL O MANON	Fog Fog Fog Fog Fog Fog Fog Fog	
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eld Representative: Da	ate:	Reviewed By:		Date:	

	Geotechnical En Environmental N	gineering • Engine lanagement • Wat	ering Geology Ser Resources	Report	Report #: Date							
Project Nam	ne: <i>B-850</i>	OIL PEM	DATION	Project	Num	ber: <i>/</i>	101117	le .	Page		of	
Field Rep:	Jay J	WILLES	, Tangan Sulatan Su	Project	Mana	ger:			···			
Scope of Work:	Mass Grading	☐ Pavement	Utility Trench	☐ Other		Hours Charg	jed:	☐ Full Time] Part Time		
Contractor:	CERT	WOO			1	Sunn	y	☐ Windy	Ē] Hot		
Contractor F	Representative:			Conditio		Cloud	dy	☐ Rain	Ĺ] Cold	П. 1	
Curve #		Descr	iption		Max (Density	Opt. Moisture	e Required Com	paction	Requir	red Mois	
08/009-0	BRN SDY	SLT W/S	5 5900	MI	10:	5.5	19.0	90%	,	□ Opt.	+ 2%	
090109-0	9/11/11	11 11	10% €	MT	10	7.0	18.5	95%		Opt.	+ 2%	
111609-	0/1111	11 11	11 11	DIRTY	10	6.5	18.5	Other:		☐ Othe	er:	
*	mw	= mor	11/081	NG W	151	1/5						
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Date:

Reviewed By:

Date:

D.F.R. Page 3 (04-08)

Field Representative:

Geosphere Consants, Inc. AN ETS COMPANY Geotechnical Engineering - Engineering Geology

Geotechnical Engineering Leology Environmental Management • Water Resources	Report #:	Date: 11-23 TO 1/47			
Project Name: B-850 SOIL ATMENTATION	Project Number: LAUII	176	Page of		
Field Rep: Joseph World 5	Project Manager:				
Scope of Work: Ass Grading Pavement Utility Trench	Other Hours Charged:	Full Time	☐ Part Time		
Contractor: LERRUBO	Sunny Sunny	□ Windy	Hot D M	ild	
Contractor Representative: ANDY AEII	Cloudy	□ Rain	■ Cold □ Fo	98	
Comment/ Sketch:	11-23-09		0.1		
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NOTICE: Our furn's professionals are represented on site soley to observe operations of the con-	R is Preliminary - A preliminary report is provided	This pen is a	inal - A final report is an instrument of	nyofoccional	
ions to our circit. The presence and activities of our field representatives on not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site salety and the methods, from and shall take	H Is Preliminary - A preliminary report is provided that field observation was performed. Observations and/ l/or recommendations conveyed in the final report may vary e precedence over those indicated in a preliminary report.		inal – A final report is an instrument of drawn from this report should be discuss nal involved.		
operations, and sequences of construction.	, , , , ,				
Field Representative 2/1/2/1/2/ Date:	Reviewed By:		Date:		
/ /					

Geosphere Con ints, Inc. JAILY FIELD REPORT AN ETS COMPANY Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources Report #: Project Name: B-850 SOIL A EMEDIATION Project Number: LAWIZ 76 Page Project Manager: Field Rep: Pavement Utility Trench Hours Charged: Mass Grading Other ☐ Full Time ☐ Part Time Scope of Work: CE ARUDO ☐ Windy Contractor: ☐ Sunny ☐ Hot ☐ Mild Conditions: Contractor Representative: ☐ Fog ☐ Cloudy Rain ☐ Cold Max Density Opt. Moisture Required Compaction Required Moisture **1** 90% ☐ Opt. + 2% **5**95% Opt. + 2% to 5% Other: Other: = MONITORING Wet Density Moisture Dry Density Pass/ Percent Test# Elevation Curve# (pcf) Content (pcf) Compaction Fail ter'worn! Mu 1300 116.7 20.0 NOTICE: Our firm's professionals are represented on site soley to observe operations of the contactor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives for not relievant contactor from its obligation to need contactural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and expenses of construction. This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report. This DFR is Final - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved. Date: Date: Field Representative: Reviewed By:

	Geotechnical En Environmental N	gineering • Engineering G Nanagement • Water Res	eclogy ources	Report #:			Date: //- ラ。	2701	
roiect Name	17-850 G	nd Attent Section	The word	Project Nur	mber:/ 1/1/12 ·	74	Page	_ of	_
eld Rep:		Paulines		Project Mai	nager:				
ope of Work:	Mass Grading		Utility Trench	. □LOther	Hours Charged:	.☑ Full Time	☐ Part Time		
ontractor:	CENT	1000			☑ Sunny	□ Windy	□ Hot	☐ Mild	15 12.1
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	AN ETS COMPANY			AILY FI	IELD REP	PORT
	Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	Report #:	B 583009	2	Date: IL 2-	509
Project Name	LLNL Site 301 B850 Soil A.		mber: LAW 12		Page	_ of
Field Rep:	Robert Wibe	Project Mai		ickerno	<u>~</u>	
Scope of Work:	Mass Grading	Other	Hours Charged:	Full Time	☐ Part Time	
Contractor:			Sunny	□ Windy	□ Hot	Z Mild
Contractor Re	presentative:	Conditions:	Cloudy	Rain	□ ′Cold	☐ Fog
Comment/ Sk	11/2/09 mon					
	- Break #37a@					
	# 380 @	sacrys	280 %	aloso mar		
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	1 1/3 prive					
	- Sample @ 1	pm #L	lla Zpm,	#416 긴	:15 pm	
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	14/09 wed					
	-Break #376@7					
	# 38 b@ 7			والمحاجل والمراجا	L.,	
	- Sample @ 11 Am -	11 71 444	III I JAW ,			
	- Charle point	. #43a	3:50pm,			
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	Break #396@ #40a@ #41a@	Idays 3days	280 ps. 2	pm 130 pm		
	#41a@	2 days	260 ps, 2	:45 pm		
					1000	
NOTICE: Our firm's profession	onals are represented on site soley to observe operations of the con-				60°F	
tractor identified, to form opinio ions to our client. The presence a from its obligation to meet contr	ons about the adequacy of those operations, and to report those opin- and activities of our field representatives do not relieve any contractor ractural requirements. No one except our client may person our contractor retains sole responsibility for site safety and the methods,	at field observation was recommendations conve	preliminary report is provided performed. Observations and/ yed in the final report may vary cated in a preliminary report.	This DFR is Final service. Any conclusions draw evaluated by the professional in	n from this report sho	instrument of professional uld be discussed with and
Field Representati	Alata III W	Revi	ewed By:		Date:	
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Date	Density Designation for Cement Treated. Fill in area Ax	Location: Northing / Easting	Elevation MSL	Wet Den.	Dry Den.	% Moist	90% min.
8/24/2009	lift #14 51' east of MW 11:10am		1294	116.4	95.6	21.7	93.00
8/24/2009	lift #14 70' west of MW 4:15pm		1294	119.3	99.4	20	95.00
8/25/2009	lift #15 35' east of MW 11:10am		1295	119.4	102.1	16.9	95.00
8/25/2009	monit. Wells (MW) 1:30pm		1295	116.8	99.5	17.4	93.00
8/25/2009	lift #15 50' north of MW 4:30pm	DUPLICATE	1295	119.5	101	18.3	95.00
8/27/2009	lift #16 80' north of MW 9:35am	elevations based on GPS	1293	121.5	101.8	19.4	92.00
8/27/2009	60' east of MW - 10% shell - 10:35am		1288	121	99.8	21.3	92.00
8/27/2009	at MW 1pm		1293	121.4	105.4	15.2	91.00
8/27/2009	lift #16 45' south MW 2:50pm		1293	119.9	103.8	15.5	90.00
8/31/2009	lift #17 96' west NW of MW 12:40pm			120.8	102.8	17.5	92.00
9/1/2009	lift #17 60' west SW of MW 11am			124.7	102.5	21.7	95.00
9/1/2009	lift #2 east side shell 10% cement 12:40pm			119.5	100.8	18.5	91
9/2/2009	lift #18 30' north NW of MW 9:30am			120.8	101.5	19	92.00
9/2/2009	at Monit. Wells 10:10am	DUPLICATE		115.5	97.6	18.4	92
9/2/2009	lift #18 40' south of MW 1pm	**************************************		119.9	98.9	21.2	96.00
9/9/2009	lift #4 east side shell 10% cement 9:10am			120.1	100	20.1	95.00
9/9/2009	lift #19 80' west SW of MW 2:25pm			119	100.2	18.8	90
9/10/2009	at MW lift #4 10:35am			119.5	100.5	18.9	91.00
9/10/2009	at MW lift #5 12:15pm			119.2	100.9	18.1	91.00
9/10/2009	east side shell 10% cement 4:15pm			122.4	100	22.4	97
9/15/2009	60' south SW of MW 3:15pm			116.7	96.3	21.2	93.00
9/15/2009	4' N of N monit. Well 3:30pm			115.9	95.1	21.9	92.00
9/16/2009	41' east of MW at east side shell 10:15am			119.4	98.4	21.4	94.00
10/28/2009	shell 10:30am		1303	119.3	96.5	23.6	94
10/28/2009	1:20pm			119.9	96.1	24.8	96.00
10/20/2000		· · · · · · · · · · · · · · · · · · ·		7.0.0			
10/29/2009	50' west of MW on shell 10:30am	DUPLICATE	1304	120	98.3	22.1	96.00
10/29/2009	33' south of MW on shell 4:30am	and the second second	1304	121	100.1	20.9	96
.0.20.2000	oo oodan on any on onon a oodan.				100.1		
11/2/2009	30' south of MW on shell 2:30pm	DUPLICATE	1304	118.9	95.3	24.8	94.00
11/2/2009	at MW 3pm	20, 2,0,1,12	1304	121.2	99.9	21.3	92.00
11/2/2009	40' NW of MW 4:45pm		1304	115.4	95.1	21.3	88
	10 KIV OF HITE TATOPH		.00-7				
11/3/2009	Retest of #3 11/2/09 8am		1304	119.9	98.4	21.6	91.00
11/3/2009	18' south of MW 8am	DUPLICATE	1304	120	100	20	91.00
11/3/2009	96' west of MW 1:45pm	DUPLICATE	1304	121.3	103.4	17.3	96
11/3/2009	21' south of MW 2pm	DUPLICATE	1304	116.8	93.8	24.5	93
111312009	Z i South of IVIVY ZPIII	DUFLICATE	1004	1 10.0	90.0	27.0	33
L							

Date	Density Designation for Cement Treated. Fill in area Ax	Location: Northing / Easting	Elevation MSL	Wet Den.	Dry Den.	% Moist	90% min.
11/4/2009	53' south of MW 11:30am			116.8	94.7	23.3	92.00
11/4/2009	70' west NW of MW 3pm			120.8	99.8	21.1	96.00
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Sample Date	Sample	Break Date	Sample Location/ Time/	unit wt.	Max	Test	
time molded	4" diam.	time	%cement	wet	Load	Strength	moist. C
					(lbs)	(psi)	,
8/25/09 11:30am	26a	8/27/09 8:45am	Ax - lift #15/ 10:50am/ 5%	119.40	3768	300	15.70%
8/25/09 11:50am	26b	9/1/09 7:45am	Ax - lift #15/ 10:50am/ 5%	119.40	4323	340	15.70%
8/25/09 4:10pm	27a	8/27/09 9am	Ax - lift #15/ 3:30pm/ 5%	119.50	3014	240	15.10%
8/25/09 4:30pm	27b	9/1/09 8am	Ax - lift #15/ 3:30pm/ 5%	119.50	4258	340	15.10%
8/27/09 9:40am	28a	8/31/09 8:50am	Ax - lift #16/ 9am/ 5%	121.50	3229	260	17.00%
8/27/09 10am	28b	9/3/09 10:20am	Ax - lift #16/ 9am/ 5%	121.50	3264	260	17.00%
8/27/09 10:40am	29a	8/31/09 9:10am	east side shell/ 10:20am/ 10%	121.00	3486	280	21.70%
8/27/09 11am	29b	9/3/09 10am	east side shell/ 10:20am/ 10%	121.00	5104	410*	21.70%
8/31/09 12:50pm	30a	9/3/09 10:40am	Ax - lift #17/ 12:10pm/ 5%	120.80	2615	210	14.40%
8/31/09 1:10pm	30b	9/8/09 12pm	Ax - lift #17/ 12:10pm/ 5%	120.80	2770	220	14.40%
9/1/09 12:50pm	31a	9/3/09 11am	east side shell/ 11:50am/ 10%	119.50	3050	240	21.20%
9/1/09 1:05pm	31b	9/8/09 12:20pm	east side shell/ 11:50am/ 10%	119.50	2852	230	21.20%
							40.700/
9/2/09 9:40am	32a	9/8/09 1:15pm	Ax - lift #18/ 9am/ 5%	120.80	2807	220	18.70%
9/2/09 10am	32b	9/9/9 10am	Ax - lift #18/ 9am/ 5%	120.80	2130	170	18.70%
9/2/09 1:10pm	33a	9/8/09 2:20pm	Ax - lift #18/ 12pm/ 5%	119.90	2422	190	20.10%
9/2/09 1:30pm	33b	9/9/9 10:20am	Ax - lift #18/ 12pm/ 5%	119.9	3264	260	20.10%
							10.000/
9/9/9 9:45am	34a	9/14/09 8:30am	east side shell/ 8:45am/ 10%	120.10	4439	350	18.20%
9/9/9 10am	34b	9/16/09 8am	east side shell/ 8:45am/ 10%	120.10	5104	410*	18.20%
9/9/9 2:45pm	35a	9/14/09 9am	Ax - lift #19/ 1:45pm/ 5%	119	1556	120	21.70%
9/9/9 3pm	35b	9/16/09 8:30am	Ax - lift #19/ 1:45pm/ 5%	119.00	3143	250	21.70%
		0/04/00 0 45	11/000		0054	ļ <u></u>	40.000/
9/16/09 10:30am	36a	9/21/09 8:45am	east side shell/ 9:30am/ 10%	119.40	3951	310	16.60%
9/16/09 11am	36b	9/23/09 9am	east side shell/ 9:30am/ 10%	119.4	5104	410*	16.60%
		14/0/00 0	. 11.40.45 (400)	110.00	4000		00.000/
10/28/09 10:45am	37a	11/2/09 9am	shell/ 10:45am/ 10%	119.30	4388	350	23.60%
10/28/09 11am	37b	11/4/09 9am	shell/ 10:45am/ 10%	119.30	5104	410*	23.60%
10/28/09 1:30pm	38a	11/2/09 9:30am	Ax/ 12:45pm/ 5%	119.9	3471	280	22.00%
10/28/09 2pm	38b	11/4/09 9:30am	Ax/ 12:45pm/ 5%	119.90	4489	360	22.00%
		44/0/00 0 45	A-10-00159/	400.00	0000	000	24 000/
10/29/09 10:30am	39a	11/2/09 9:45am	Ax/ 9:30am/ 5%	120.00	2933	230	21.90%
10/29/09 11am	39b	11/5/09 2pm	Ax/ 9:30am/ 5%	120.00	3479	280	21.90%
44/02/00 2-22-	40-	44/5/00 0:20===	shell/ 1:30am/ 10%	110.0	1348	110	23.40%
11/02/09 2:30pm	40a	11/5/09 2:30pm		118.9	1340	110	23.40%
11/02/09 2:45pm	40b		shell/ 1:30am/ 10%	118.90		<u> </u>	23.40%
44/2/00 000	410	44/5/00 2:45	Ax/ 1pm/ 5%	446.90	2200	260	23.70%
11/3/09 2pm	41a 41b	11/5/09 2:45pm		116.80	3300	200	23.70%
11/3/09 2:15pm	410		Ax/ 1pm/ 5%	116.8			23.70%
11/4/00 11:45	42a		shall/ 41am/ 409/	116,80			21.40%
11/4/09 11:45am			shell/ 11am/ 10%	·····			21.40%
11/4/09 12:15pm	42b		shell/ 11am/ 10%	116,80			24.00%
11/4/09 3:30pm	43a		Ax/ 2:30pm/ 5%	120.8			
11/4/09 3:45pm	43b		Ax/ 2:30pm/ 5%	120.8		<u> </u>	24.00%
						L	l

Geosphere Cons ants, Inc.			المالك (FIELD REPORT
Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	Report#:	B 583005		Date: 11 9-12 09
Project Name: LLNL Site 300 B 850 Soil K.	Project Nur		1278	Page of
Field Rep:	Project Ma	nager: Cal	Dicker	man
Scope of Work: Mass Grading Pavement Utility Trench	☐ Other	Hours Charged:	☑ Full Time	☐ PartTime
Contractor: Cerrulo		☑ Sunny	□ Windy ···	☐ Hot ☐ Mild
Contractor Representative: Analy Bell	Conditions:	Cloudy	□ Rain :	Cold Fog
Comment/Sketch: II 9 09 Mon Break #40b @ Idays 290 #42a @ Sdeys 230 #43a @ Sdays 210 Sample @ 10:45 Am #44 a Sample @ 10:45 Am #45a - Sample @ 10:45 Am #45a - Compaction tests at V- II 10 09 Tue - V-ditch obs rack dan 40 apart	psi 1: psi 2 H:30 AI IZ pm ditch outside outs	30pm pm , # 446 11 , # 456 12 Sc uplicate ~ , # 466 1 izh, ajgovar.	1:20 mm	
- Break # 426@ ?days . # 436@ ?days	290 ps:	12:20pm		
_ sample @ 9:30 Am # 4"	70:3	0am,#471	o II Am	
- U-ditch obs. compact	m of	20' long are	a along s	outh side of
- U-ditch obs. compacti roud to B-850, one life	t comp	heted wil	1 count. +	romarson
			Swany	55° F
(11/12/09/Thu				

	Geospl		Cons	nts, Inc.				AIL۱	/ FII	ELD RI	EPOR	T
	Geotechni Environme	cal Engin ntal Man	eering • Enginee agement • Watı	ering Geology er Resources	Report	#: B S	58300 S		Da	ate: IL	9/09	
Project Nam	e: د الالا	_ Si	e 301 F	3850 5014	R Project		LAW	278	Pa	ge	of _	
Field Rep:	Poloe	4	Uribe			Manager:	Cel I	Dickern	nay	<u> </u>		
Scope of Work:	Mass Gr	ading [Pavement	Utility Trench	☐ Other	Hours	Charged:	☑ Full Time		☐ PartTir	ne	
Contractor:	Cen	γu	do			⊿ s	unny	☐ Windy		☐ Hot		Mild
Contractor R	epresentativ	ve:	Andly	Bell	Conditio	ns:	Cloudy	☐ Rain		✓ Cold		Fog
Equipment			Type			lumber	e green a la company	☑ Nuclea	-	Туре: Т	10 %	
Compaction	ران	mpi	in)	ack			Density Testing Equipment	☐ Tube				
Moving			-0					☐ Sand C	one			
Water						·		✓ Native	ðν	site	•	
Support						· · · · · ·	Fill Source	☐ Import			<u> </u>	
Plan			Engineer	· Washington	Milyer of the state	Date	Fill Location:					
Civil							west	side a	£,	u-di	teh	at
Structural	•							en of	•		•	
Geotech	200 02000000000	PASAGETTA	er te de trassit de cent		S. (MO) CALVERY 180		25.1 a.24.24.40.00.		CRIMINE	SACO (ESCACIONES		
Curve#			Descrij	NEB 4464615150030 UNCERNOO		Max Density	MARIE CONTRACTOR	re Required Cor	npactio	on Re	equired Moi	isture
071409-01	Br	· 5a	udy s	ilt w/5	S	114.5	14.5	2 90%			Opt. + 2%	6
			<u>. T</u>	1.0		.0.0		☐ 95%		T	Opt. + 2%	6 to 5%
5091026	790			(V3		138-	2 500	Othe	r :		Other:	
										ove	-Cypt	•
	F 10 02 2			A STATE OF		Wet Densi	ty Moisture	Dry Density			Percent	Pass/
Test #			Location		Elevation	(pcf)	Content	(pcf)	Cu	rve# G	ompaction	Fail
<u> </u>	45 2	of	אכז-ס	9 MW	-2' F56	i	14.9	105.2	071	409-01	92	
2	45'8	ιζ		4	-1.5' 856	i	15.7	103.5		$I \rightarrow$	90	
3	45'2	ų		4	-1 F56		15.2	. 103.1			10	
4	40'E	h		4,	RFSG		14.6	106.3		 	73	
	10 C	• (14.00			100.2		-		
												
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Comment/ Sketch:	AB	حم	ner an	g buns	ما محانا	ر م کود	omoada	. / w / ;	Len	whin	ack	•
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NOTICE: Our firm's profess tractor identified, to form opin	nions about the adequa	cy of those ope	rations, and to report the	seopin- 🖳 This 🕻	OFR is Prelimina nce that field observation	ry - A preliminary	report is provided	This DFR is	Final	- A final report is	s an instrumen	t of professiona
ions to our client. The presence from its obligation to meet co findings and opinions. The operations, and sequences of	ntractural requirement e contractor retains sol	s. No one exc	ept our client may rely	on our or conclusions a	nce that held observation and/or recommendation: take precedence over the	s conveyed in the fi	nal report may vary	evaluated by the profes			. anoulu DE GIS	cussed Willi dill
operations, and sequences 01		1	£//		1-1	•				Τ.		
Field Representa	tive:	1	2//	Date: 11	[2/09	Reviewed By:				Date:		

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A STATE OF THE PARTY OF THE PAR	Geotechnical Engli Environmental Ma	neering • Engine nagement • Wat	ering Geology er Resources	Report	** : 3 .	583005		Date:	119	०९
Project Nam	e: LLUL Si	te 300 B	850 Sóil K	Project		LAW 17	728	Page		of
Field Rep:	Robert	Unlo	e	Project	Manager:	cal D	ickern	nan		
Scope of Work:	Mass Grading	☐ Pavement	Utility Trench	☐ Other	Hours	Charged:	✓ Full Time		Part Time	
Contractor:	Cam	do				Sunny	□ Windy		Hot	☐ Mild
Contractor R	epresentative:	body	Bell	Conditio		Cloudy	☐ Rain	Ø	Cold	☐ Fog
Equipment		Туре			Number		☐ Nuclea	г Туј	pe:	
Compaction	Rex					Density Testing Equipment	☐ Tube			
Moving					•	Equipment	✓ Sand C	Cone		
Water		-					Native		: 1-	
Support					 	Fill Source	☐ Import		iche.	
Plan		Enginee	y Palatana	an demand not beau	Date	Fill Location:	iii iniport			
Civil	425 FACITERSUM 119 (1910) MSI	9100 halla 2119				7 m Location	Ax			
Structural							•			
Geotech										
Curve#		Descri	iption		Max Densit	y Opt. Moistu	re Required Co	mpaction	Requ	ired Moisture
080409-01	Bru San	dy Silt	- w/55 pl	45	III.S	17.5	1 90%		□ Op	t. + 2%
		5 ½ ce	ment				□ 95%		□ ор	t. + 2% to 59
							☐ Othe	r:	⊘ Oth	ner:
									over	opt.
	WALL CONTROL OF THE PROPERTY OF THE AREA	OUT OF VOM TON		Literatus Romanos de Sentre Constituente de l'	na literations and the			- John Daving Street at 1	control in the same	etaculetost villa sa aturas
		Location		Elevation	Wet Dens (pcf)		Dry Density	Curve #		rcent Pas paction Fai
Test#					- Linch	Content	(pcf)		' Com	
iest#	C00 01 - 2		C Uhbile		STATE PARTICULAR TO SERVICE				Com	. Example 12000-2
lest#	approx 3		f MWells	1305	125.			<i>∪</i> €040°	Com	2
lest#	арргох 3		f MWells		STATE PARTICULAR TO SERVICE				Com	. Example 12000-2
lest#	<u>appro</u> ≈ 3		f Mwells		STATE PARTICULAR TO SERVICE				Com	. Example 12000-2
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I I I I I I I I I I I I I I I I I I I	approx 3		F MWells		STATE PARTICULAR TO SERVICE				Com	2



CONSOLIDATED ENGINEERING

DATE: /	11	9 09	INSPECTOR	₹: -	Robert	U. Tony &
PROJECT#: _	<u></u>	AW 1278	PROJECT N	IAME:	LLNL Site	<u> 2 300 B 850 5</u>
COMPACTION SPE	C:	90	TEST LOCA	TION:	Ax	
MOISTURE SPEC:		over opt. Morot.				
		SAND	CONE TE	ESTING		
	A	WT of cone, jar, sand - Before	.	6875.	2	g
	В	WT of cone, jar, sand - After	number	3841.1		g ·
	С	WT of sand in cone		1580		g
	D	WT of sand used		3034.1	<u>, </u>	g A-B
i	E	WT of sand in hole		1454.1		g D-C
	F	Density of sand	·	89.6		pcf
•	G	Volume of hole		16.2 /0	0.0358	cf E÷F
•	Н	Gross WT of excavated soil +	TARE			Ibs
	1	WT of TARE #2		138.4		lbs
	J	Net WT of soil		2038.	7 /4.495	lbs H-I
	K	WT Density	_	125.6		pcf J÷G
	L	Soil + TARE (Wet)		1344.7	2	lbs
	М	TARE #2		138,4		ibs
	N	Soil + TARE (Dry)	·	1122.3		lbs
	Ö	WT of Water		-222-1 2	21.9	lbs L-N
	₽	WT of Soil		983.9		lbs N-M
	Q	Moisture Content		22.6		% O ÷ P
		Optimum Moisture Content				%
• .	R	Dry Density	-	102.4		pcf K÷(I+Q)
	S	Lab Maximum				pcf
		(Lab No.)			·
	Т	Percent Compaction	_			% R÷S
Weight = WT Cubic Feet =		Pounds = lbs Gram		Pounds per Cubic Conversion Grams		

Sample Date	Sample	Break Date	Sample Location/ Time/	unit wt.	Max	Test	
time molded	4" diam.		%cement	wet	Load	Strength	moist. C.
	,	·		- 	(lbs)	(psi)	
8/25/09 11:30am	26a	8/27/09 8:45am		119.40	3768	300	15.70%
8/25/09 11:50am	26b	9/1/09 7:45am	Ax - lift #15/ 10:50am/ 5%	119.40	4323	340	15.70%
8/25/09 4:10pm	27a	8/27/09 9am	Ax - lift #15/ 3:30pm/ 5%	119.50	3014	240	15.10%
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				ļ	<u> </u>		
8/27/09 9:40am	28a	8/31/09 8:50am	Ax - lift #16/ 9am/ 5%	121.50	3229	260	17.00%
8/27/09 10am	28b	9/3/09 10:20am	Ax - lift #16/ 9am/ 5%	121.50	3264	260	17.00%
8/27/09 10:40am	29a	8/31/09 9:10am	east side shell/ 10:20am/ 10%	121.00	3486	280	21.70%
8/27/09 11am	29b	9/3/09 10am	east side shell/ 10:20am/ 10%	121.00	5104	410*	21.70%
							<u> </u>
8/31/09 12:50pm	30a	9/3/09 10:40am	Ax - lift #17/ 12:10pm/ 5%	120.80	2615	210	14.40%
8/31/09 1:10pm	30b	9/8/09 12pm	Ax - lift #17/ 12:10pm/ 5%	120.80	2770	220	14.40%
9/1/09 12:50pm	31a	9/3/09 11am	east side shell/ 11:50am/ 10%	119.50	3050	240	21.20%
9/1/09 1:05pm	31b	9/8/09 12:20pm	east side shell/ 11:50am/ 10%	119.50	2852	230	21.20%
9/2/09 9:40am	32a	9/8/09 1:15pm	Ax - lift #18/ 9am/ 5%	120.80	2807	220	18.70%
9/2/09 10am	32b	9/9/9 10am	Ax - lift #18/ 9am/ 5%	120.80	2130	170	18.70%
9/2/09 1:10pm	33a	9/8/09 2:20pm	Ax - lift #18/ 12pm/ 5%	119.90	2422	190	20.10%
9/2/09 1:30pm	33b	9/9/9 10:20am	Ax - lift #18/ 12pm/ 5%	119.9	3264	260	20.10%
							1
9/9/9 9:45am	34a	9/14/09 8:30am	east side shell/ 8:45am/ 10%	120.10	4439	350 .	18.20%
9/9/9 10am	34b	9/16/09 8am	east side shell/ 8:45am/ 10%	120.10	5104	410*	18.20%
9/9/9 2:45pm	35a	9/14/09 9am	Ax - lift #19/ 1:45pm/ 5%	119	1556	120	21.70%
9/9/9 3pm	35b	9/16/09 8:30am	Ax - lift #19/ 1:45pm/ 5%	119.00	3143	250	21.70%
9/16/09 10:30am	36a	9/21/09 8:45am	east side shell/ 9:30am/ 10%	119.40	3951	310	16.60%
9/16/09 11am	36b	9/23/09 9am	east side shell/ 9:30am/ 10%	119.4	5104	410*	16.60%
							1010070
10/28/09 10:45am	37a	11/2/09 9am	shell/ 10:45am/ 10%	119.30	4388	350	23.60%
10/28/09 11am	37b	11/4/09 9am	shell/ 10:45am/ 10%	119.30	5104	410*	23.60%
10/28/09 1:30pm	38a	11/2/09 9:30am	Ax/ 12:45pm/ 5%	119.9	3471	280	22.00%
10/28/09 2pm	38b	11/4/09 9:30am	Ax/ 12:45pm/ 5%	119.90	4489	360	22.00%
					, .00		00/0
10/29/09 10:30am	39a	11/2/09 9:45am	Ax/ 9:30am/ 5%	120.00	2933	230	21.90%
10/29/09 11am	39b	11/5/09 2pm	Ax/ 9:30am/ 5%	120.00	3479	280	21.90%
		, 20 April	7.00 0.0001117 070	120.00	0.170	#44	21.0070
11/02/09 2:30pm	40a	11/5/09 2:30pm	shell/ 1:30am/ 10%	118.9	1348	110	23.40%
11/02/09 2:35pm	40b	11/9/09 1pm	shell/ 1:30am/ 10%	118.90	3651	290	23.40%
1 1702/03 2.40PIII	700	rirarda ipisi	SHEW LOUGHW 1070	110.50	JUJ 1	#30	∠J. 7U /0
11/3/09 2pm	41a	11/5/09 2:45pm	Ax/ 1pm/ 5% DUPLICATE	116.80	3300	260	23.70%
11/3/09 2:15pm	41b	11/10/09 12pm	Ax/ 1pm/ 5% DUPLICATE	116.8	4149	330	23.70%
THOIDE Z. IOPHI	710	THIQUE IZPIII	AW IPHI ON DUFLICATE	1 10.0	4148	- วงบ	23.10%
11/4/09 11:45am	42a	11/9/09 1:30pm	sholl/ 44cm/ 400/	116.00	2026	220	24 400/
	42b	11/11/09 12pm	shell/ 11am/ 10% shell/ 11am/ 10%	116.80	2926	230	21.40% 21.40%
11/4/09 12:15pm 11/4/09 3:30pm	42b 43a		**	116.80	4105	370	
· · · · · · · · · · · · · · · · · · ·		11/9/09 2pm	Ax/ 2:30pm/ 5%	120.8	2585	210	24.00%
11/4/09 3:45pm	43b	11/11/09 12:20pm	Ax/ 2:30pm/ 5%	120.8	3586	290	24.00%

*Test stopped due to limit of machine 100psi min.

CONSOLIDATED ENGINEERING LABORATORIES

Sample Date time molded		Break Date time	Sample Location/ Time/ %cement	unit wt. wet	Max Load (lbs)	Test Strength (psi)	moist. C
11/9/09 11:30am	44a	11/12/09 9am	shell/ 10:45am/ 10%	116.50	3659	290	24.70%
11/9/09 11:40am	. 44b		shell/ 10:45am/ 10%	116.50			24.70%
11/9/09 12pm	45a	11/12/09 9:20am	Ax/ 10:45am/ 5%	116.40	2407	190	27.20%
11/9/09 12:30pm	45b		Ax/ 10:45am/ 5%	116.40			27.20%
11/10/09 11am	46a	11/12/09 9:40am	shell/ 10:30am/ 10%	118.50	3443	270	25.10%
11/10/09 11:20am	46b		shell/ 10:30am/ 10%	118.50			25.10%
11/11/09 10:30am	47a		Ax/ 9:30am/ 5%	116.20			23.20%
11/11/09 11am	47b	,	Ax/ 9:30am/ 5%	116.20			23.20%
							*
11/12/09 10:30am	48a	· .	Ax/ 9:30am/ 5%	114.70			
11/12/09 11am	48b	,	Ax/ 9:30am/ 5%	114.70			
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CONSOLIDATED ENGINEERING LLNL Site 300 B-850 Soil Remediation LABORATORIES

B-583005

Date	Density Designation for Cement	-	Elevation	Wet	Dry	%	90%
	Treated. Fill in area Ax	Easting	MSL	Den.	Den.	Moist	min.
11/4/2009	53' south of MW 11:30am			116.8	94.7	23.3	92.00
11/4/2009	70' west NW of MW 3pm			120.8	99.8	21.1	96.00
11/9/2009	96' west of MW 11:30am		1305	116.5	93.2	25	92.00
11/9/2009	96' west NW of MW 11:45am		1305	116.4	93.7	24.6	93.00
11/9/2009	40' west NW of north MW 2:45pm		1305	121.4	99.8	21.6	92.00
11/10/2009	33' north NE of MW 10:30am		1306	118.5	99.7	18.8	94.00
11/10/2009	at center of MW		1306	113.4	90.4	25.4	90.00
11/11/2009		·	1306	116.2	93.9	23.8	93.00
11/11/2009	48' north NW of center of MW 3:45pm		1306	118.5	99.6	19	94.00
11/12/2009				114.7	95.2	20.5	91
11/12/2009	40' west of north MW 11:30am			117.4	99.2	18.3	94.00
11/12/2009	at center of MW 11:40am			105.2	87.2	20.6	84
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Geosphere Consants, Inc.			AILY F	IELD REP	ORŢ
Geotechnical Engineering - Engineering Geology Environmental Management - Water Resources	-Report#.	B 583005		Date: LL 16	-19/09
Project Name: LLNL Site 300, 8850 Soil IL.	Project Nu	mber: LAW 12	.78	Page	_ of
Field Rep: Robert Uribe	Project Ma	nager:	Dickerm	an_	
Scope of Work: Mass Grading Pavement Utility Trench	☐ Other	Hours Charged:	Full Time	☐ Part Time	
Contractor: Cerrudo			□ Windy	☐ Hot	□ Mild
Contractor Representative: Andy Bell	Conditions:	☐: Cloudy	Rain	⊅ cold	□ Fog
Comment/Sketch: 11/16/09 mon - Break #446@ 7days #456@ 7days #47a@ 5days #48a@ 4days - Curve - Semple @ 1:30 pm #49a 11/17/09 Twe - Break, #466@ 7days - Sample @ 1/pm #50a	270 pg 130 pg 140 ps 2pm;	5i 12 pm 5i 12:20 p 12:40 pm 1 pm 4496 2:20 pm, 4506	m Sumi	1 55°	
J11/18/09) wed - Break # 476@7days	180 p:	54 my 5	s°F		
11/19/09/Thin - Break # 486 @ 7 days # 49a@ 3 days # 50a@ 2 days - Sample @ 12pm # 51a 12 - Scand cone	360 ps	i 8:30 AM i 8:50 AM i 9:10 am , 計516 li		55° F	
ions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our or conclusions and/or	at field observation was recommendations conv	preliminary report is provided performed. Observations and/eyed in the final report may vary icated in a preliminary report.	This DFR is Fin service. Any conclusions dra evaluated by the professiona	wn from this report sho	instrument of professiona uld be discussed with an
Field Representative. Date: 1/1	7/09 Rev	iewed By:		Date:	

Date	Density Designation for Cement Treated. Fill in area Ax	Location: Northing / Easting	Elevation MSL	Wet Den.	Dry Den.	% Moist	90% min.
11/4/2009	53' south of MW 11:30am			116.8	94.7	23.3	92.00
11/4/2009	70' west NW of MW 3pm		I ,	120.8	99.8	21.1	96.00
11/9/2009	96' west of MW 11:30am		1305	116.5	93.2	25	92.00
11/9/2009	96' west NW of MW 11:45am	DUPLICATE	1305	116.4	93.7	24.6	93.00
11/9/2009	40' west NW of north MW 2:45pm		1305	121.4	99.8	21.6	92.00
		4					
11/10/2009	33' north NE of MW 10:30am	***************************************	1306	118.5	99.7	18.8	94.00
11/10/2009	at center of MW		1306	113.4	90.4	25.4	90.00
		·····					
11/11/2009	54' north of center of MW 10am		1306	116.2	93.9	23.8	93.00
11/11/2009			1306	118.5	99.6	19	94.00
11/12/2009	8' south of center of MW 9:45am			114.7	95.2	20.5	91
11/12/2009	40' west of north MW 11:30am	DUPLICATE		117.4	99.2	18.3	94.00
11/12/2009	at center of MW 11:40am	DOILIOATE		105.2	87.2	20.6	84
1111212003	at ochtor or May 11. Todili			100.2	7	20.0	04
11/16/2009	retest of #3 11/12/09		1308	112.7	94.6	19.1	90.00
11/16/2009	54' west of center of MW		1308			19.7	93
11/16/2009	40' north of center of MW	DUDLICATE	1308	117.8	98.4		
		DUPLICATE	,	120.7	99.7	21.1	95.00
11/16/2009	at north MW		1308	113.8	96.4	18	90.00
11/47/2000	001 11 12 13 13 13		4000	1100		0.4	
11/17/2009	60' north of north MW		1308	118.8	98.2	21	94
11/17/2009	30' north NE of center of MW	· · · · · · · · · · · · · · · · · · ·	1308	121.5	101.3	20	96.00
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11/19/2009	21' south of center of MW		1308	117.9	96	22.8	93.00
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LLNL Site 300 B-850 Soil Remediation B-583005

*Test stopped due to limit of machine 100psi min.

Sample Date time molded	Sample 4" diam.	Break Date time	Sample Location/ Time/ %cement	unit wt. wet	Max Load (lbs)	Test Strength (psi)	moist. C.
11/9/09 11:30am	44a	11/12/09 9am	shell/ 10:45am/ 10%	116.50	3659	290	24.70%
11/9/09 11:40am	44b	11/16/09 12pm	shell/ 10:45am/ 10%	116.50	4533	360	24.70%
11/9/09 12pm	45a	11/12/09 9:20am	Ax/ 10:45am/ 5%	116.40	2407	190	27.20%
11/9/09 12:30pm	45b	11/16/09 12:20pm	Ax/ 10:45am/ 5%	116.40	3371	270	27.20%
11/10/09 11am	46a	11/12/09 9:40am	shell/ 10:30am/ 10%	118.50	3443	270	25.10%
11/10/09 11:20am	46b	11/17/09 10am	shell/ 10:30am/ 10%	118.50	4892	390	25.10%
							
11/11/09 10:30am	47a	11/16/09 12:40pm	Ax/ 9:30am/ 5%	116.20	1681	130	23.20%
11/11/09 11am	47b	11/18/09 10am	Ax/ 9:30am/ 5%	116.20	2280	180	23.20%
					1		
11/12/09 10:30am	48a	11/16/09 1pm	Ax/ 9:30am/ 5%	114.70	1756	140	20.00%
11/12/09 11am	48b	11/19/09 8:30am	Ax/ 9:30am/ 5%	114.70	2130	170	20.00%
11/16/09 2pm	49a	11/19/09 8:50am	Ax/ 1:30pm/ 10%	117.80	3100	250	21.20%
11/16/09 2:20pm	49b		Ax/ 1:30pm/ 10%	117.8			21.20%
							
11/17/09 2:30pm	50a	11/19/09 9:10am	Ax/ 1pm/ 10%	118.80	4533	360	17.20%
11/17/09 2:50pm	50b		Ax/ 1pm/ 10%	118.80			17.20%
11/19/09 12:30pm	51b		Ax/ 12pm/ 10%	117.90			
11/19/09 1pm	51b		Ax/ 12pm/ 10%	117.90			
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Project Manager:		Geotechnical En Environmental N	gineering • Engine lanagement • Wat	ering Geology er Resources	Repo	t#:	B 59	83005		Date	: 11 19	09	-
Soge of Work: Mass Gooding Provenest Unity Steech Other Wound Contractor Representative: Andy Boll Conditions Sanary Windy Hor Mild Register Cold Re	Project Nam	e: <u>(</u>	te30 B9	850 Soilk.	Projec	t Nur	nber: L				e	of	
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Contractor Representative: And Bell Conditions: Cloudy Cloudy Rela Codd Fog Equipment Type: Number Description Water Support Plan Engineer Plan Engineer Plan Date: Fill Location Cover Plan Date: Fill Location Cover Plan Date: Fill Location Cover Plan Support Cover Plan Description Cover Plan Support Cover Plan Date: Fill Location Cover Plan Support Co	Scope of Work:	Mass Grading	☐ Pavement	Utility Trench	☐ Othe	r	Hours Cha	arged:	☑ Full Time		3 Part Time		
Contractor Representative: And Sel Gloudy Rain Cold Fog Equipment Type: Destry Testing Equipment Tube Tub	Contractor:	Cenn	do_		Candit	iane.	⊿ Sun	ny	□ Windy	C] Hot	П	⁄Iild
Squipment Type Number Pensity Testing Tube Tub	Contractor R	epresentative:	Andy	Bell	Condic	ions:	☐ Cl₀	udy	☐ Rain	P	Cold	□ F	og
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Comment/ Sketch: Comment/ Sketch: Content					n e	W	et Density	Moisture	Dry Density		" Pe	cent	Pass/
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This DFR is Preliminary - A preliminary report is provided in strument of profession should be adequacy of those operations, and to report those opin-instruments of profession should be adequated by the profession of the profession of the presence and activities of our fell expression and a continuous performance. Observation was performed. Observations and/ or review, any conclusions drawn from this report should be discussed with mortions and a continuous. The contractor relations to the profession and/or recommendations conveyed in the final report may vary evaluated by the professional involved.													
This DFR is Preliminary - A preliminary report is provided in strument of profession should be adequacy of those operations, and to report those opin-instruments of profession should be adequated by the profession of the profession of the presence and activities of our fell expression and a continuous performance. Observation was performed. Observations and/ or review, any conclusions drawn from this report should be discussed with mortions and a continuous. The contractor relations to the profession and/or recommendations conveyed in the final report may vary evaluated by the professional involved.													
This DFR is Preliminary - A preliminary report is provided in strument of profession should be adequacy of those operations, and to report those opin-instruments of profession should be adequated by the profession of the profession of the presence and activities of our fell expression and a continuous performance. Observation was performed. Observations and/ or review, any conclusions drawn from this report should be discussed with mortions and a continuous. The contractor relations to the profession and/or recommendations conveyed in the final report may vary evaluated by the professional involved.													
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	indings and opinions. The	è contractor retains sole responsi	except our client may rel iblity for site safety and the	y on our or conclusions a	nd/or recommendati	ons convey	ed in the final r	report may vary	evaluated by the profes	sional involve	ed.		
Field Representative: 19/9 Reviewed By: Date:			2///	,	/n/	1							



CONSOLIDATED ENGINEERING

DATE:	ula	(m	INSPECTOR:	ony P. / R. Wribe
PROJECT #:	LAL	3 12.78	PROJECT NAME:	LNL site 300 B 850 Soil
COMPACTION	SPEC:	_	TEST LOCATION:	Ax shell
MOISTURE SPE		above opt. Moist	21'S of cont	~ MW
		CAND	CONT. TESTING	
		SAND	CONE TESTING	
	Α	WT of cone, jar, sand - Before	6902.1	g
	В В	WT of cone, jar, sand - After	3842.8	g
	C	WT of sand in cone	1580	g
	D.	WT of sand used	3059.3	g A-B
	: E	WT of sand in hole	1479.3	g D-C
	F	Density of sand	89.6	pcf
	G	Volume of hole	16.50 /0.	0364 cf E+F
egiste de la companya de la companya de la companya de la companya de la companya de la companya de la company La companya de la companya de la companya de la companya de la companya de la companya de la companya de la co	Н	Gross WT of excavated soil +	rare	lbs
	. 1	WT of TARE	7062 /	lbs
•	J	Net WT of soil	2052.6	/ 4.525 lbs H-1
	. K	WT Density	124.3	pcf J÷G
	L	Soil + TARE (Wet)	901.7	lbs
	М	TARE #6	137.2	lbs
	N	Soil + TARE (Dry)	776.2	lbs
	10	W⊤ of Water	125.5	lbs L-N
	Р	WT of Soil	639.0	lbs N-M
	Q	Moisture Content	19.6	% O÷P
		Optimum Moisture Content		%
	R	Dry Density	103.9	pcf K÷(I+Q)
		Lab Maximum	106.5	pcf
	3	(Lab No)	
		(Lab 140.		
	Т	Percent Compaction	98	% R÷S
Weight = Cubic Fe		Pounds = Ibs Grams	Pounds per Cubic Fe Conversion Grams ÷	· · · · · · · · · · · · · · · · · · ·

Date	Density Designation for Cement Treated. Fill in area Ax	Location: Northing / Easting	Elevation MSL	Wet Den.	Dry Den.	% Moist	90% min.
11/4/2009	53' south of MW 11:30am			116.8	94.7	23.3	92.00
11/4/2009	70' west NW of MW 3pm			120.8	99.8	21.1	96.00
11/9/2009	96' west of MW 11:30am		1305	116.5	93.2	25	92.00
11/9/2009	96' west NW of MW 11:45am	DUPLICATE	1305	116.4	93.7	24.6	93.00
11/9/2009	40' west NW of north MW 2:45pm		1305	121.4	99.8	21.6	92.00
11/10/2009	33' north NE of MW 10:30am	·	1306	118.5	99.7	18.8	94.00
11/10/2009	at center of MW		1306	113.4	90.4	25.4	90.00
					·		
11/11/2009	54' north of center of MW 10am		1306	116.2	93.9	23.8	93.00
11/11/2009	48' north NW of center of MW 3:45pm		1306	118.5	99.6	19	94.00
11/12/2009	8' south of center of MW 9:45am		,	114.7	95.2	20.5	91
11/12/2009	40' west of north MW 11:30am	DUPLICATE		117.4	99.2	18.3	94.00
11/12/2009	at center of MW 11:40am			105.2	87.2	20.6	84
11/16/2009	retest of #3 11/12/09	,	1308	112.7	94.6	19.1	90.00
11/16/2009	54' west of center of MW		1308	117.8	98.4	19.7	93
11/16/2009	40' north of center of MW	DUPLICATE	1308	120.7	99.7	21.1	95.00
11/16/2009	at north MW		1308	113.8	96.4	18	90.00
11/17/2009	60' north of north MW		1308	118.8	98.2	21	94
11/17/2009	30' north NE of center of MW	,	1308	121.5	101.3	20	96.00
11/19/2009	21' south of center of MW		1308	117.9	96	22.8	93.00
11/23/2009	87' west of north MW			116.7	97.3	20	92.00
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LLNL Site 300 B-850 Soil Remediation B-583005

*Test stopped due to limit of machine 100psi min.

Sample Date time molded		Break Date time	Sample Location/ Time/ %cement	unit wt. wet	Max Load (lbs)	Test Strength (psi)	moist. C.
11/9/09 11:30am	44a	11/12/09 9am	shell/ 10:45am/ 10%	116.50	3659	290	24.70%
11/9/09 11:40am	44b	11/16/09 12pm	shell/ 10:45am/ 10%	116.50	4533	360	24.70%
11/9/09 12pm	45a	11/12/09 9:20am	Ax/ 10:45am/ 5%	116.40	2407	190	27.20%
11/9/09 12:30pm	45b	11/16/09 12:20pm	Ax/ 10:45am/ 5%	116.40	3371	270	27.20%
11/10/09 11am	46a	11/12/09 9:40am	shell/ 10:30am/ 10%	118.50	3443	270	25.10%
11/10/09 11:20am	46b	11/17/09 10am	shell/ 10:30am/ 10%	118.50	4892	390	25.10%
		,					
11/11/09 10:30am	47a	11/16/09 12:40pm	Ax/ 9:30am/ 5%	116.20	1681	130	23.20%
11/11/09 11am	47b	11/18/09 10am	Ax/ 9:30am/ 5%	116.20	2280	180	23.20%
11/12/09 10:30am	48a	11/16/09 1pm	Ax/ 9:30am/ 5%	114.70	1756	140	20.00%
11/12/09 11am	48b	11/19/09 8:30am	Ax/ 9:30am/ 5%	114.70	2130	170	20.00%
							
11/16/09 2pm	49a	11/19/09 8:50am	Ax/ 1:30pm/ 10%	117.80	3100	250	21.20%
11/16/09 2:20pm	49b	11/23/09 1pm	Ax/ 1:30pm/ 10%	117.8	4171	330	21.20%
			,		***************************************		
11/17/09 2:30pm	50a	11/19/09 9:10am	Ax/ 1pm/ 10%	118.80	4533	360	17.20%
11/17/09 2:50pm	50b	11/24/09 9am	Ax/ 1pm/ 10%	118.80	4764	380	17.20%
		,					
11/19/09 12:30pm	51b	11/23/09 1:30pm	Ax/ 12pm/ 10%	117.90	3586	290	24.90%
11/19/09 1pm	51b	11/25/09 9am	Ax/ 12pm/ 10%	117.90	3922	310	24.90%
11/23/09 12pm	52a	11/25/09 9:30am	Ax/ 11:30am/ 10%	116.7	3029	240	21.10%
11/23/09 12:30pm	52b		Ax/ 11:30am/ 10%	116.70			21.10%
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Geotechnical Engineering · Engineering Geology Environmental Management · Water Resources	Report#: B 58.3005	Date: 11 23-25 09
Project Name: LLNL Site 300 B880 Soil R.	Project Number: LAW 1278	Page of
Field Rep: Robert Unbe	Project Manager: Cal Dickern	an
Scope of Work: Ass Grading Pavement Utility Trench	□ Other Hours Charged: Full Time	☐ Part Time
Contractor: Cervudo	☑ Sunny ☐ Windy	☐ Hot ☐ Mild
Contractor Representative: Andy Bell	Conditions: Cloudy Rain	: 🖊 Cold: 🗆 Fog
Comment/Sketch: [11 23 09] mon Break #49b@7da #51a@4da - Samphe @ 11:30 am - Obs. of rock apron apron was redecing SCS, no spec asso SG underlying falor	15 330 psi 1pm 17 290 psi 1:30 pm # 520 12pm, # 5210 SW of MW NC7-6 ped reclesigned by cicted with new des re was smooth and Sumy 55	12:30 pm 11, rock L.Long w/ 19n Stiff
- Break #506@70	days 380 psi 9 Am	
	Sunny 60° t	
NOTICE: Our firm's professionals are represented on site soley to observe operations of the contract debutified. In form polytoins about the adequary of those operations, and to report those coliniary and the soleton and t		Final - A final report is an instrument of professional
tractor identified, to form opinions about the adequacy of those operations, and to report those opin- tions to out ridient. The presence and earlyities of our field epicsentatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may pely on our or conclusions and/or r	t field observation was performed. Observations and/ ecommendations conveyed in the final report may vary evaluated by the profession	drawn from this report should be discussed with and
	occedence over those indicated in a preliminary report.	
Field Representative: Date: 11/25	Reviewed By:	Date:
	<u> </u>	

	Geosphere Cons ints, Inc.
<u> </u>	AN ETS COMPANY
	Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources
Project Name	:: LLNL site 300 8850 Soil

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Project Nam	e: <u>Ĺ</u> L	NL.	Site	. 300	88	50	Sol	12							<u>در د</u>	2-7	8			Page		<u>.</u>		of _		_
Field Rep:	alyuma di	iana see	- 100 mg/m	www.	76 ES	2 3 467.9	NANTO	Patri	Pro	ojec	t Mar	nager	:	<u> </u>		Þ	ند	Ke	∕ ∖\	70	<u> </u>	_				
Scope of Work:	Ø Ma	ss Grading		avement	Ė	1 Utility	Trench			Other		Hour	Charg	jed:		P	Full	Time		□	l Part	Time	!			
Contractor:		Ce	ssu	باو	0							P	Sunn	y ± π'			Wi	ndy		E	ľън) t	L] \	Лild	
Contractor R	epresent	ative:	An	dy	B	el			Cor	ditic	ons:		Cloud	ly .			Rai	n		Z	Lc	ıld	L] _F	og	
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ns to our client. The presen om its obligation to meet co ndings and opinions. Th	ce and activities : ontractural requi ne contractor reta	of our field repr rements. No o	esentatives do ne except ou	o not relieve a or client ma	any contract y rely on o	or /sole ur orc	ely as evic onclusion n and sha	ience tha s and/or	at field ol recomme	bservat endatio	ion was p ns convey	erforme ed in the	d. Obser final rep	rvations oort may	and/ y vary		e. Any	conclusion the profe	ns dra	wn fror	n this re					
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Field Representa	tive	14	بر	1	1	_ Da	te:	4/3	70/E	4	Revie	ewed E	у:								Date:					_



"Partners in Quality"

January 12, 2010

Mr. Steve Ellis Lawrence Livermore National Laboratory P.O. Box 808; L-871 Livermore, California 94551-0808

Subject:

LLNL B-850 Soil Remediation

B850-S300 Livermore, CA

CEL Project #10-01280LAW & 10-01279LAW

EARTHWORK AND LABORATORY TESTING SUMMARY December 1, 2009 thru December 31, 2009

CEL representatives observed site operations and/or performed nuclear gauge moisture and density determinations on compacted soils at the above project from December 1, 2009 thru December 31, 2009. Laboratory testing was performed on soil samples from the site. Enclosed are the results of the field and laboratory testing.

It is the responsibility of LLNL to review and after consulting with SCS Engineers, approve these test results.

Eric J. Swenson, PE, GE

Principal Geotechnical Engineer

Exp. 12/2010

Respectfully submitted,

CONSOLIDATED ENGINEERING LABORATORIES

Michael Wissink Project Manager

Enclosures: Daily Field Reports

Moisture/Density Curves
Sand Cone Testing

Moisture Content Summary

Break Log Summary

Distribution:

1 PDF to Addressee, ellis12@llnl.gov

MW/EJS: pmf

R:\Geotech Projects by Number\LLNL\LLNL Bldg 850 Excavation and Remediation Plan - 95% Submittal\Monthly Summary Reports\12 - December Summary.doc

	80		-409
Project Name: LLNL Site 300 B850 Soil R. Project Number: LAW 12 Field Rep: Project Manager: Cal D		_	
	: 1	Page	of
Coppo of Model	charme	<u> </u>	
Stope of violating and a stranger of the stran	☑ Full Time	☐ Part Time	
Contractor: Cerrudo Sunny I	□ Windy	□∶Hot	☐ Mild
	□ Rain	∠ Cold	☐ Fog
Comment/Sketch: 12/1/09/Twe	11:30 ai		
# 546	/2 pm		
5amphe @ 3pm #55a #55b	3:30 pm 4 pm		
Bunny	- 1 l. 1 r i.		
12 2 39 1000			
12/2/09/ wed 5/on progress			
Sun,	ny 55°	F	
12/3/09 Thu			
- Sample @ 10:30 am #56a 11a sample @ 3:45 pm #57a 4:1	n #56 5 pm	6 U.S	10 gw
	opsi,	10 am	:
12/4/09/ 841			
Break #54a @ 3days 210 p. Break #55@ @ 3days 90pe			
Torcal #55@ @ 3days 90pg 5ample @ 12:45pm #58a 1:45pm , # 5ample @ 3pm #59a4pm , #5964	:30 pm	ц 55°	4
ions to our client. The presence and activities of our field representatives do not refleve any contractor solely as evidence that field observation was performed. Observations and/	7	al A final report is an i wn from this report shou	nstrument of professiona Ild be discussed with and
17/4/29		D-4	
Field Representative: Date: 79 70 Reviewed By:		Date:	

LLNL Site 300 B-850 Soil Remediation B-583005

*Test stopped due to limit of machine 100psi min.

Sample Date	Sample	Break Date	Sample Location/ Time/	unit wt.	Max	Test	
time molded	4" diam.	time	%cement	wet	Load	Strength	moist. C.
ume moided	4 ulam.	ane	70Cerrient	WCL	(lbs)	(psi)	
11/9/09 11:30am	44a	11/12/09 9am	shell/ 10:45am/ 10%	116.50	3659	290	24.70%
11/9/09 11:40am	44b	11/16/09 12pm	shell/ 10:45am/ 10%	116.50	4533	360	24.70%
11/9/09 12pm	45a	11/12/09 9:20am	Ax/ 10:45am/ 5%	116.40	2407	190	27.20%
11/9/09 12:30pm	45b	11/16/09 12:20pm	Ax/ 10:45am/ 5%	116.40	3371	270	27.20%
11/10/09 11am	46a	11/12/09 9:40am	shell/ 10:30am/ 10%	118.50	3443	270	25.10%
11/10/09 11:20am	46b	11/17/09 10am	shell/ 10:30am/ 10%	118.50	4892	390	25.10%
11/11/09 10:30am	47a	11/16/09 12:40pm	Ax/ 9:30am/ 5%	116.20	1681	130	23.20%
11/11/09 11am	47b	11/18/09 10am	Ax/ 9:30am/ 5%	116.20	2280	180	23.20%
11/12/09 10:30am	48a	11/16/09 1pm	Ax/ 9:30am/ 5%	114.70	1756	140	20.00%
11/12/09 11am	48b	11/19/09 8:30am	Ax/ 9:30am/ 5%	114.70	2130	170	20.00%
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11/16/09 2pm	49a	11/19/09 8:50am	Ax/ 1:30pm/ 10%	117.80	3100	250	21.20%
11/16/09 2:20pm	49b	11/23/09 1pm	Ax/ 1:30pm/ 10%	117.8	4171	330	21.20%
11/17/09 2:30pm	50a	11/19/09 9:10am	Ax/ 1pm/ 10%	118.80	4533	360	17.20%
11/17/09 2:50pm	50b	11/24/09 9am	Ax/ 1pm/ 10%	118.80	4764	380	17.20%
11/19/09 12:30pm	51b	11/23/09 1:30pm	Ax/ 12pm/ 10%	117.90	3586	290	24.90%
11/19/09 1pm	51b	11/25/09 9am	Ax/ 12pm/ 10%	117.90	3922	310	24.90%
11/23/09 12pm	52a	11/25/09 9:30am	Ax/ 11:30am/ 10%	116.7	3029	240	21.10%
11/23/09 12:30pm	52b	11/30/09 9am	Ax/ 11:30am/ 10%	116.70	4163	330	21.10%
11/30/09 12pm	53a	12/3/09 10am	Ax/ 11:30am/ 10%	118.00	3193	250	23.60%
11/30/09 12:30pm	53b		Ax/ 11:30am/ 10%	118			23.60%
12/1/09 11:30pm	54a	12/4/09 12:30pm	Ax/ 11am/ 10%	119.30	2630	210	22.40%
12/1/09 12pm	54b		Ax/ 11am/ 10%	119.30			22.40%
12/1/09 3:30pm	55a	12/4/09 1pm	Ax/ 3pm/ 10%	118.6	2430	190	25.50%
12/1/09 4pm	55b		Ax/ 3pm/ 10%	118.60			25.50%
12/3/09 11am	56a		Ax/ 10:30am/ 10%	119.40			23.60%
12/3/09 11:30am	56b		Ax/ 10:30am/ 10%	119.40			23.60%
12/3/09 4:15pm	57		Ax/ 3:45pm/ 10%	121.70			23.00%
12/4/09 1:45pm	58a		Ax/ 12:45pm/ 10%	118.50			
12/4/09 2pm	58b		Ax/ 12:45pm/ 10%	118.50			
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12/4/09 4pm	59b		Ax/ 3pm/ 10%	121.9			
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Geosphere Cons ants, Inc. AN ETS COMPANY Geotechnical Engineering - Engineering Geology Faviormental Management Marter Resources

	Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	Report i	#:		Date: //-/3	0 70 12-1
Project Name:	3-850 SOL KEMES CATIO	Project	Number: / ful 12 9	16	Page	of 2
Field Rep:	TONY Phillips		Manager:			
cope of Work:	Mass Grading Pavement Utility Tre	ench Den Other	Hours Charged:	Full Time	☐ Part Time	
Contractor:	CEARUSO		Sunny	□ Windy	∷ Hot	☐ Mild
ontractor Rep	presentative: ANDA REII	Condition	s: 🔲 Cloudy	☐ Rain	₩ Cold	☐ Fog
Contractor Rep. Comment/Sk O 900 1 000 1 100 1 100 1 400 1 400 1 400 1 400 1 100 1	PRESENTATION PROPERTY SPAN 10 70 CMT MIX & BEMIX SOIL SAMPLE CYL DENSITY TEST SPAN 10 70 CMT WT. MIX & BEMIX COMPACT DENSITY TEST DENSITY TEST ON SAMPLE PAR COMPACT DENSITY TEST CMT WT. CHECK SOIL SAMPLE CAY OF STARTED BACK FINE OF SPAN 1020 CMT OF MIX & ACCUSED S OF MIX & ACCUSED S OF MIX & ACCUSED S	302 307 12-1-0 16CK 554 50K CM 54 BAK. 312 51K. 12-2-6 12-2-6 12-3-6	Cloudy Cloudy CON S. BUT THET COM, WEEN N. P. THET COM, THE TOM, THE	Rain Rain RAIN RAIN RACTIO	EAST	Fög
1400 1430 1445 1500 1530 1530	omats are represented on site saley to observe operations of the commandativities of an infect green enables of the elegation of the commandativities of an infect green enables of the elegation contactor radius of the except of the enables, the contractor radius of the enables, the enables of the enables	This DFR is Preliminar as evidence that field observation dustions and/or commendations.	RONE ON R. TORING WILL OF INSTANT	z Est A-4 ' 119. id.	nal – A final report is an	
eld Representații	A Dhille	:	Reviewed By:		Date:	

	Geotechnical Engineering • Engineering Ge Environmental Management • Water Reso	Repo	ort #:			Date: / 1/2-"	3412-4-6
oject Name	B-850 Soil REMED	Proje	ect Num	ber: LAW 1	278	Page	
eld Rep:	Town Dhilly		ect Mana	-			
ope of Work:		Itility Trench Doth	er	Hours Charged:	Full Time	☐ Part Time	
ontractor:	CERRUDO		d.	AL Sunny	□ Windy	Г Нот	☐ Mild
ontractor Rep	presentative: 4NDY BE	<i>≃</i> // Condi	tions:	Cloudy	Rain	Cold	27.62
		12-3-	4150 m 1571 m	<u> </u>			
omment/ Sk	and the second s	,,,					
	SPRD 10 % CAY			. !		2067.7.1.1.14	764
501	Low DADINS	111 -1	בייאר. באיר שבינו	W 7. 37		1	
0810	MIX + REMIX P BACK FILL AROUND	HO TONE D	HE K	1-111 14 KG	OUND CT	K- MOR	TITORING LA
	MIX & DEMIX D						
1000	DUNSITY TEST		<u></u>				
1000	DENSITY TEST	3					
1030	SOIL SAMPLE	TORCYL.	BRE	c.			+
	DENSITY TEST						
	CHECK WY DE	17. 3/M					
1145	DE SUSTY TEST						
1545	SOIL SAMPLE FOR	l cyl. BRA	6- /	WER A	JROKE 7	DNGUE	מב בתנת מתומים
1630	DENSITY TEST.			+++-			
		12-4	-09	. - - - -		1	
0100	SES CREW PA	ACOD ±15	"KI		MLLIFT)	or ale	
12	Ill over Entill.	E PAD IN	500	10A 14-	תידומיש איני	1 25.01	red
15	Y SES USING OWEN SHAPED 3	WROBE M	MARK	EDE!	Som, Enter	U ALSO T 31	21
12	RITHIN - WELDE	D TANKIN		silone a	31000	140	
	37RO CM 7 10;			we are	11 KZ120		
1045	MIXAREMIX						+-
	MIXER BROKE						
1200	MIXER FIXED	+ BACK TO	MA	XING 1	ozo em		
1300	SOIL SAMPLE,	FOR CYL.	13/2	K			
マコル	DENSITY TES		1				
345	CHECK WHIW	T. on en	1	10% 3	300		
500	CHECK WHY W SOIL SAMPLE DENSITY TES DENSITY TE	OGL. BAK.	,				
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dentified, to form opinio our client. The presence a obligation to meet contr s and opinions. The c	onals are represented on site soley to observe operations of the con- ors about the adequacy of those operations, and to report those opin- and activities of our field representatives do not relieve any contractor ractural requirements. No one except our client may rely on our contractor relains sole responsibility for site safety and the methods, instruction.	This DFR is Prelimi solely as evidence that field obser or conclusions and/or recommende from and shall take precedence over	rvation was pe ations conveye	d in the final report may vary	This DFR is Fi service. Any conclusions devaluated by the profession	rawn from this report shi	instrument of professional ould be discussed with and
identified, to form opinio our client. The presence a s obligation to meet conti	ons about the adequacy of those operations, and to report those opin- and activities of our field representatives do not relieve any contractor itactural requirements. No one except our client may rely on our contractor retains sole responsibility for site safety and the methods,	solely as evidence that field obser or conclusions and/or recommenda	rvation was pe ations conveye	rformed. Observations and/ d in the final report may vary	service. Any conclusions d	rawn from this report shi	instrument of professional ould be discussed with and

Project Nam	e: R. R.	Cal AFREST	DIATION	Report		nber: 🖊	Vertical Contraction of the Cont	1279	Page	11-30 70	#
Field Rep:		NILIPS		Project			W7 / 5	7-7-1	rage	<u> </u>	_
Scope of Work:	Mass Grading		Utility Trench	Let_Other		Hours Char	ged:	Full Time		Part Time	
Contractor:	CER	PUDO				✓ Sunn	v	☐ Windy		Hot 🔲	Vil
Contractor R	epresentative:		BEIL	Condition	ns:	☐ Clou		☐ Rain		k Cold	7 7 5
Curve#		Descr	ption		0.00	Density	Opt. Moistur	e Required Com	paction	Required Moi:	
90109-01	BRNSOW	ShT W/5	15 10% CM	97	10	7.0	185	2 90%	ed Color Jane 1980	☐ Opt. + 2%	,
1164-01	21 11	11 11	11 11	DIPTY	16	6.5		□ 95%		⊿ Opt. + 2%	
71409-01	MIXBAN	504547	1 2/55		11	14.5	14:		:	Other:	
		<i>).</i>									
	mil=	· Montl	TORING	א דינוני	شوم						
Test#		Location		Elevation	1.000	et Density (pcf)	Moisture Content	Dry Density (pcf)	Curve	# Percent Compaction	
Augus (Arrang Arra)	1	1-30-	09					Marketin Community of the All Community of the Community			
1	+ 30'50	DOFE	Th. mus	1312	1	18.0	1914	98.8	A	92	
2			TRMW	11	1	19.8		101,0	Ź		
		2-1-8									
/	± 60 u	107 N.	nul	17/3	11	9.3	22.2	97.6	ß	92	
2	±60'N			11	11	18.6	22-6	96.7	Ī	91	
	1%	7-2-0	7								
	±80'W	OF LTI	e mu	1313	1	195	21.7	98.2	14	1 92	L
2	@ A-4	PIT		-3'56	11	1818	12.3	105,7	C	92	L
	13	7-3-0	9								
		e mu	/	1314	11	18.5	23.0	96.3	A	90	
	± 70 W.	NW.O.	FN.MW	11	11	19,4	23.4	96.8	A	90	L
<u> </u>	8 A-4	PIT		-2 56	: //	18.3	13.7	104.0	C	9/	L
4	=6'W	FETA	Mus	1314	10	21.7	22.8	99.1	A	93	
	13	2-4-0	9								
	7 90 N.	NWOF	N.MU	1315	1	18/5	22.6	96.7	A	90	L
2	- 40 N	OF CT	Emus	, !	10	21.9	215	103.0	A	94	L
<u>J</u>	=120 N	WOFC	TR.MW	, ,	11	8,4	20,4	98.3	A	92	_
5,			···								L
ractor identified, to form opia ons to our client. The presenc	sionals are represented on site s nions about the adequacy of thos te and activities of our field repres ntractural requirements. No one	e operations, and to report th entatives do not relieve any o		PFR is Prelimina				This DFR is service. Any conclusion evaluated by the profess	s drawn fron	final report is an instrument n this report should be disc	of p
findings and opinions. The operations, and sequences of	e contractor retains sole respons	iblity for site safety and the		nd/or recommendation ake precedence over th	ose indic	ated in a prelimi		evaluated by the profess	T	u.	
			~								

		ETS COMPA					AILY	FIELD	REPOR'	T
	Geotechnical Eng Environmental M	gineering • Engine lanagement • Wat	ering Geology er Resources	Report #	:			Date:	2-9-	£
Project Nam	B-850	Soil Ag	MEDIA TIC			MU12	79	Page _	of _	_
Field Rep:	Toog D	hfhi/	15	Project M	/lanager	:	T			_
Scope of Work:	Mass Grading	Pavement	Utility Trench	Other	Hours	Charged:	Eull Time	☐ Pa	art Time	
Contractor:						Sunny	☐ Windy		Hot 🔲	М
Contractor R	epresentative:			Condition	" PL	Cloudy	□ Rain	A	Cold 🗆	Fo
Equipment		Туре		Nu	nber		Nuclear Nuclear		Mex.	
Compaction	BON	nA6		/	,	Density Testing Equipment	☐ Tube			
Moving	BON	DER					☐ Sand Co	one		
Water		The second second			-,-,-		Native			
Support						Fill Source	☐ Import			_
Plan		Enginee	Y Zan II II. Sancya	D D	ate	Fill Location:	111	1:2	0,-/	
Civil						-/	9-9	(D)	7/	
Structural			·			4				
Geotech				\$\$4.500 ₀₀₀ 0000000000000000000000000000000	(A. 200 - 20	rgaçor parawayayaya		642224		100
Curve #		Descr	. 1	C 261-994-7670-F1 101-91	Max Densi	<u> </u>	54-9101 2-140-4-936-65-697-515	Mahadija prigras	Required Moi	in pro
11409-01	MIX BA	48D4 =	81.7 W/S.	'S'	114	5 14.5			Opt. + 2%	
		- 					95%		9pt. + 2%	ó
							Other	: <u></u>	Other:	_
					unen			Tar at Service Co.	1	# K
Test#		Location.		Elevation	Wet Den (pcf)	sity Moisture Content	Dry Density (pcf)	Curve#	Percent Compaction	
1	A-4	27		-1'36	1191	1 1417	103.8	A	91	T
2	12-41	2,5		rSG	118.		104.6	1	91	†
	77-7			730	1134) ///	10-1-6		71	\dagger
									<u>-</u>	+
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omment/Cleatel										_
omment/ Sketch:										
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IOTICE: Our firm's profes	sionals are represented on site so ions about the adequacy of those	oley to observe operations of	f the con-	R is Prolimina	- A prolimina	ary report is provided	This DFR is	Final - A final	report is an instrumen	nt ·
ns to our client. The presence	ions about the adequacy of those e and activities of our field repres ntractural requirements. No one e contractor retains sole responsi	entatives do not relieve any o	or conclusions and	R is Preliminary that field observation /or recommendations c	onveyea in the	mai report may vary	service. Any conclusion evaluated by the profess	is drawn from thi	s report should be dis	icu
ndings and opinions. The perations, and sequences of	construction.	ouncy ror site safety and the	from and shall take	e precedence over those	indicated in a	preliminary report.				_
		/////		1				1		
Field Representa	1 1. 111		Date:		Reviewed B			Dat		

Geosphere Consants, Inc.

Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	Report #:			Date://2-7 To 12-10		
roject Name: B-150 Soil REMEDIA Trans	Project Nu	mber: LAW 17	1	Page of		
eld Rep: Tary Phillips	Project Ma					
ope of Work: Affass Grading Pavement Utility Trench	O ther	Hours Charged:	E Full Time	☐ Part Time		
ontractor: CERAUDO SERV.		□ Sunny	□ Windy	☐ Hot ☐ Mild		
ontractor Representative: ANDY BELL	Conditions:	Cloudy	Rain	Cold Grog X5		
omment/Sketch: SUS CREW DECONTAR 9 THE OFF PALLED ACCESS CONDITIONS, ShIP, TRIPS, FAIR 4 POSSIALE FROST BITE DE LINK 4 SUS WAS IN FORM 4 MYSELF, BUT WORK CONTINUE WEST, & SOUTH SIDE OF SUS CREW CONTINUE WEST, & SOUTH SIDE OF IN STAIT WADDLES IN CEMENT (CONCRETE SA PUCLINIER PIPE USWAN	S ROAD S ARA WE TO WED OF PAR S TO S TO S TO S TO S TO S TO S TO S TO	E GRIFTE AND S. FOUND THE MAN E COUNT, THE SE ON AS S. TO SELON EG SELON EG SELON EG SELON AS S. T. A. A. A. A. A. A. A. A. A. A. A. A. A.	ED A + WEATHER BORNA GOOD HA SUNTA SUNTA SUNTA CAEW SACK TO PUE CA	TOTATAK. TOTATAK. TOTATAK. TOTATAK. TOTATAK. TARDS TEDAY TOTAK. D'S BY CERRUA. TY NO MEERDE TY NO MEERDE TY NO MEERDE TY NO MEERDE TY NO MEERT. TY KED NEAT. TO GEAL. OF		
CTRIMES 4 @ N. MUS. BALK FILL & COMPACT	0-24, NE7- 9-4, PI J-10	7, W-850 71. 7 DENSIT -09	-2416, 1 Y TEST	NET-28, TAKEN.		
SCS CREW CONTINUE WADDLES ON SLOPES OF LY OF SOIL @ JEEP T	or set RAIL A	ster A-X	1. C. A P.	T PLACE PLSO EXCAUPTED LACE MIRARY		
		preliminary report is provided performed. Observations and/		al – A final report is an instrument of professional wn from this report should be discussed with and		

Geosphere Concants, Inc.			AILY F	IELD REPORT
Geotechnical Engineering · Engineering Geology Environmental Management · Water Resources	Report #:	B-583005	2	Date: 127-1009
Project Name: LLNL Site 300 8850 Soil A.	Project Nur	nber: LAW L		Page of
Field Rep: Robert Wibe	Project Mar	nager:	lickerman	<u> </u>
Scope of Work: Mass Grading Pavement Utility Trench.	☐ Other	Hours Charged:	Full Time	☐ Part Time
Contractor: Cerroido	Conditions:	Sunny	Windy	☐ Hot ☐ Mild
Contractor Representative: Andy Bell	Condidons.	Cloudy	Rain .	Cold D Fog
Comment/Sketch: 12 7 09 Mon Break #536 @	7 dou	350 psi	94m	
#56a@			· · · · · · · · · · · · · · · · · ·	
#589@	3 days	24.7 DSi	LO AW	
# 59a@	3 strys	260 PSi	10:30	
	4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
540	w,	Cloudy 3	2°F	
/12/8/09/The				
Break # 546@7	7 a) ave	290 Bi	10 Am	
45510				
# 556 @ 7	aays	310 ps1	llam	
	Sun	ny 35° F		
12 9 09 wed		! ·/ · · · · · · · · · · · · · · · · · ·		
12/9/09 Wed			++	
Bres # 566 @	2 6 da	y 320 p	si 8:30	Am
#57 % @	2 6 day	5 310 ps	: 9 Am	•
# 58 b C		15 390 ps	1 7:30	ım
# 59 h @		15 360 ps	i 10 Aw	~
		5,44 3	s°F	
[12/10/09/1-1.	1	Janny)		
2-1-01 72hu				
- Reports				
- lab work	1			
NOTICE: Our firm's professionals are represented on site soley to observe operations of the con-	<u> </u>			
tractor identified, to form opinions about the adequacy of those operations, and to report those opin- tions to our client. The presence and activities of our field erpresentatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client pay rely on our or conclusions and/or	at field observation was recommendations conve	preliminary report is provided performed. Observations and/ yed in the final report may vary		 A final report is an instrument of professior awn from this report should be discussed with a al involved.
months and sequences of construction. The manufacture is an expension of contraction recains sole responsibility as the support of the sequences of construction.	recedence over those indi	cated in a preliminary report.		
Field Representative Date: 12/16	Revi	ewed By:		Date:

Date	Density Designation for Cement Treated. Fill in area Ax	Location: Northing / Easting	Elevation MSL	Wet Den.	Dry Den.	% Moist	90% min.
11/4/2009	53' south of MW 11:30am	`		116.8	94.7	23.3	92.00
11/4/2009	70' west NW of MW 3pm	, , , , , , , , , , , , , , , , , , , ,		120.8	99.8	21.1	96.00
			·				
11/9/2009	96' west of MW 11:30am		1305	116.5	93.2	25	92.00
11/9/2009	96' west NW of MW 11:45am	DUPLICATE	1305	116.4	93.7	24.6	93.00
11/9/2009	40' west NW of north MW 2:45pm		1305	121.4	99.8	21.6	92.00
11/10/2009	33' north NE of MW 10:30am		1306	118.5	99.7	18.8	94.00
11/10/2009	at center of MW		1306	113.4	90.4	25.4	90.00
11/11/2009	54' north of center of MW 10am		1306	116.2	93.9	23.8	93.00
11/11/2009	48' north NW of center of MW 3:45pm		1306	118.5	99.6	19	94.00
				411=	05.0	00.5	
11/12/2009	8' south of center of MW 9:45am			114.7	95.2	20.5	91
11/12/2009	40' west of north MW 11:30am	DUPLICATE		117.4	99.2	18.3	94.00
11/12/2009	at center of MW 11:40am			105.2	87.2	20.6	84
4411075555	-540 44/40/00		1308	112.7	94.6	19.1	90.00
11/16/2009	retest of #3 11/12/09	<u></u>				19.1	93
11/16/2009	54' west of center of MW	DUDUCATE	1308 1308	117.8 120.7	98.4 99.7	21.1	95.00
11/16/2009	40' north of center of MW	DUPLICATE	1308	113.8	96.4	18	90.00
11/16/2009	at north MW		1300	113.0	90.4	10	30.00
44/47/0000	60' north of north MW		1308	118.8	98.2	21	94
11/17/2009	30' north NE of center of MW		1308	121.5	101.3	20	96.00
11/11/2009	30 Hold NE of Center of MAA		1000	121.0	101.0	20	30.00
11/19/2009	21' south of center of MW		1308	117.9	96	22.8	93.00
11/18/2003	27 Journ of Jornal of Wife				7		
11/23/2009	87' west of north MW			116.7	97.3	20	92.00
11/20/2000							
11/30/2009	30' SW of center MW 12pm		1312	118	98.8	19.4	93.00
11/30/2009	40' NW of center MW 4pm		1312	119.8	101	18.6	95
12/1/2009	60' west of north MW 12pm		1313	119.3	97.6	22.2	94
12/1/2009	60' north of center MW 3:15pm		1313	118.6	96.7	22.6	94
12/2/2009	80' west of center MW 12:20pm		1313	119.5	98.2	21.7	94
12/3/2009	at center MW 10am		1314	118.5	96.3	23	94
12/3/2009	70' west NW of north MW 11am		1314	119.4	96.8	23.4	94.00
12/3/2009	6' west of center MW 4:30pm		1314	121.7	99.1	22.8	96.00
12/4/2009	90' north NW of north MW 1pm		1315	118.5	96.7	22.6	94
12/4/2009	40' north of center MW 3:45pm		1315	121.9	100.3		96.00
12/4/2009	120' NW of center MW 4:45pm		1315	118.4	98.3	20.4	94.00
	,			<u> </u>		<u> </u>	<u> </u>

					Max	Test	
Sample Date		Break Date	Sample Location/ Time/	unit wt.	Load	Strength	moist. C
time molded	4" diam.	time	%cement	wet	(lbs)	(psi)	
11/9/09 11:30am	44a	11/12/09 9am	shell/ 10:45am/ 10%	116.50	3659	290	24.70%
11/9/09 11:40am	44b	11/16/09 12pm	shell/ 10:45am/ 10%	116.50	4533	360	24.70%
11/9/09 12pm	45a	11/12/09 9:20am	Ax/ 10:45am/ 5%	116.40	2407	190	27.20%
11/9/09 12:30pm	45b	11/16/09 12:20pm	Ax/ 10:45am/ 5%	116.40	3371	270	27.20%
11/9/09 12.30piii	700	11/10/03 (2.20)	700 10.4001117 070	110.40	0071	 	21.2070
11/10/09 11am	46a	11/12/09 9:40am	shell/ 10:30am/ 10%	118.50	3443	270	25.10%
11/10/09 11:20am	46b	11/17/09 10am	shell/ 10:30am/ 10%	118.50	4892	390	25.10%
11/10/03 11:20411	100	11/1/100 100111	0,10,1,10,000,11,10,70	1	.002		
11/11/09 10:30am	47a	11/16/09 12:40pm	Ax/ 9:30am/ 5%	116.20	1681	130	23.20%
11/11/09 11am	47b	11/18/09 10am	Ax/ 9:30am/ 5%	116.20	2280	180	23.20%
71711700 114111		11710700 100111	700 0.000111 070	110.20			20.2070
11/12/09 10:30am	48a	11/16/09 1pm	Ax/ 9:30am/ 5%	114.70	1756	140	20.00%
11/12/09 10:30am	48b	11/19/09 8:30am	Ax/ 9:30am/ 5%	114.70	2130	170	20.00%
11/12/03 Talli	400	11/19/03 0.30aiii	700 0.00dilli 070	117.10	2100	 	20.0070
11/16/09 2pm	49a	11/19/09 8:50am	Ax/ 1:30pm/ 10%	117.80	3100	250	21.20%
11/16/09 2:20pm	49b	11/23/09 1pm	Ax/ 1:30pm/ 10%	117.8	4171	330	21.20%
an lorus z.zupiil	-100	1 (120) OO IPHI	7 to 1.00pin 1070	117.0		000	-1.20/0
11/17/09 2:30pm	50a	11/19/09 9:10am	Ax/ 1pm/ 10%	118.80	4533	360	17.20%
11/17/09 2:50pm	50b	11/24/09 9am	Ax/ 1pm/ 10%	118.80	4764	380	17.20%
11/11/09 2.50piii	000	11/24/03 3411	700 (pin) 1076	110.00	7707	300	17.2070
11/19/09 12:30pm	51b	11/23/09 1:30pm	Ax/ 12pm/ 10%	117.90	3586	290	24.90%
11/19/09 12:30pm	51b	11/25/09 1.50pm	Ax/ 12pm/ 10%	117.90	3922	310	24.90%
Thraida thin	J1 D	11/25/09 94/11	AX 120111 1070	117.00	JOEL	3.0	24.3070
11/23/09 12pm	52a	11/25/09 9:30am	Ax/ 11:30am/ 10%	116.7	3029	240	21.10%
11/23/09 12:30pm	52b	11/30/09 9am	Ax/ 11:30am/ 10%	116.70	4163	330	21.10%
11/25/09 12.50pm	020	11700700 04111	707 11.004117 1070	110.70	4100		21.1070
11/30/09 12pm	53a	12/3/09 10am	Ax/ 11:30am/ 10%	118.00	3193	250	23.60%
11/30/09 12:30pm	53b	12/7/09 9am	Ax/ 11:30am/ 10%	118	4356	350	23.60%
11/30/04 12.30piii	000	12/1/00 Jaili	700 11.00dm/ 7070	1,10	7000	000	20.0070
12/1/09 11:30pm	54a	12/4/09 12:30pm	Ax/ 11am/ 10%	119.30	2630	210	22.40%
12/1/09 11:30pm	54b	12/8/09 10am	Ax/ 11am/ 10%	119.30	3644	290	22.40%
12/1/09 12pm	55a	12/4/09 1pm	Ax/ 3pm/ 10%	118.6	2430	190	25.50%
12/1/09 3.30pm	55b	12/8/09 11am	Ax/ 3pm/ 10%	118.60	3321	260	25.50%
121 1700 TPIII	300	izioroo i lalli	7.00 OPIN 1070	1.10.00			20.0070
12/3/09 11am	56a	12/7/09 9:30am	Ax/ 10:30am/ 10%	119.40	4061	320	23.60%
12/3/09 11:30am	56b	12/9/09 8:30am	Ax/ 10:30am/ 10%	119.40	4083	320	23,60%
12/3/09 4:15pm	57	12/9/09 9am	Ax/ 3:45pm/ 10%	121.70	3863	310	23.00%
.2.0.00 T. 10pill		i acoros ocini	7 00 0. (Opini 1070			717	_0.0070
12/4/09 1:45pm	58a	12/7/09 10am	Ax/ 12:45pm/ 10%	118.50	4453	350	20.20%
12/4/09 2pm	58b	12/9/09 9:30am	Ax/ 12:45pm/ 10%	118.50	4856	390	20.20%
12/409 3:45pm	59a	12/7/09 10:30am	Ax/ 3pm/ 10%	121.90	3321	260	23.10%
12/4/09 4pm	59b	12/9/09 10:30am	Ax/ 3pm/ 10%	121.9	4525	360	23.10%
121-11 OU TOIL			7.00 02000 1070	1			
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	Geosphere Cont				AILY F	IELD REPORT
	Geotechnical Engineering • Eng Environmental Management • 1	gineering Geology Water Resources	Report#:	B-583005		Date: 12/4-17/09
Project Name	: While Site 300 F	3 850 Soil R.			280	Page of
Field Rep:	hobert Win	be	Project Ma	nager: Cal D	ickelman	1
cope of Work:	Mass Grading	nt Utility Trench	Other	Hours Charged:	☑ Full Time	☐ Part Time
Contractor:	Cerrendo			Z Sunny	□ Windy	☐ Hot ☐ Mild
Contractor Re	epresentative: Andy	Bell	Conditions:	Cloudy	Rain -	Z Cold □ Fog
The second second	ketch: 12/14-1. Ch 12/17/09 50 50 50 10 10 10 10 10 10 10	Jan mon.	1 mix	ils lab	for to	ausphot
	B 850, 4 scarified over night	and w	is ou	er ojot. me	nst, and	rea was
tor identified, to form opir to our client. The presenc n its obligation to meet co	sionals are represented on site soley to observe operations about the adequacy of those operations, and to re and activities of our field representatives do not reliev intractural requirements. No one except our client occurrence contractor retains sole responsibilities site safety as construction.	port those opin- e any contractor nay rely on our op conclusions and/o	nat field observation was r recommendations conv	preliminary report is provided performed. Observations and/ eyed in the final report may vary licated in a preliminary report.		al – A final report is an instrument of professi wn from this report should be discussed with involved.

Geosphere Cons ints, Inc. JAILY FIELD REPORT AN ETS COMPANY
Geotechnical Engineering - Engineering Geology
Environmental Management - Water Resources B 583005 Report #: Project Name: LLNL Site 30) B850 Soil & Project Number: LAW 1280 Page Dickerman Project Manager: Cal Field Rep: **✓** Full Time Hours Charged: ☐ Part Time Scope of Work: Mass Grading Pavement Utility Trench Other Contractor: Sunny ☐ Windy ☐ Hot ☐ Mild Conditions: ☐ Rain Cold Contractor Representative: ☐ Fog ☐ Cloudy ☑ Nuclear Equipment Number Type: TYOX **Density Testing** ☐ Tube Compaction Equipment Moving ☐ Sand Cone Water Native Jn Fill Source Support ☐ Import Plan Fill Location: Engineer Date Civil 30 ×10 aven Structural jarge bin Geotech Max Density Opt. Moisture Curve# Description Required Compaction Required Moisture 4 Bm 7080901 16.5 **Ø** 90% 113.5 Opt. + 2% **5**95% Opt. + 2% to 5% Other: Other: Dry Density (pcf) Wet Density Moisture Percent Pass/ Test# Location Elevation Curve # (pcf) Content Compaction Fail LO'E and 10'S of NW COVERS 91 ĺ 103.2 70809-01 FSG is Nand WW of SECOME 2 20.3 104.9 92 Comment/ Sketch: NOTICE: Our firm's professionals are represented on site soley to observe operations of the con-tractor identified, to form opinions about the adequacy of those operations, and to report those opin-ions to our client. The presence and activities of our field representatives do not relieve any contractor This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report. This DFR is Final - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Reviewed By:

Date:

D	FR	Page	1 ((04-08)

from its obligation to meet contractural requirements. No one except our client ma findings and opinions. The contractor retains sole responsibility for site safety and

Field Representative

Geosphere Consants, Inc.

	Geospher		ants, Inc.				JAILY	' EIEI	D RE	DUB.	т
	Geotechnical E	ETS COMPA ngineering • Engine Management • Wat	ering Geology	Reper		. 642 20 /	JAILI	Date			291
Project Name			१४० डां।	<u>, </u>	±#: B S t Number:	83005 LAW	1280	Page		of	
Field Rep:	Robert	+ Uri	ve	4.	t Manager:	Cal D		May	$\overline{}$		
Scope of Work:	Mass Grading	Pavement	Utility Trench	☐ Other	Hours (Charged: .	Full Time		Part Tim	e	
Contractor:	Cern	ido			∠ s	unny	☐ Windy		Hot		Mild
Contractor R	epresentative:	Andy 1	3ell	Condition	ons:	loudy	☐ Rain	P	Cold		Fog
Equipment		Type			Number .		Nuclear	Ту	pe:	(ex	
Compaction	Shee	eos for	4			Density Testing Equipment	☐ Tube		<u> </u>	<u> </u>	
Moving		7 /00	<u>, </u>			Equipment	☐ Sand C	one			
Water							☑ Native	. 3.4	ح الح		
Support						Fill Source	☐ Import	<i></i>			
Plan		Enginee			Date	Fill Location:	ш лироге				
Civil		security of the		700.832.7		@ NO	27-09	M	W		
Structural						_					
Geotech		and obtains an anomalan ann				Name of the second state of the second		Sour-reverse	terminanes	war wo curred Twares	
Curve #		Descri	ption		Max Density	Opt. Moistu	re Required Con	paction	Rei	quired Moi	sture
090109-01	Bm 5a	ndy sift	· w/55		107 K	18.5	2 90%			pt. + 2%	Ď
		<u>'Qlu</u>	s#10%, ce	ment			□ 95%			pt. + 2%	to 5%
							Other	:	Ø 0	ther:	
			· · · · · · · · · · · · · · · · · · ·						over	· opt.	
		3001 201 301 1 C 201 1			Wet Densi	tv Moisture	Dry Density			Percent `	Pass/
Test#	11.000	Location		Elevation	(pcf)	Content	(pcf)	Curve		mpaction	Fail
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Z	2'5 n		4	-1' FSG		22.8	101.3	. 1	9	' 5	
3	1'5 W	,	"	rfsg		20.5	97.4		. 4	7/	
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Aydos MW A pad a still	vc7-09 to south	nues p nues p nues nues nues parred	compact of MW	t sou	was d the side and l	de of south up	up all area o , par ed , s	mor Al to mal	ning f te l de	ope inp	at
tractor identified, to form opinions to our client. The present	sionals are represented on site ilons about the adequacy of the e and activities of our field repr intractural requirements. No o e contractor retains sole respon construction.	ose operations, and to report the resentatives do not relieve any c	ose opin- ontractor solely as evidence y on our or conclusions and	that field observal /or recommendatio	ary – A preliminary ion was performed. Ins conveyed in the fi hose indicated in a pi	nal report may vary	This DFR is service. Any conclusion evaluated by the profes	ns drawn from	n this report :		

Geosphere Con: ints, Inc. ∠AILY FIELD REPORT AN ETS COMPANY eotechnical Engineering • Engineering Geology nvironmental Management • Water Resources Date: 12 Project Name: LLNL Site 30 386 Soil R Project Number: LAW 1280 Robert Idribe Project Manager: Cal Dickerman Field Rep: ☐ Part Time Mass Grading Pavement Utility Trench Other Hours Charged: **✓** Full Time Scope of Work: remuda Sunny Contractor: ☐ Windy ☐ Hot ☐ Mild Conditions: Cold C ☐ Cloudy ☐ Fog Contractor Representative: ☐ Rain Nuclear Type: Type Number Equipment **Density Testing** ☐ Tube Compaction Equipment Moving ☐ Sand Cone Water D Native In Site Fill Source Support ☐ Import 12 22 Plan Engineer Date Fill Location: Jecp (wad; # 2-4 east A.#4) #/ Civil Structural #1-2 east of R.#4 Geotech Required Compaction Curve # Max Density Opt. Moisture Required Moisture bron soundy sitt w/ss wy com 18.5 107.0 **Ø** 90% Opt. + 2% □ 95% Opt. + 2% to 5% Lt Brn sandy sift R 113.5 K.S 🖊 Other: Other: above apt Dry Density **Wet Density** Moisture Pass/ Test# location Elevation Curve# (pcf) Compaction 15 west of austonal A 95 FSG 101.3 18.9 s'E and 10's of large Vallet - 2' FSG 103.6 ${\mathfrak B}$ 91 2 i7. i 93 4 ·1'FSGI 3 11 19.5 105.3 11 18.5 91 R F55 102.7 5'E and 30's of large Voltel -1.5'F56 B 9Z. 16.6 104.1 5'5 and 40'5" 12 23 17.4 67.6 B 95 Comment/Sketch: Tests # 2 - 4 on 12/22 were taken in 20 x 15 area along east side of Route 4 and south of V-ditch Tests #1-2 on 12/23 were then along east side of Route 4 south of buge V-dutch NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those epinions to use client. The presence and activities of our field representatives for our field representatives for our field representatives of unclient experiments. We not relieve any construction finding to all opinions. The contractor relatives of responsibility for size sales and the method of the contractor relatives of responsibility for size sales and the method of the contractor relatives of responsibility for size sales and the method of the contractor of This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report. This DFR is Final - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved. Reviewed By:

12/22

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12/23

AN ETS COMPANY	AILY FIELD REPORT							
Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	Report#: B 583005	D	Pate: 12 21-23 09					
oject Name: LLNL Site 300 8650 Soil K.	Project Number: LAW 1	280 P	age of					
eld Rep: Robert Wilde	Project Manager:	Dickerma	m					
pe of Work: Mass Grading Pavement Utility Trench	Other Hours Charged:	☑ Full Time	☐ Part Time					
ontractor:	☐ Sunny	□ Windy	☐ Hot ☐ Mild					
ontractor Representative:	Conditions: 🔲 Gloudy	□ Rain	□ Cold □ Fog					
omment/sketch: IZ Zi oq Mon SCS cont. Cut apper part of n north side o bench cut on ea	f clean pile st side of Ca	picked, cont. i	up rocks					
	road and along) s growte	d to top,					
	Jeep soad com Le of dean pite,	paction of	along Side at 11 Am					
our client. The presence and activities of our field representatives do not relieve any contractor solely as evidence the soligation to meet contractural requirements. No one except our client may rely on our or conclusions and/o	is Preliminary - A preliminary report is provided hat field observation was performed. Observations and/ r recommendations conveyed in the final report may vary recedence over those indicated in a preliminary report.		 A final report is an instrument of profes from this report should be discussed wit volved. 					
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	Geotechnical Engineering • Engir Environmental Management • W	neering Geology ater Resources

AILY FIELD REPORT

Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	Report #:	Date:	
Project Name: UNL Site 300 B857	Project Number: 10-0128	Page of	
Field Rep: ROBERT ON DE	Project Manager: Cal Di	ckerm	an
Scope of Work:	Other Hours Charged:	☐ Full Time	☐ Part Time
Contractor:	☐ Sunny	□ Windy	☐ Hot ☐ Mild
Contractor Representative:	Conditions:	☐ Rain :	Cold Pog
Comment/Sketch: 12/28/09 mon SCS comprated	2pprox 4" of m	catavial	on east
side of Rowle #1 son prevented testing work on bench cut and removed fabric of rain in an hour on cann	t, removed and AB un	y at cattle of designates	Az, B1, garals
indles in ear to south side of workers in Route standing nater	+ #4 , eleaned	p , put	np road
ns to our client. The presence and activities of our field representatives do not relieve any contractor solely as evidence the orn its obligation to meet contractural requirements. No one except our client may rely on our or conclusions and/or	is Preliminary - A preliminary report is provided at field observation was performed. Observations and/ recommendations conveyed in the final report may vary recedence over those indicated in a preliminary report.		nal - A final report is an instrument of profession rawn from this report should be discussed with an al involved. Date:



"Partners in Quality"

February 16, 2010

Mr. Steve Ellis Lawrence Livermore National Laboratory P.O. Box 808; L-871 Livermore, California 94551-0808

Subject:

LLNL B-850 Soil Remediation

B850-S300 Livermore, CA

CEL Project #10-01282-LAW & 10-01283-LAW

EARTHWORK AND LABORATORY TESTING SUMMARY

January 4, 2010 through January 17, 2010

CEL representatives observed site operations and/or performed nuclear gauge moisture and density determinations on compacted soils at the above project from January 4, 2010 through January 17, 2010. Laboratory testing from previous work on soil samples were used to evaluate the field results. Enclosed are the results of the field and laboratory testing.

We submit the density tests as presented in this report. We recommend that you confirm with the Project Engineer, SCS Engineers, to accept the density results submitted in these tests. It is the responsibility of LLNL to review and after consulting with SCS Engineers, approve these test results.

Eric J. Swenson, PE, GE

Principal Geotechnical Engineer

Respectfully submitted,

Michal At Wison K

CONSOLIDATED ENGINEERING LABORATORIES

Michael Wissink

Project Manager

Daily Field Reports

Distribution:

Enclosures:

1 to Addressee

MW/EJS: pmf

R:\Geotech Projects by Number\LLNL\LLNL Bldg 850 Excavation and Remediation Plan - 95% Submittal\Monthly Summary Reports\01 January 2010 Summary.doc

AN ETS COMPANY				FIELD REPORT		
Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	-Report #:	3005	Date: 1 4-7	10		
Project Name: LLNL Site 300 B850 Sail R.	Project Number: LAW 12	82	Page	of:		
Field Rep: Robert Uribe	Project Manager: Cal)	ickelman	·			
Scope of Work: Mass Grading Pavement Utility Trench	□ Other Hours Charged:	Full Time	☐ Part Time	108 - 40000 25- 30		
Contractor: Cerrudo	□ Suriny	□ Windy	☐ Hot	□ Mild		
Contractor Representative: Andy Bell	Conditions: Z Cloudy	Rain	☑ Cold	□ Fog		
Comment/Sketch: 140 Mon - Mnd remared A - Small Stock pile	enaved from top	of Cam	A			
- two loads of hyrof - back hoe delivere - north side of clean - low areas filled no more than	N to site an pile graded	and track				
- BUG 850 clean 4 - Work cont. on clear	p cont. n pile, 3 to 1 slope					
- Sweeper and concert - hydro seed was mon 1/4/10/wed - conth. work on clean	red down to opp	iće tvai	lo			
- silt force around - areas to be patched	site was remove with AC were or	ed by LLN				
- work cont. on clear - Route #4 swepted	compacted in the pile and power washes			au		
D6 removed from Jeep road tested compacted NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequay of thuse operations, and to report those epin-	s Preliminary - A preliminary report is provided	Dete broug	al - A final report is an in	nstrument of professional		
ions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our or conclusions and/or r	t field observation was performed. Observations and/ ecommendations conveyed in the final report may vary keedence over those indicated in a preliminary report.	service. Any conclusions dra evaluated by the professiona	wn from this report shou	ld be discussed with and		
Field Representative: Date: 1/7/	Reviewed By:		Date:			

		TS COMPA						AILY	FIEL	D REPOI	RT
	Geotechnical Eng Environmental M	jineering • Engine anagement • Wat	ering Geology er Resources	Report	#:]	3/5	69005		Date:	, 710	
Project Nam	e: LLNL S	ite 300 I	5850 551 R	. Project			AW 128	7	Page		
Field Rep:	Robert	Uribe			Manag	er: (al Die	kerman			
Scope of Work:	Mass Grading	☐ Pavement	Utility Trench	Other	Н	urs Cha	rged:	☑ Full Time		Part Time	
Contractor:	Centro	do			<u> </u> _	Suni	ıy	□ Windy		Hot 🛘	Mild
Contractor R	epresentative:		Bell	Conditio		1 Clou	idy Fog	☐ Rain	Z	Cold 🗆	Fog
Equipment		Туре		, I	lumber	12.48 1.17 F. F. M.		Nuclear	Ту	pe: TVX	
Compaction	smooth	drun.	oller		1	D	ensity Testing Equipment	☐ Tube			
Moving	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,							☐ Sand C	one		
Water						20.00 20.00 20.00	reconstruction	Z Native	JN.	site	
Support							Fill Source	☐ Import			
Plan		Enginee	r 1910-1900 de la		Date	Fi	ll Location:				
Civil							•	side of		icess v	road
Structural							to MW	# NC7	-69		
Geotech					, francisk		(acyski.yz.sasz)			1244 - 13 To 122 - 13	
Curve#		Descri	ption	Part of Arabi Paramir	Max De	S. 10.5	Opt. Moistur		npaction	Required N	loisture
	Lt Bry	Sandy	Silt		113	.5	16.5	90%		Opt. + 2	
								95%		☐ Opt. + 2	% to 5%
B	Tan C	CLII 4	B		136	0	4.3	Other	: •	Other:	
										above	ypt.
					Wet I	ensity	Moisture	Dry Density		" Percent	Pass/
Test#		Location		Elevation		d)	Content	(pcf)	Curve	# Compaction	
l	40'NE of	Ronte	4	-1'F56	<u>.</u>		17.7	103.9	A	92	
Z	40'NE of	Route	4	rfsa			16.8	101.7	A	90	
3	224.0		so east	FAB	<u> </u>		6.3	134.5	В	99	
	center of	bep that	SO BROOK	1718			ر . و	151.5	15	- 1	
	of weeks	end		<u> </u>		**-		-			
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Comment/ Sketch		·/ K	on pile	5				1	<u></u>	<u>1</u>	1
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I th		1/2 /	acces	Road			•				
	- Accessory - Factor - Francisco		Con Contraction								
			1								
tractor identified, to form opi ions to our client. The presen from its obligation to meet of findings and opinions. The	sionals are represented on site so nions about the adequacy of those te and activities of our field repres entractural requirements. No one e contractor retains sole responsi	e operations, and to report the entatives do not relieve any o except our client may re	contractor solely as eviden ly on our or conclusions a	OFR is Prelimina ce that field observati nd/or recommendation ake precedence over the	on was perfo is conveyed ii	rmed. Obs the final r	ervations and/ eport may vary	This DFR is service. Any conclusio evaluated by the profes	ns drawn fror	final report is an instrur n this report should be d.	nent of professional discussed with and
operations, and sequences of		-11	Date: 1/	/2/10	Reviewe					Date:	
rieio nepresenta	uve		Date:/		Véviewe	u ву			<u>—</u> 1	naic	

JAILY FIELD REPORT

	Geotechnical Engineering • Engineering Geology Environmental Management • Water Resources	Report #:	Date: /-// To		
Project Name: B-850 Soil REMEDIA GON		Project Number: 4AU1283	Page of		
Field Rep: -	Tony Phillips	Project Manager:			
Scope of Work:	☐ Mass Grading ☐ Pavement ☐ Utility Trench	Hours Charged: Full Time	☐ Part Time		
Contractor:	CEARUDO SERV.	Sunny	☐ Hot ☐ Mild		
Contractor Re	presentative: TANDY BELL	Conditions: Cloudy Arain	Cold DiFog		
Comment/Ships	LECOMPACTED USING OF COMPACTED USING OF COMPACTED USING OF PROPER CONTINUES ON PACTION ACTION ACTION ACTION ACTION ACTION ACTION BRUMS THE SEA SEAN PULE 4 SEAN PULE 4 SEAN COTORS CREW SAW CUT		DIE JEED RD. RD. 15 HIGHER S NOT CONTINE ETO 1 3:12 ETO 1 3:12 ETO 1 3:12 EN OF DO AII ER EW ALSO TES RO. WE PERIMETER PAUED ROADS,		
	AREA 10 WX 15 L. X ; ER com PACTION.	1 = 4 N FROM THE 3-89 (" DEED + USED SMOOT 1-14-10	M SHOW SONTER		
6	SCS LATEN REMOVED ARTAS IN ROADURY, SORK. AL AN SITE MOOTH DROW ROUTER,	EMIPDED AL AROUND * THEK WHED EDGES ELOSOHAS, TEMP OF FOR COMPACTIONS ON	OF AC PATER		
6	SCS LATEN REMOVED ARTAS IN ROADURY, SORK. AL AN SITE MOOTH DROW ROUTER,	CHIPPED AC AROUND	OF AC PATER		
NOTICE: 0ur firm's professi	anals are represented on site solery to observe operations of the con- mon about the adequacy of those operations and to report those con- mon about the adequacy of those operations and to report those con-	EMIPATO A E ALOUAND THERE OIL ED EDGES POR COMMANTION OFFI BSD ACCESS NO. This DFR is	SOF AC PATEN AC PATEN AC PATEN S Final - A final report is an instrument of professional		
NOTICE: Our firm's profess tractor Identified, to formoginal lons to our diest. The presence from its obligation to meet con	onals are represented on site soley to observe operations of the consortation of the declaracy of those operations, and to report those opin-and activities of orified representatives for relative any contractor tractural requirements. No one except our client may rely on our contractor relations does responsibility of resignishing the methods, on the relative and the residence of the residence	EMIPATO A E ALOUAJA THERE OIL ED EDGES POR COMPARTION OFFI BSD ACCESS NO. This DFR is	S Final - A final report is an instrument of professional and drawn from this report should be discussed with and		

Geosphere Cons ints, Inc. JAILY FIELD REPORT ectechnical Engineering • Engineering Geology vironmental Management • Water Resources Date: /-//-/0 Report #: Project Number: LAW 1283 Project Name: B-850 SOIL REMEDIA Trong TONY Phillips Project Manager: Field Rep: Full Time Scope of Work: ☐ Mass Grading ☐ Pavement ☐ Utility Trench Other Hours Charged: ☐ Part Time CEARURO ☐ Hot ☐ Mild Contractor: ☐ Sunny ☐ Windy Conditions: Cold EK Fog Rain Type: Toylor Nuclear Number Equipment **Density Testing** SMEETH DRUM ROMAL Compaction ☐ Tube Equipment Moving ☐ Sand Cone Water Native Support ☐ Import MEAN DILE Plan Date Fill Location: Civil Structural Geotech Max Density Opt. Moisture **Required Compaction** Required Moisture 07/409-01 MIX BAN SANAY 91/ - U/85 **25** 90% ☐ Opt. + 2% □ 95% ☐ Opt. + 2% to 5% Other: Other: Percent Pass/ Wet Density Moisture Dry Density Location Elevation Curve # Test # Compaction (pcf) Content SOF CLERN PILE & FSG 113.8 17.2 105.6 A S. DF CLEAN PILE @ N'NOF DO All AD FS6 1226 18.5 Comment/Sketch: A= RT. #4 B = DO AN RD. E = CLEAN PILE XI = TEST #1

This DFR is Preliminary – A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report. Field Representative Reviewed By:

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erve operations of the con-is, and to report those opin-

Geosphere Con. ants, inc. AILY FIELD REPORT AN ETS COMPANY Geatechnical Engineering • Engineering Geology Environmental Management • Water Resources Report #: Date: 1-19-16 Project Name: B-850 South DEMEDIATION Project Number: 19413 Page Field Rep: Tom thillips Project Manager: Scope of Work: Mass Grading Pavement Utility Trench Other Hours Charged: Full Time ☐ Part Time ☐ Hot ☐ Mild Windy Contractor: Sunny Conditions: Cloudy Contractor Representative: Rain Cold D Fog Comment/ Sketch: RAIN! 1 SCS CAEW INSTALL SINT FENCH ON W. SIDE OF RT. 44 @ sowER OMP. ROAD CROSSING TOB SITE I OFF HAULED EQUID. TRAILER. FIXED FILTER FABRICIND. Z. & MUCKED 007 MUD ON S. SIDE OF 13-850 ACCESS AL

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contactor identified, to form opinions about the adequacy of those operations, and to report those opinions to our clear the presence and activities of our field representatives.

This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or or conclusions drawn from this report should be discussed with and from its obligation to meet contractural requirements. No one except our client may rely on our findings and applients. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

This DFR is Preliminary report is provided solely as evidence that field observation was performed. Observations and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

Field Representative:

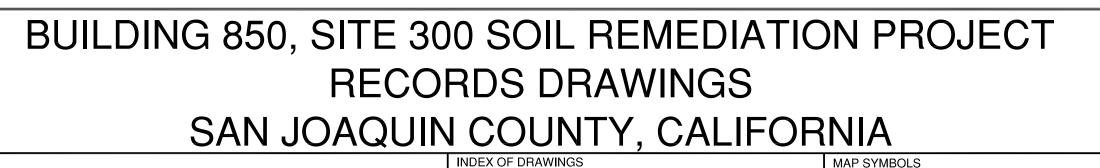
Date:

Reviewed By:

Date:



Building 850 Corrective Action Management Unit As-Built Drawings





Consultants

F - PRECAST CONCRETE, FUEL OIL WAULT

SCSENGINEERS

Environmental Consultants and Contractors

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RELEASED FOR CONSTRUCTION

APPROVED BY

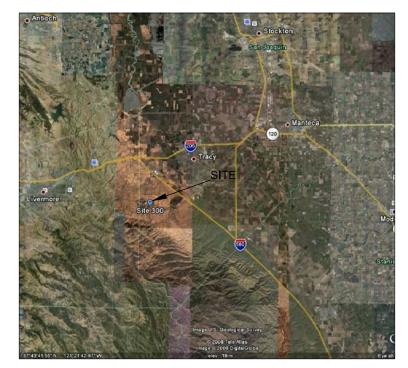
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Design:

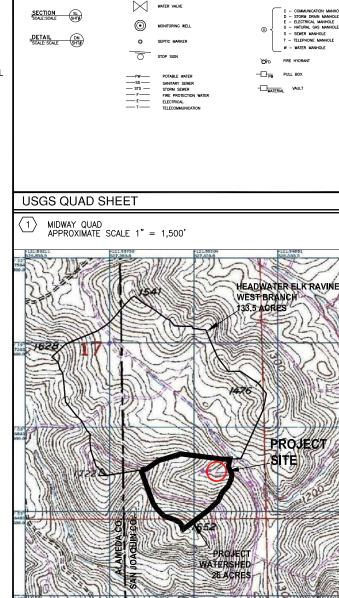
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Project Mngr.:



LOCATION MAP

DRAWING NUMBER: LOCATION MAP, VICINITY MAP, AND INDEX OF DRAWINGS PSC2008-0850-0001BA PSC2008-0850-0002BA SITE PLAN PSC2008-0850-0003BA DRAINAGE FLOW FEATURES EXCAVATION PLAN FOR IMPACTED PSC2008-0850-0004BA PSC2008-0850-0005BA CLEAN FILL OVER-EXCAVATION PLAN PSC2008-0850-0006BA FILL PLAN PSC2008-0850-0007BA CROSS SECTION: SECTION A CROSS SECTION: SECTION B PSC2008-0850-0008BA PSC2008-0850-0009BA CROSS SECTION: SECTION C PSC2008-0850-0010BA CROSS SECTION: SECTION D PSC2008-0850-0011BA CROSS SECTION: SECTION E PSC2008-0850-0012BA DRAINAGE CHANNEL PSC2008-0850-0013BA CMP LAYOUT PSC2008-0850-0014BA PSC2008-0850-0015BA SLOPE RESTORATION/STABILIZATION PSC2008-0850-0016BA SEDIMENT TRAP AND CHECK DAM PSC2008-0850-0017BA SEDIMENT TRAP UNDERDRAIN DETAIL PSC2008-0850-0018BA EROSION DETAILS PSC2008-0850-0019BA **EROSION DETAILS** PSC2008-0850-0020BA MISCELLANEOUS DETAILS PSC2008-0850-0021BA WELL EXTENSION DETAILS WELL EXTENSION DETAILS PSC2008-0850-0022BA PSC2008-0850-0023BA SOIL STAGING AREAS SOIL VERIFICATION SAMPLE RESULTS AND FINAL EXCAVATION PSC2008-0850-0024BA



ACRONYMS

- FIRE HYDRANT

WV - WATER VALVE

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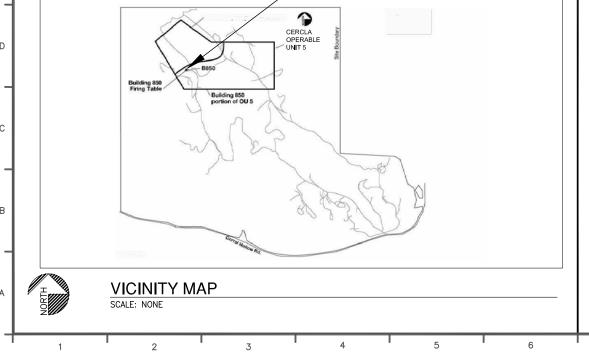
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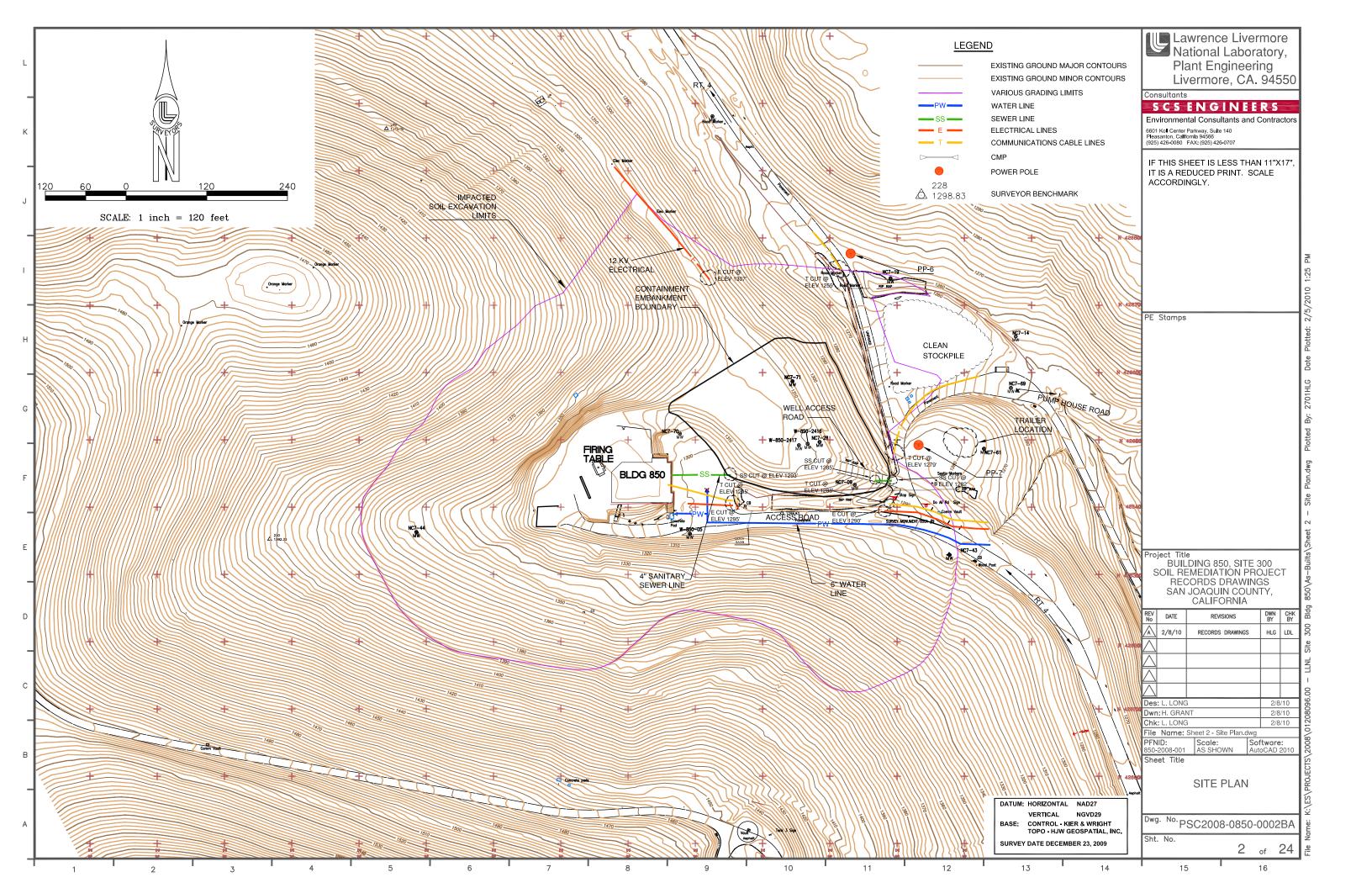
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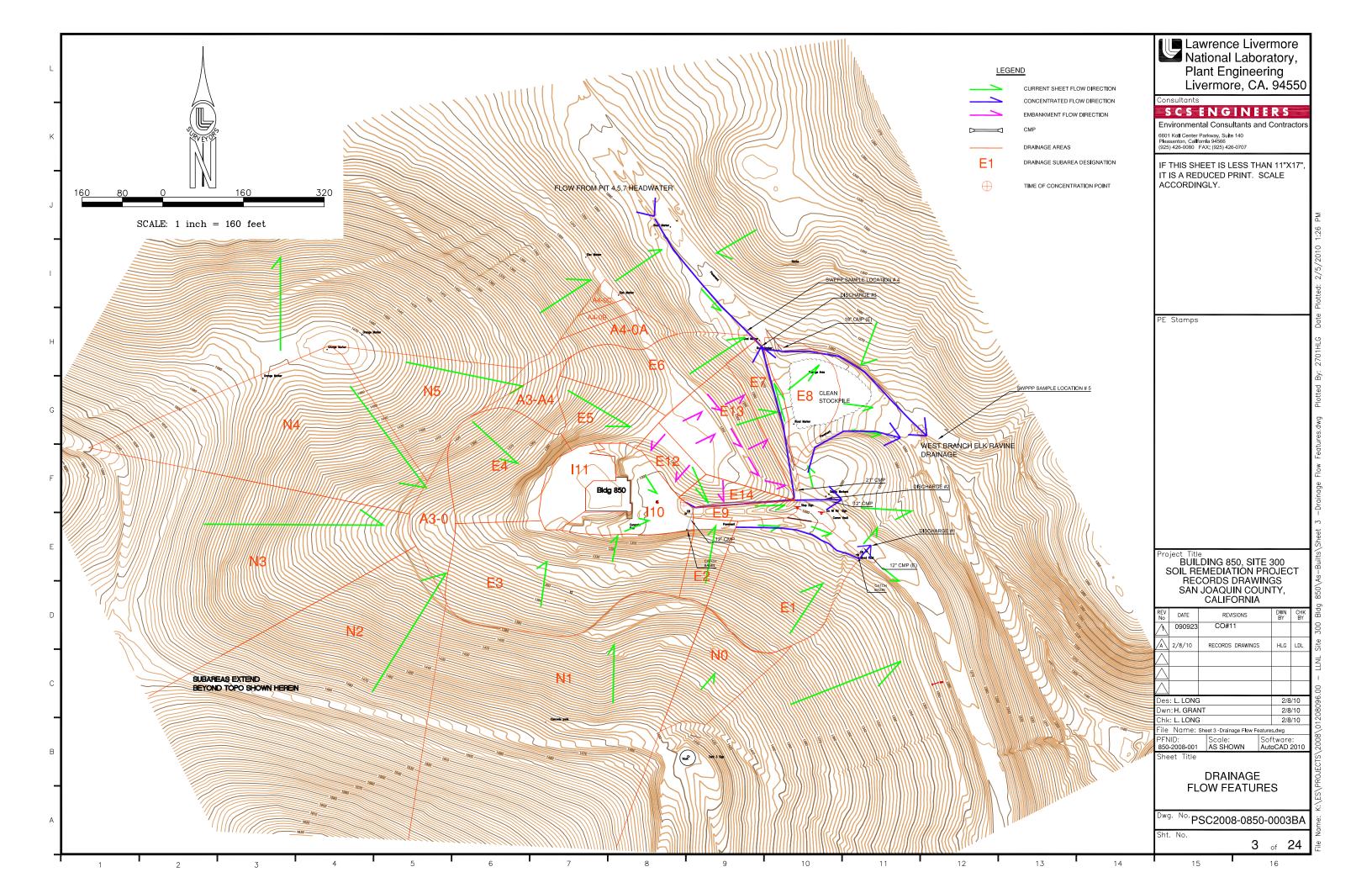
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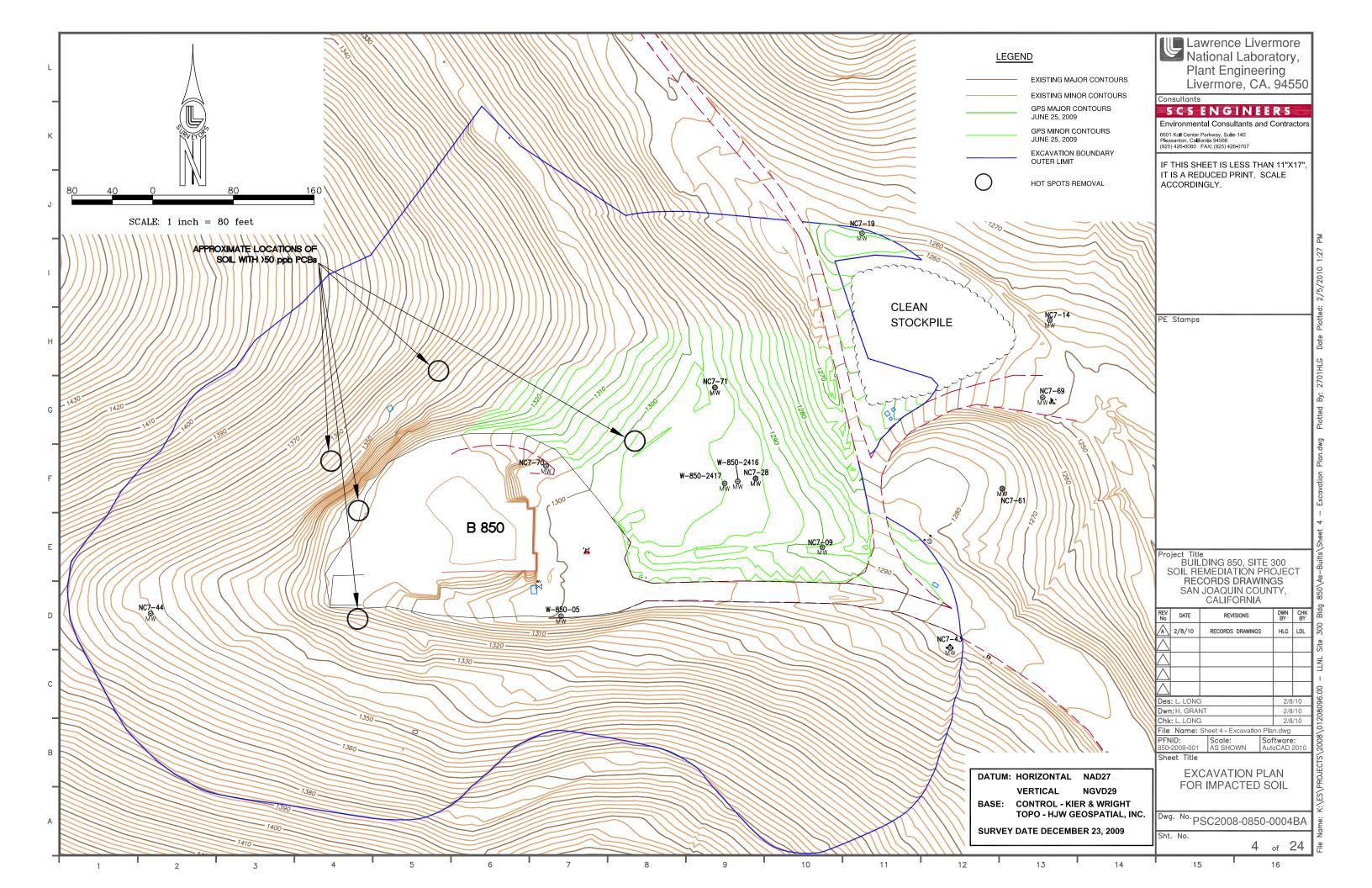
BUILDING 850, SITE 300 SOIL REMEDIATION PROJECT RECORDS DRAWINGS SAN JOAQUIN COUNTY, CALIFORNIA A 2/8/10 RECORDS DRAWINGS Des: L. LONG Chk: L. LONG File Name: Sheet 1 - Title Sheet.dwg Software: LOCATION MAP, VICINITY MAP, AND INDEX OF DRAWINGS Dwg. No. PSC2008-0850-0001BA

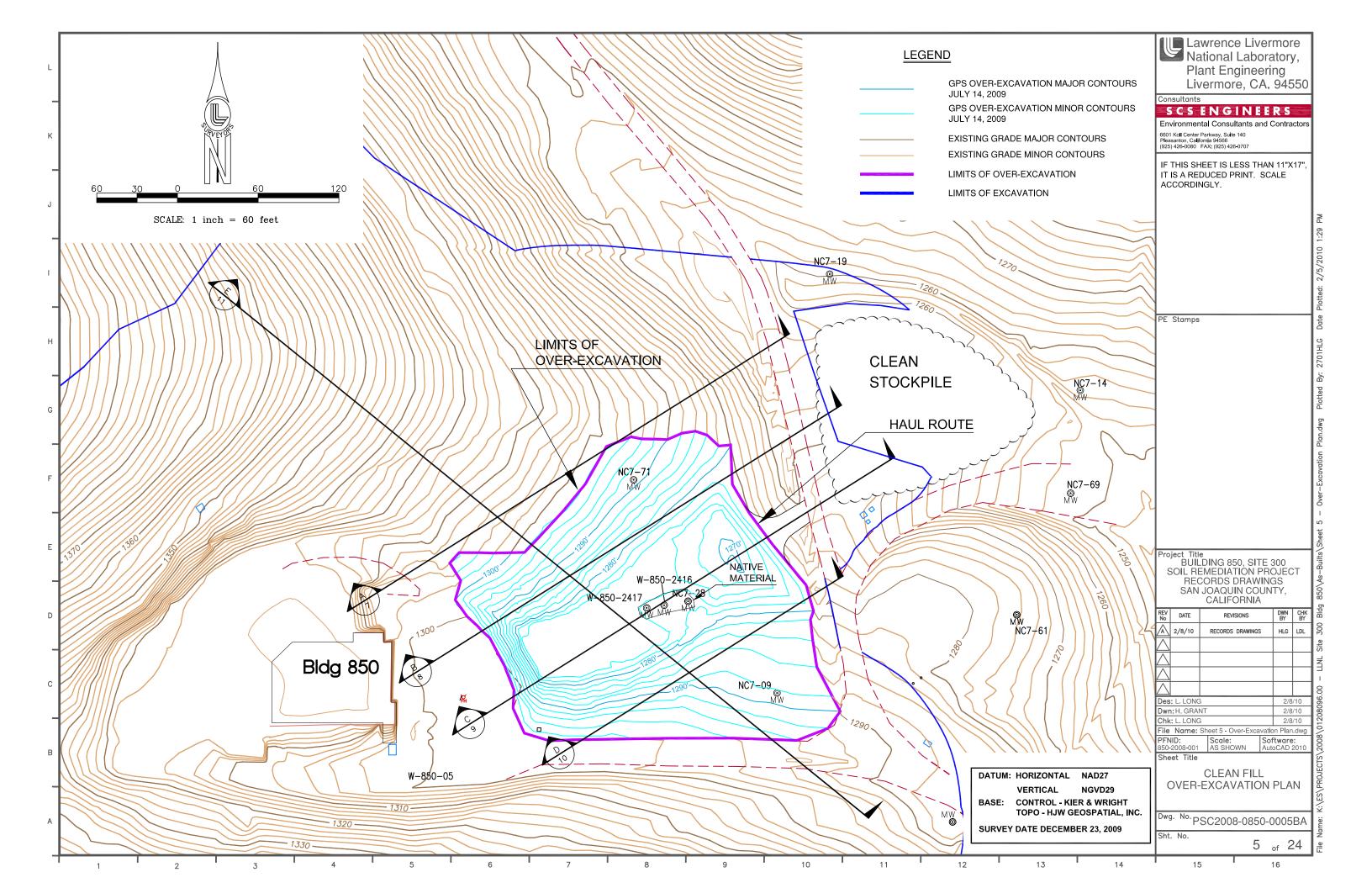


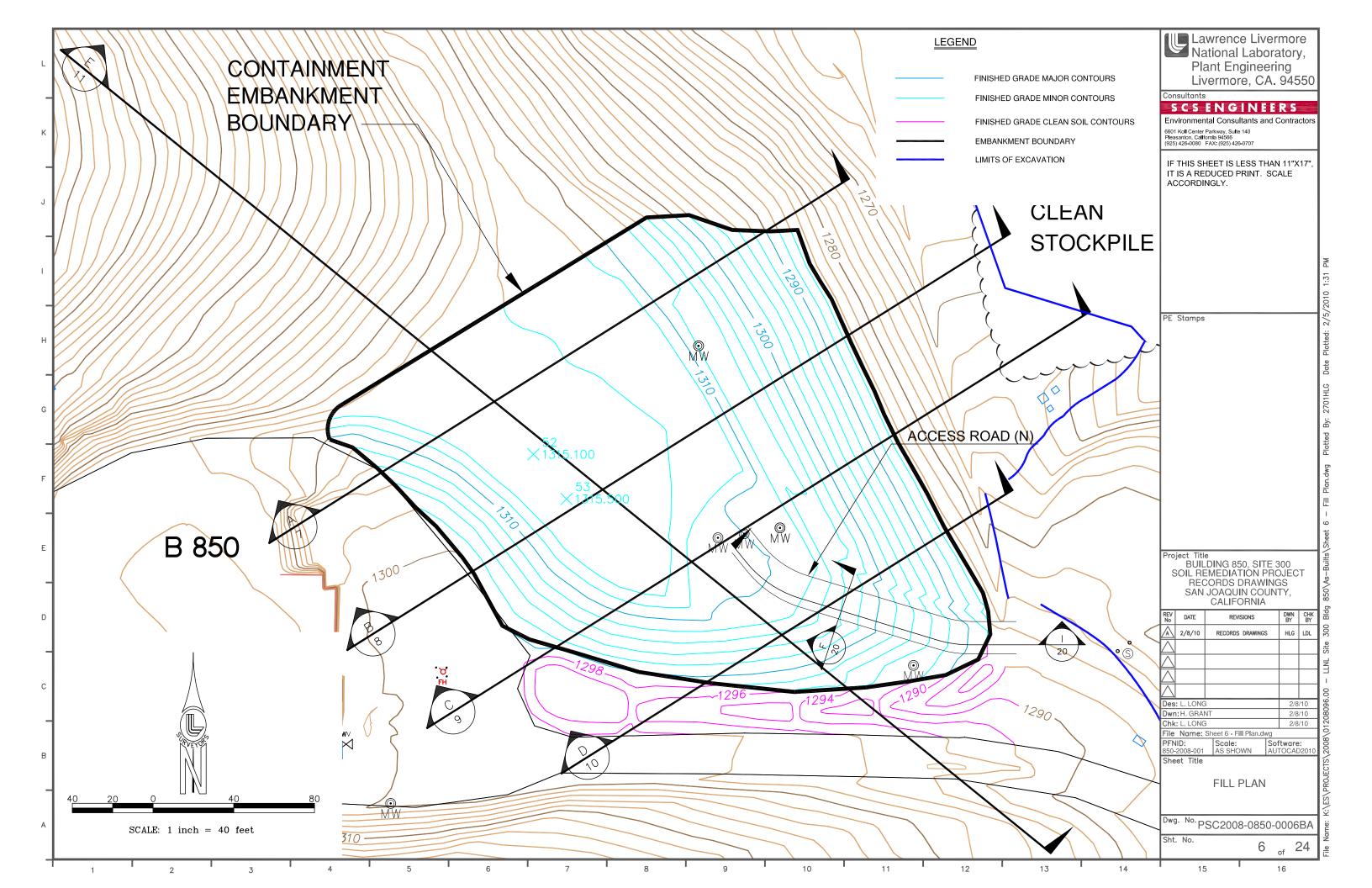
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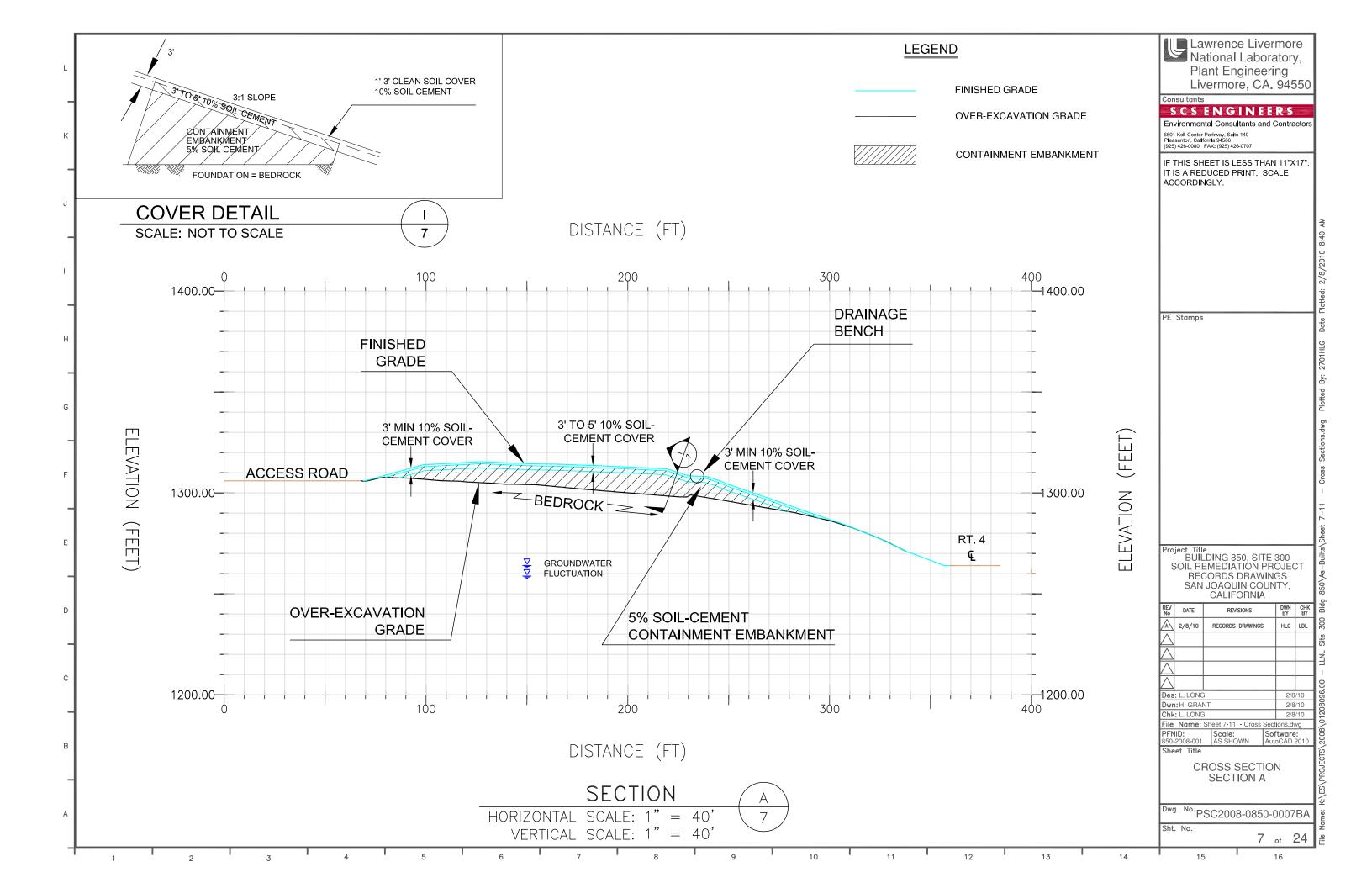


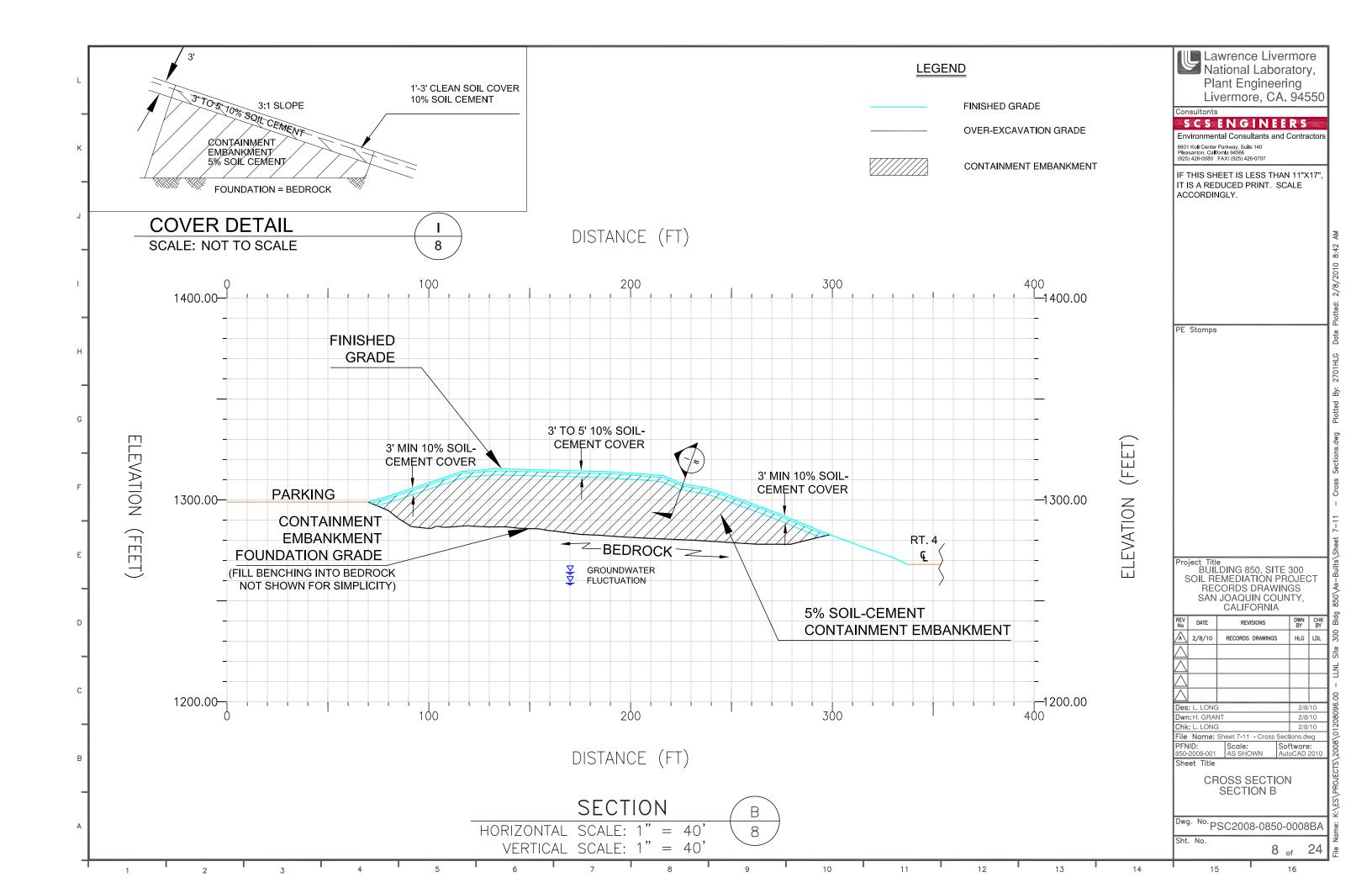


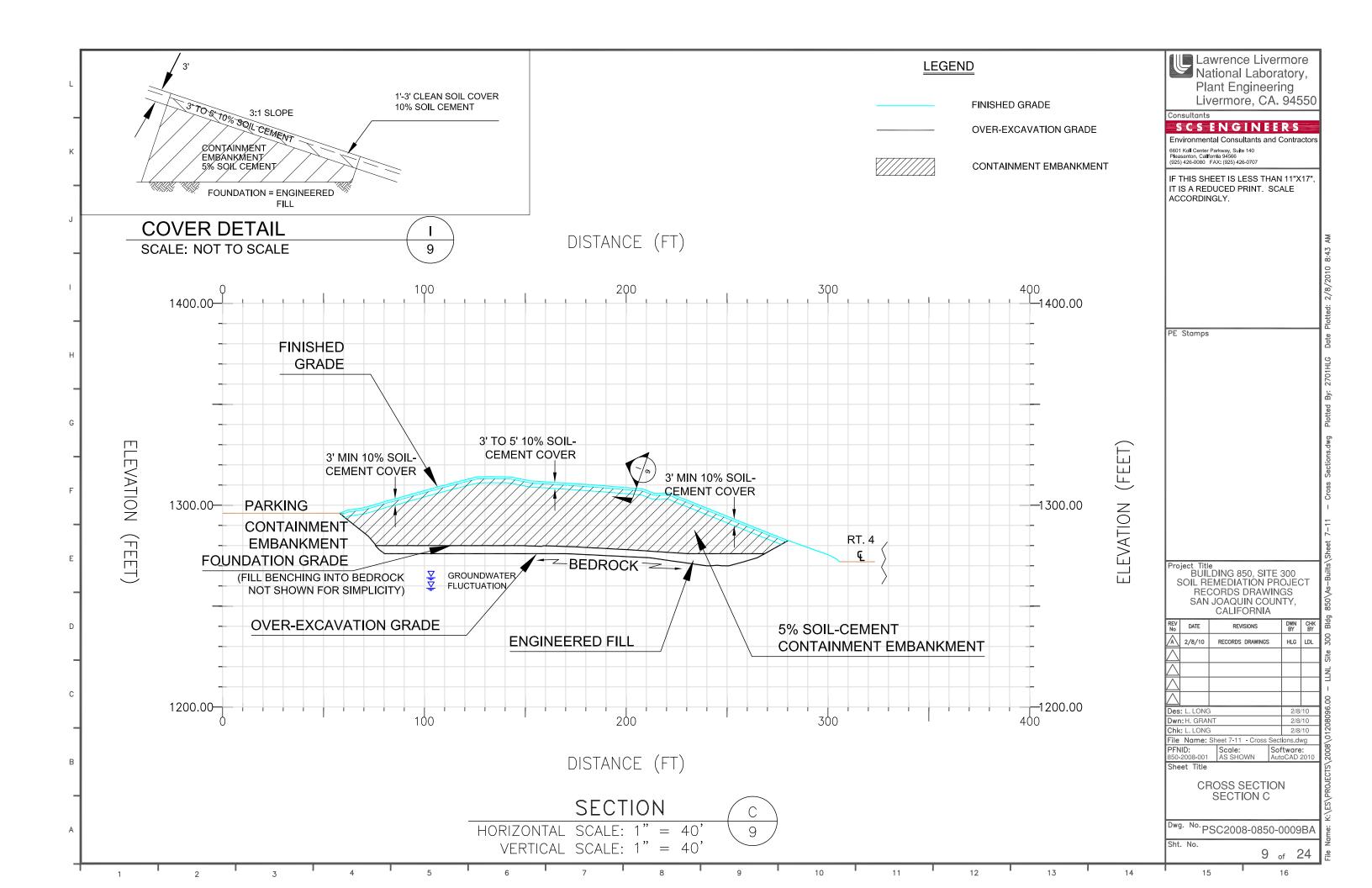


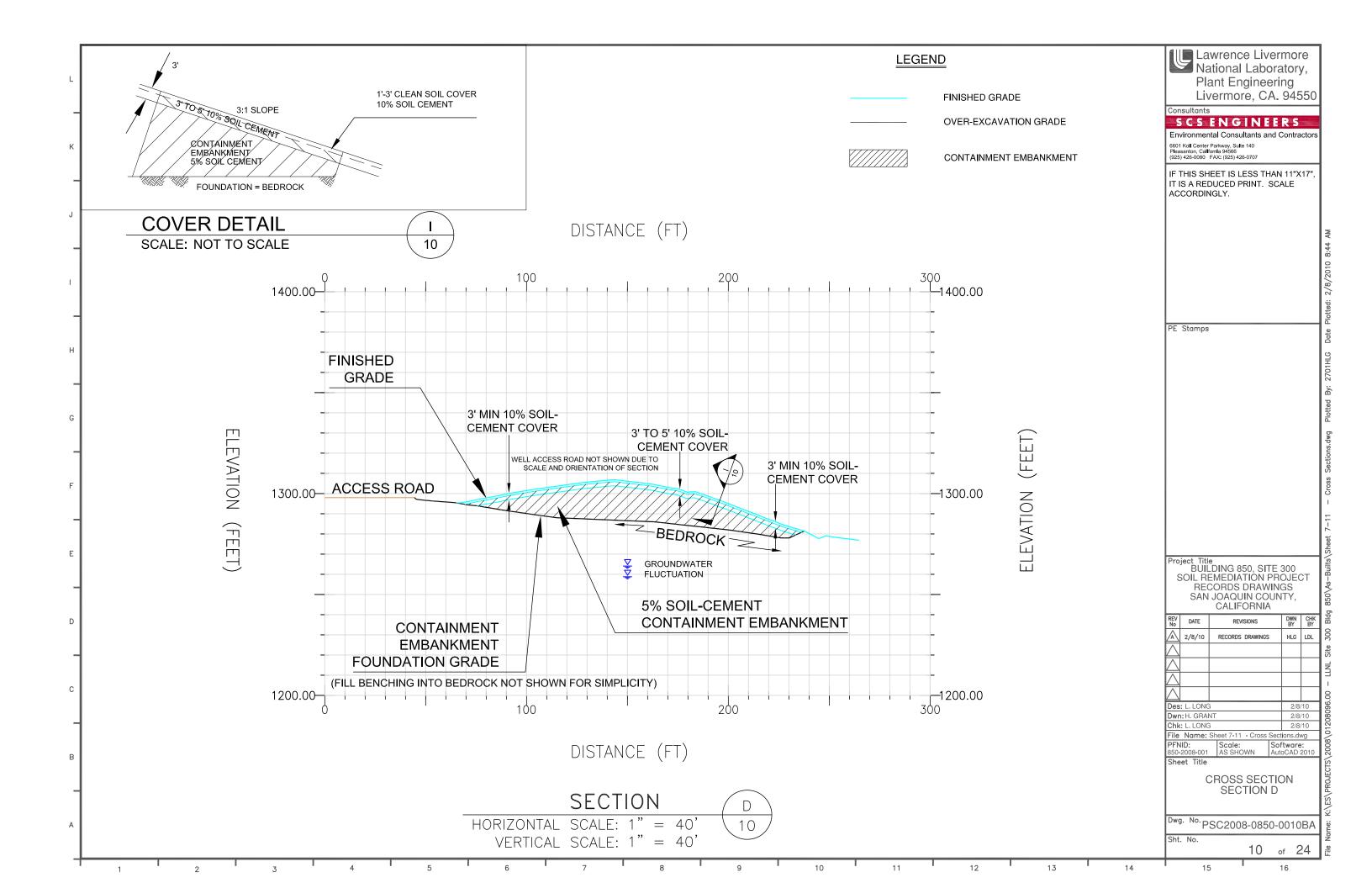


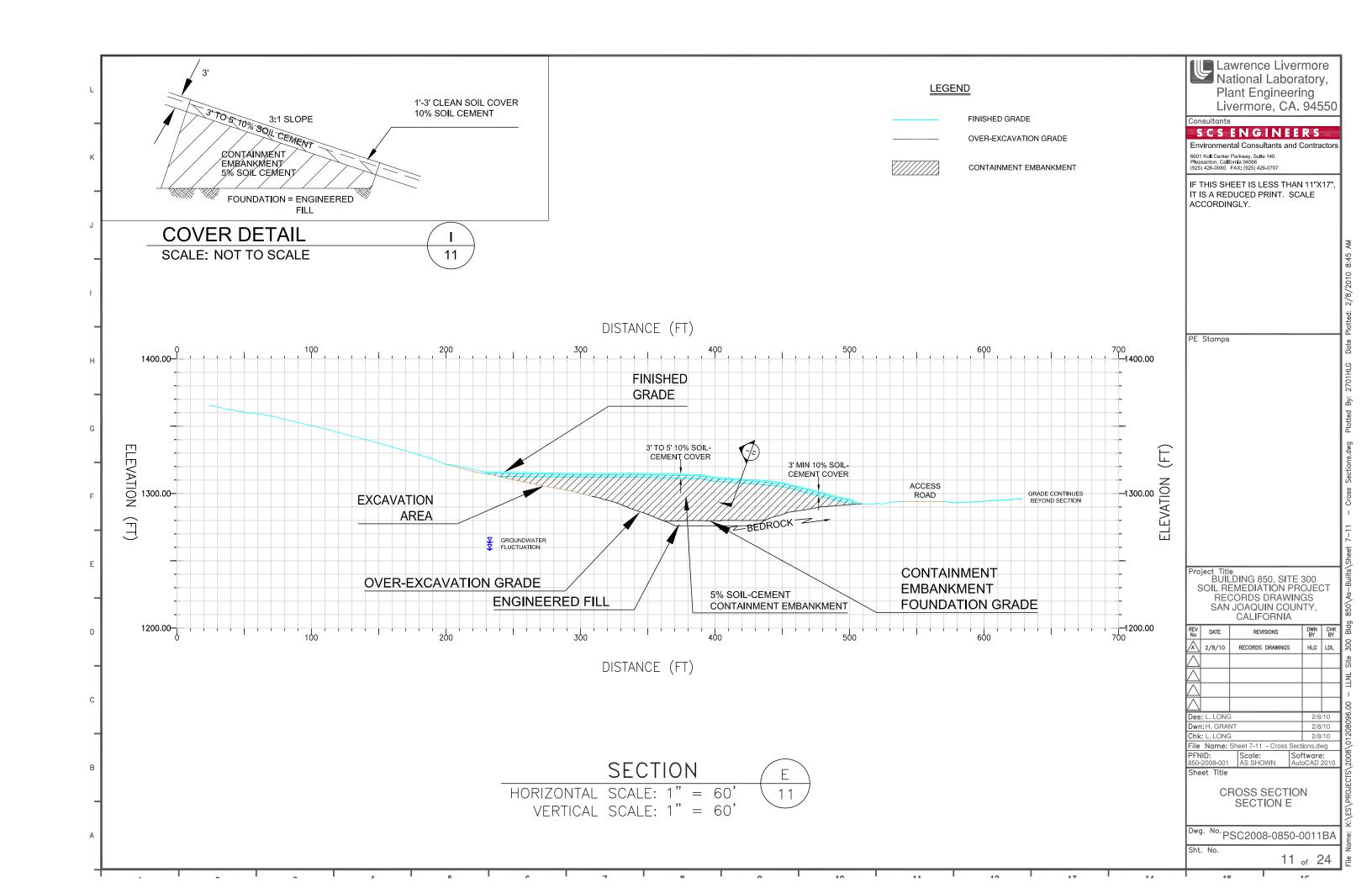


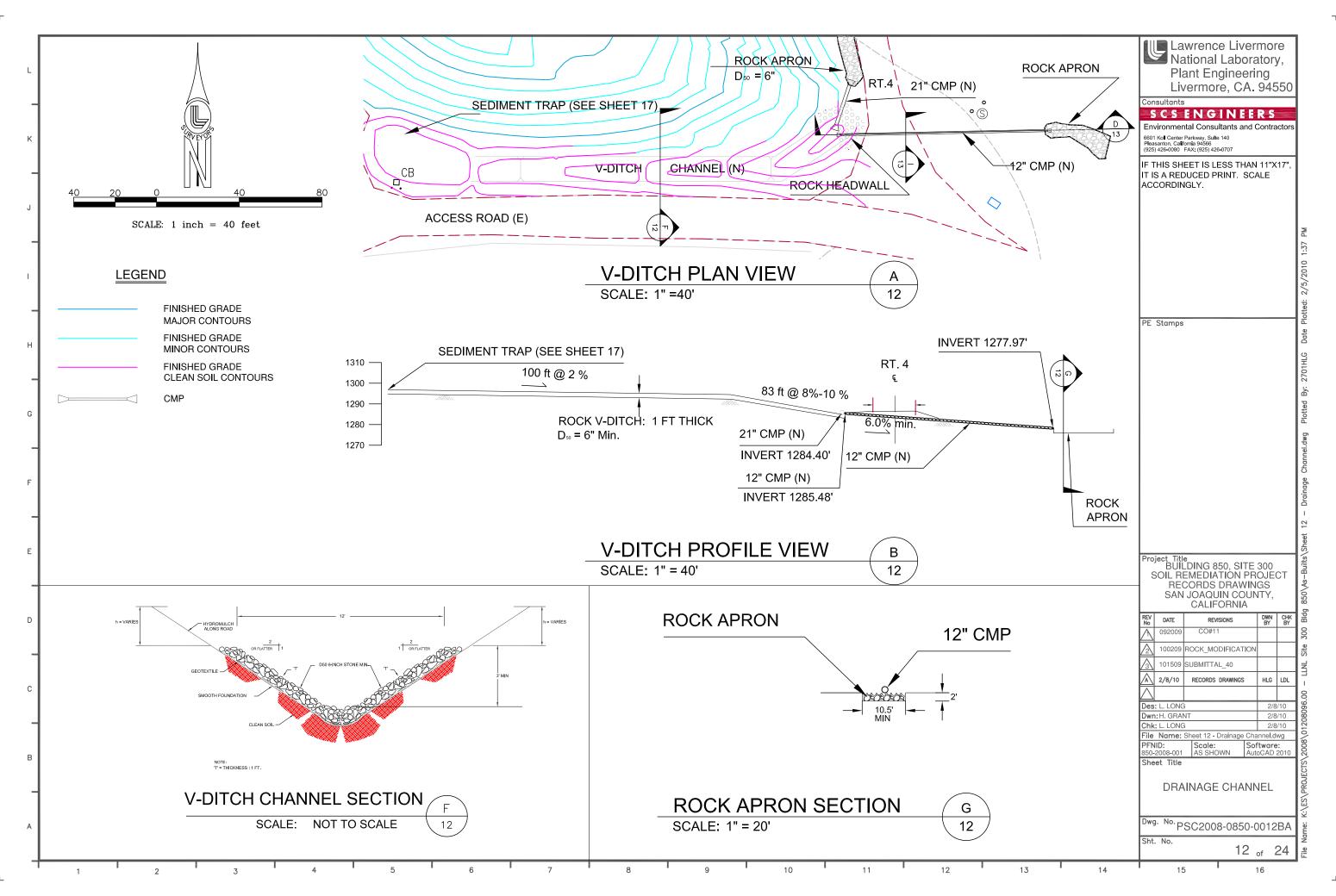


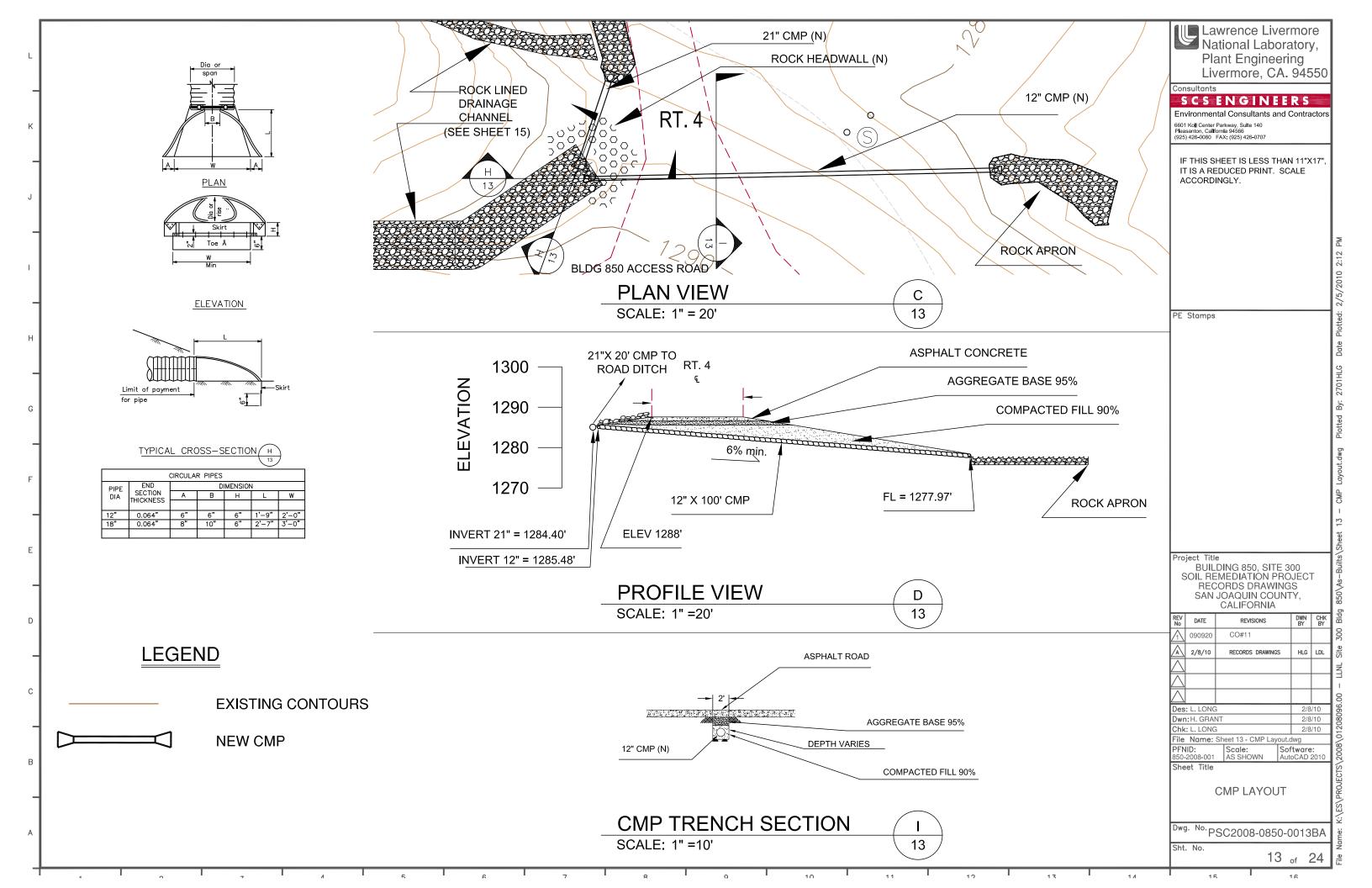


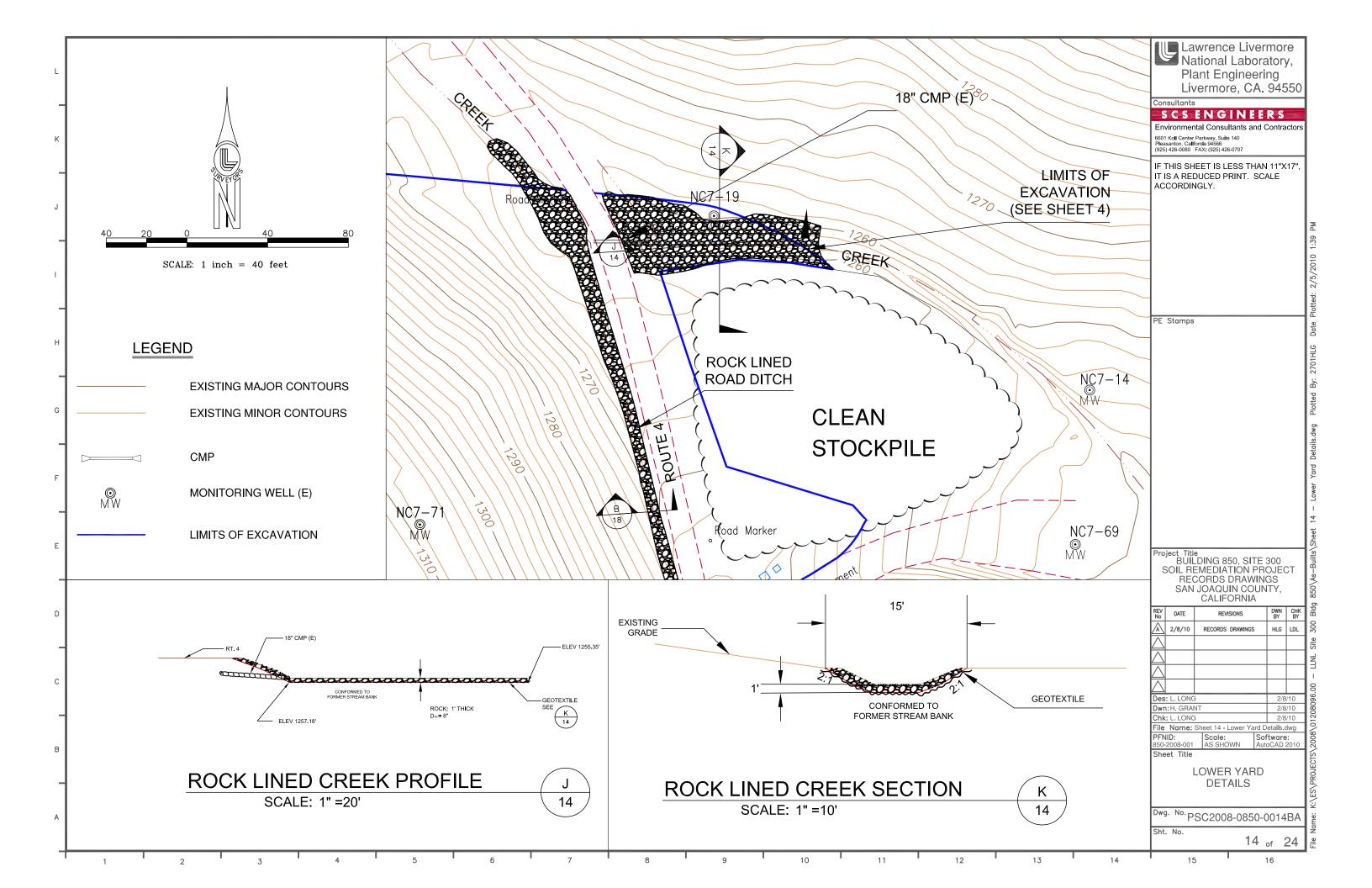


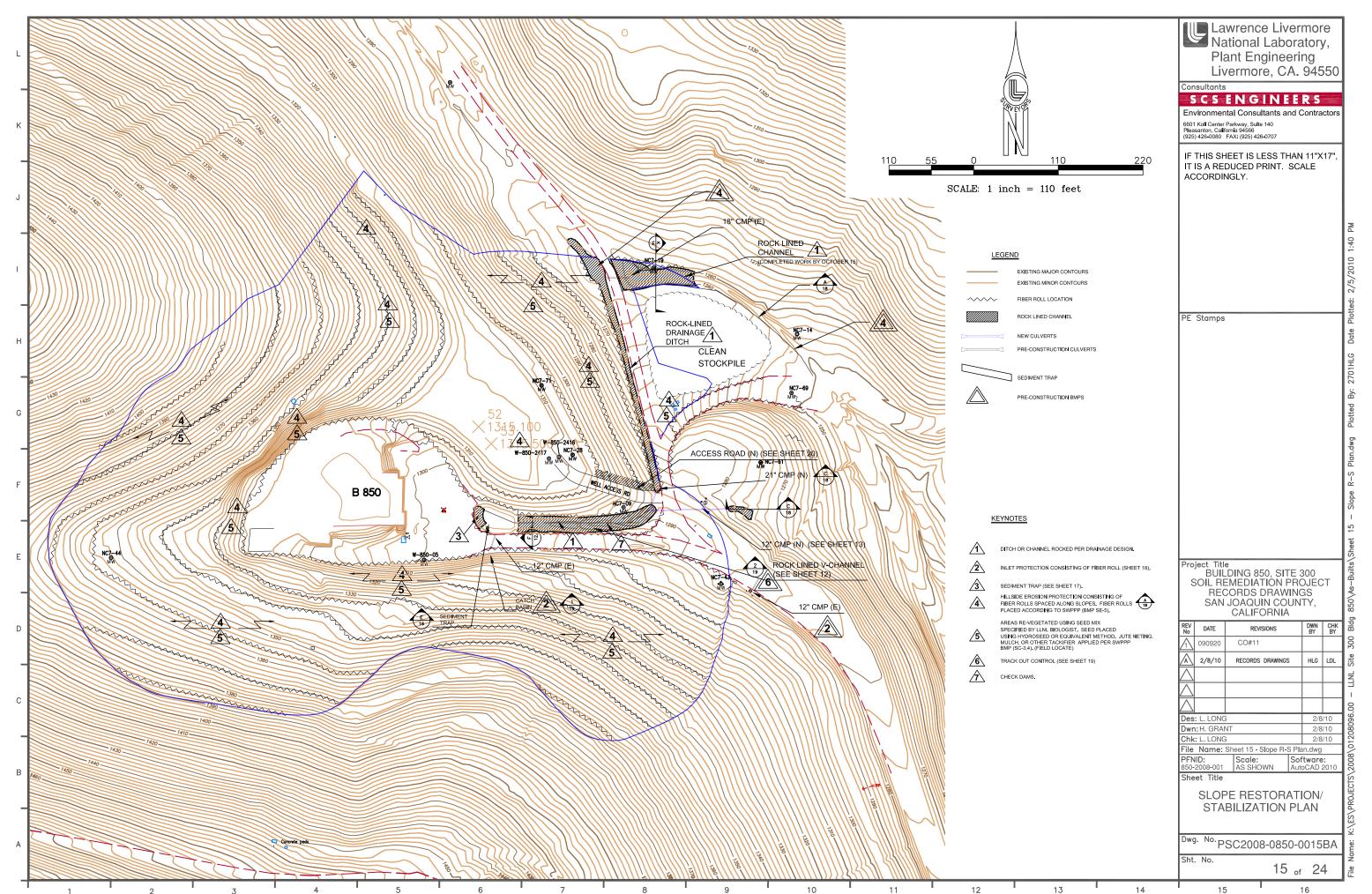






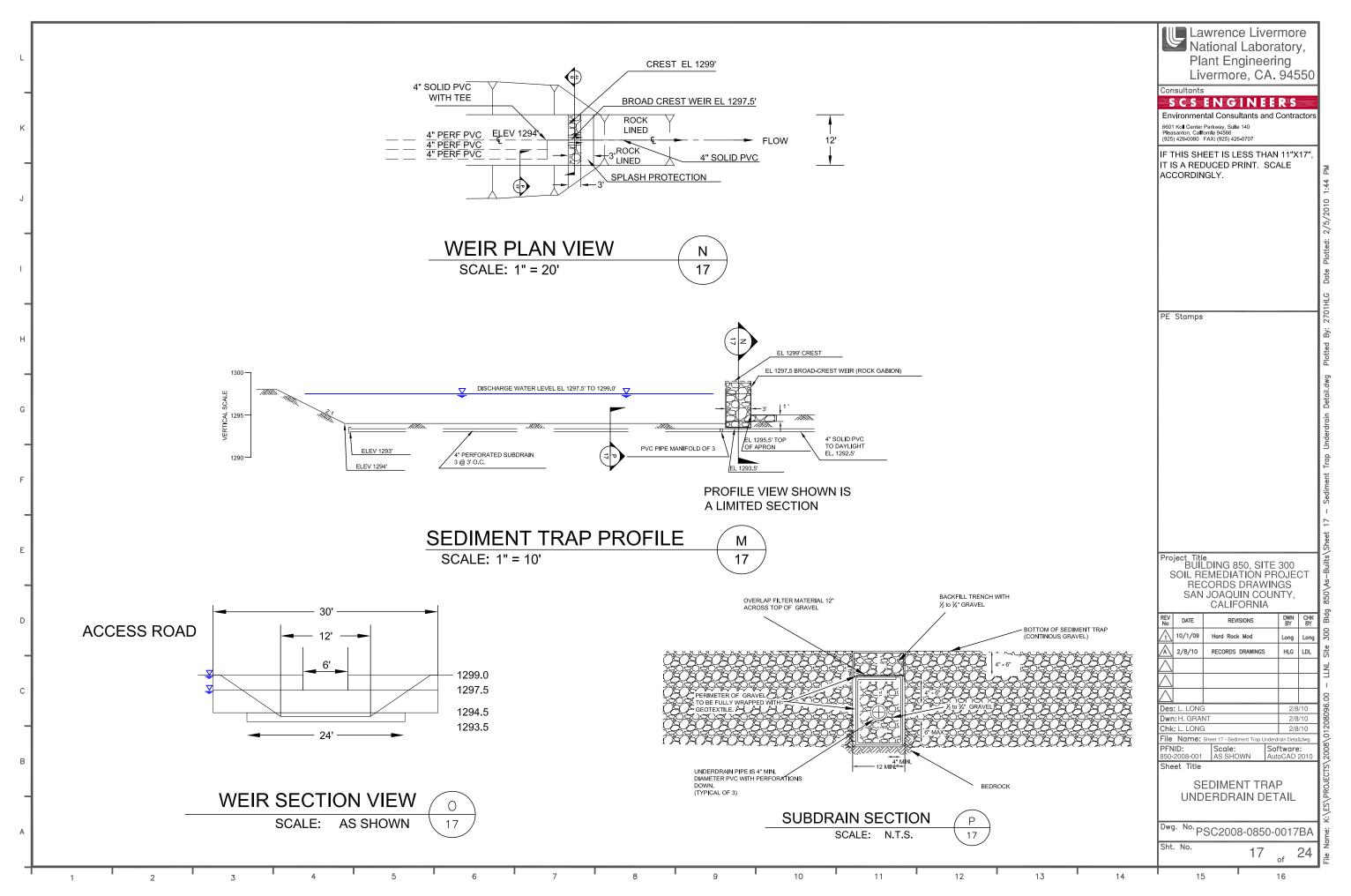






Lawrence Livermore National Laboratory, Plant Engineering Livermore, CA. 94550 SCSENGINEERS WELL ACCESS ROAD (N) **Environmental Consultants and Contractors** 6601 Koll Center Parkway, Sulte 140 Pleasanton, California 94566 (925) 426-0080 FAX: (925) 426-0707 21" CMP (N) IF THIS SHEET IS LESS THAN 11"X17", FL 1297.5' IT IS A REDUCED PRINT. SCALE ACCORDINGLY. SEDIMENT TRAP V-DITCH CHANNEL (N) 12" CMP (N) 3' MIN. CREST BREATH **ROCK CHECK DAM** 1299' CREST -BLDG 850 ACCESS ROAD-PE Stamps SEDIMENT TRAP PLAN VIEW Ε 16 SCALE: 1" = 20' **BROAD-CREST WEIR** Ν DISCHARGE EL 1297.5' 2 FT ROCK CHECK DAMS (TYP) Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS 21" CMP (N) 1295 83 FT @ 8 to 10% MATCH INVERTS 100 FT @ 2% min. 급 1290 -SAN JOAQUIN COUNTY, CALIFORNIA 36' TYP - 12" CMP (N) EL 1295.5' 1285 REVISIONS 100209 ROCK_MODIFICATION INVERT 21" CMP 1284.40' 101509 SUBMITTAL 40 **CHECK DAM PROFILE** A 2/8/10 RECORDS DRAWINGS INVERT 12" CMP 1285.48' SCALE: 1" = 20' 16 Des: L. LONG Dwn: H. GRANT 2/8/10 Chk: L. LONG 2/8/10 File Name: Sheet 16 - Sed Trap & Check Dams LEGEND FNID: Scale: 50-2008-001 AS SHOWN Software: AutoCAD 201 SEDIMENT TRAP AND FINISHED GRADE MAJOR CONTOURS CHECK DAM DETAILS FINISHED GRADE MINOR CONTOURS Dwg. No. PSC2008-0850-0016BA FINISHED GRADE CLEAN SOIL CONTOURS Sht. No. 16_{of} 24

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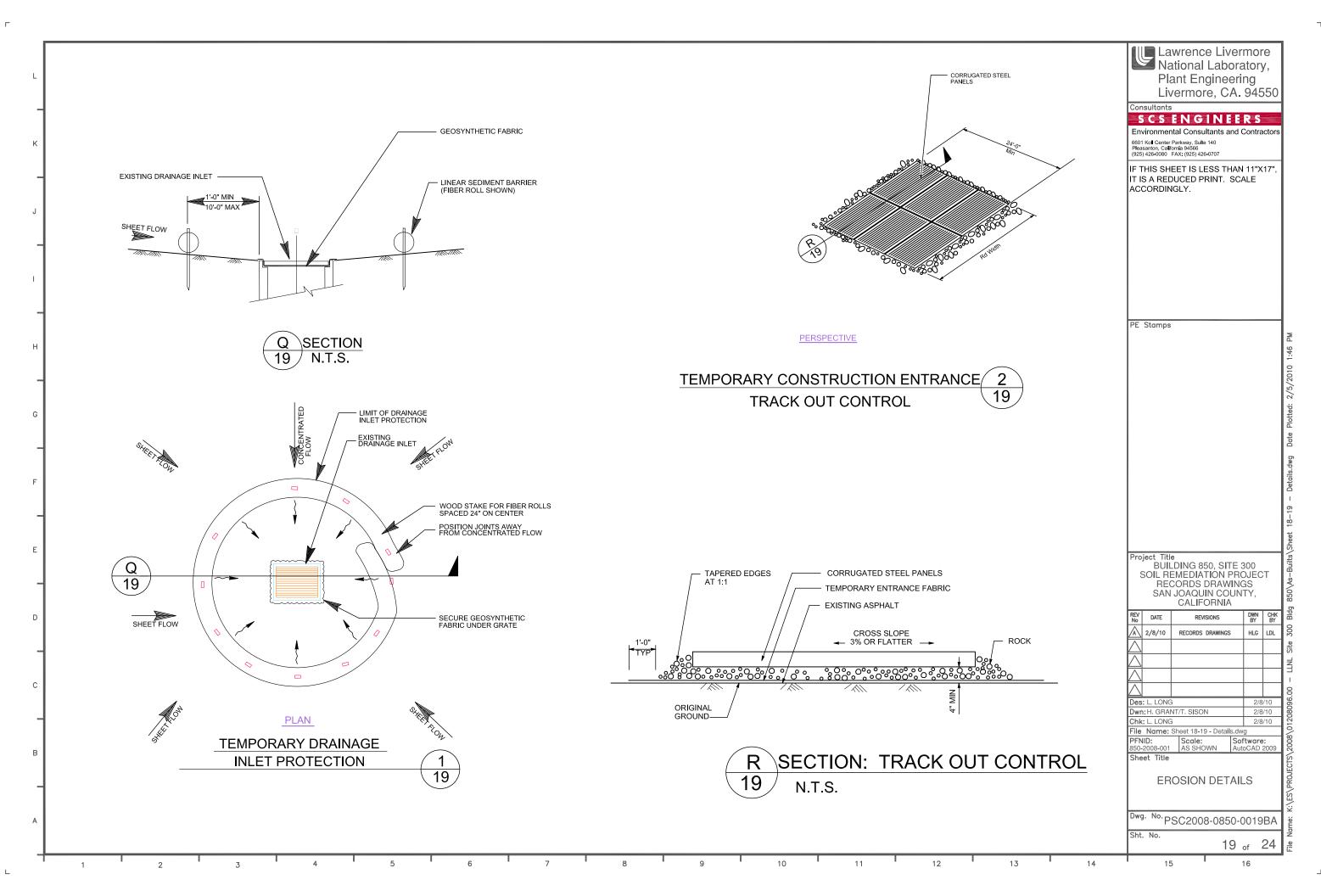
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Lawrence Livermore National Laboratory, Plant Engineering Livermore, CA. 94550 Consultants SCS ENGINEERS **Environmental Consultants and Contractors** 3:1 6601 Koll Center Parkway, Sulte 140 Pleasanton, California 94566 (925) 426-0080 FAX: (925) 426-0707 18" 🛌 RT.4 AC IF THIS SHEET IS LESS THAN 11"X17", 1.5:1 IT IS A REDUCED PRINT. SCALE ACCORDINGLY. **RIP RAP** $D_{50} = 6$ " NOTE:

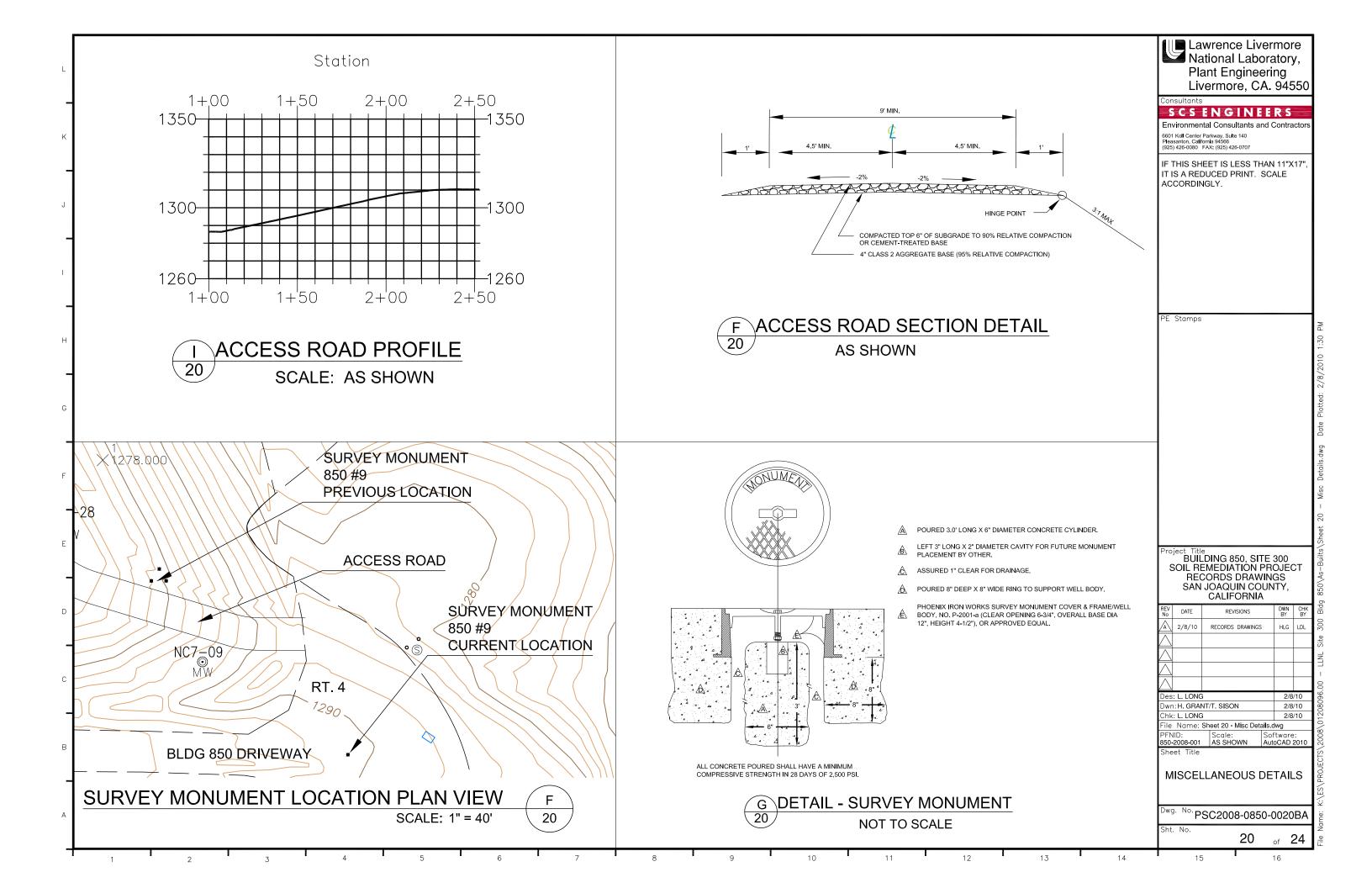
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2. STRAW WATTLES TRAP SEDIMENT AND REDUCE
SHEET A RILL EROSION BY REDUCING SLOPE
GRADIENT, INCREASING INFILTRATION RATES
AND BY PRODUCING A FAVORABLE ENVIRONMENT
FOR PLANT ESTABLISHMENT.
3. STRAW WATTLE INSTALLATION REQUIRES THE
WATTLE IN A TRENCH, 2". 2" DEEP (SOIL ONLY), DUG ON
CONTOUR, RUNOFF MUST NOT BE ALLOWED TO
RUN UNDER OR AROUND WATTLE. PE Stamps **GEOTEXTILE** A DETAIL - BIODEGRADABLE STRAW WATTLES

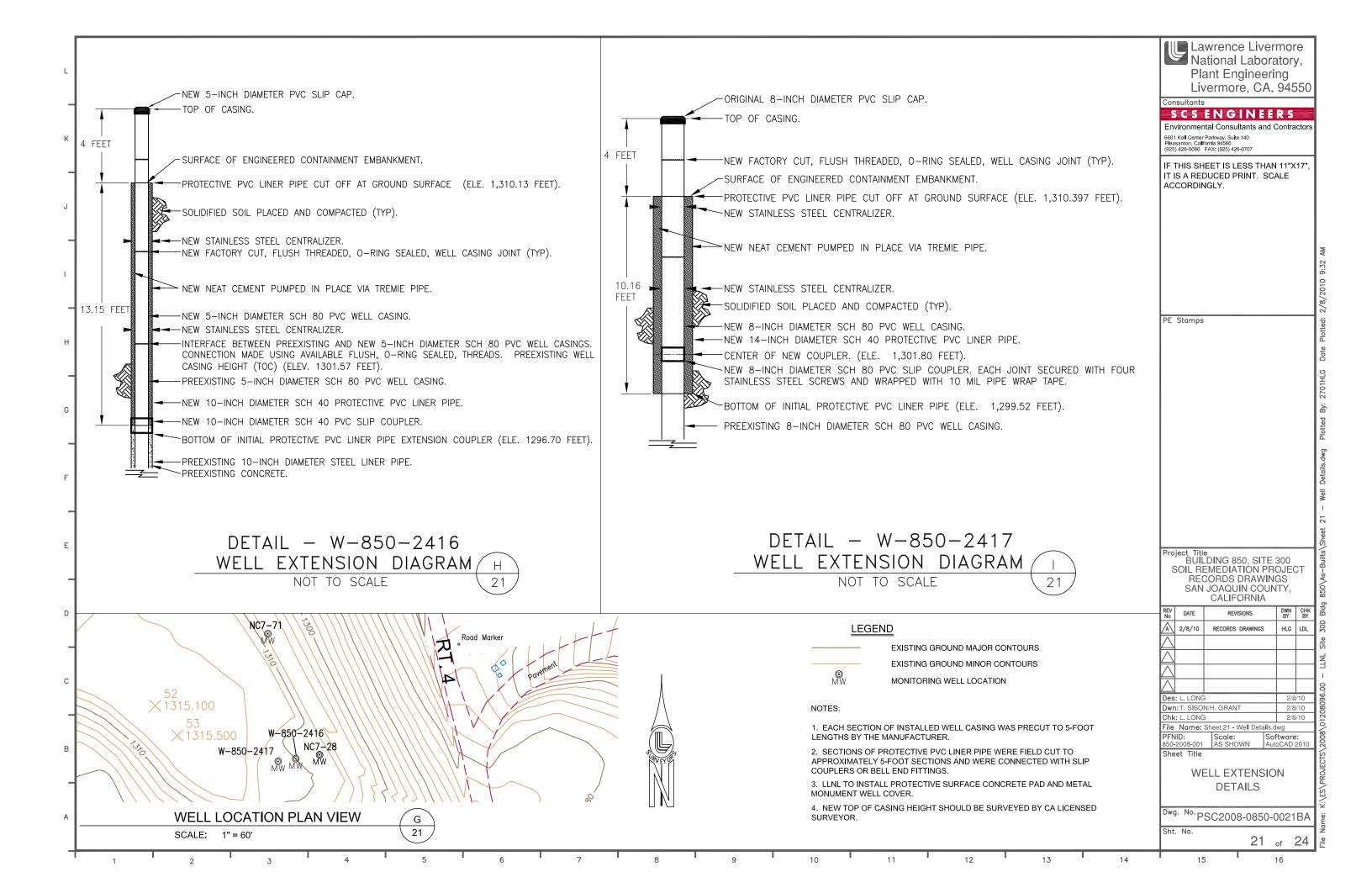
NOT TO SCALE B DETAIL - RT. 4 ROCK LINED DITCH
18 NOT TO SCALE NOT TO SCALE OVERFALL ELEVATION RECEIVING — ELEVATION THICKNESS ('T') = 1.5 x MAX ROCK DIAMETER (4" MIN.) Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY,
CALIFORNIA SECTION 0.5 DIA MIN. La = 4.5 x 'D' MIN. DATE REVISIONS 1 100709 SWPPP REVIEW 2/8/10 RECORDS DRAWINGS HLG LDL ROCK d50 Des: L. LONG 2/8/10 Dwn: H.GRANT/T. SISON 2/8/10 Chk: L. LONG 2/8/10 PLAN File Name: Sheet 18-19 - Details.dwg Software: AutoCAD 2009 PFNID: PFNID: Scale: 850-2008-001 AS SHOWN NOTES: Sheet Title 2. APRON FIELD FIT TO NEW ROCK LINED DITCH. **EROSION DETAILS** 3. FILTER MATERIAL IS FILTER FABRIC. C DETAIL - ENERGY DISSIPATOR

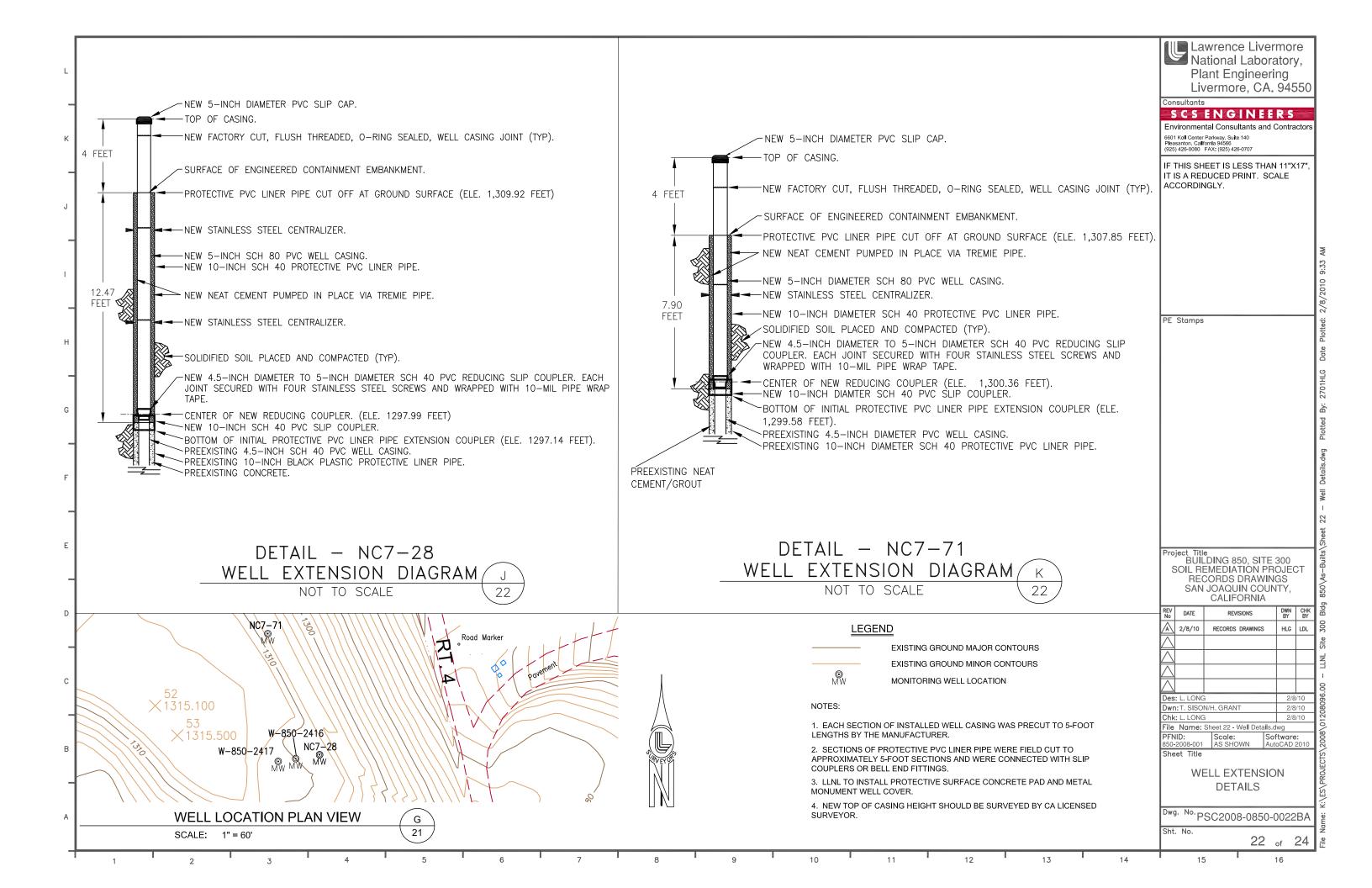
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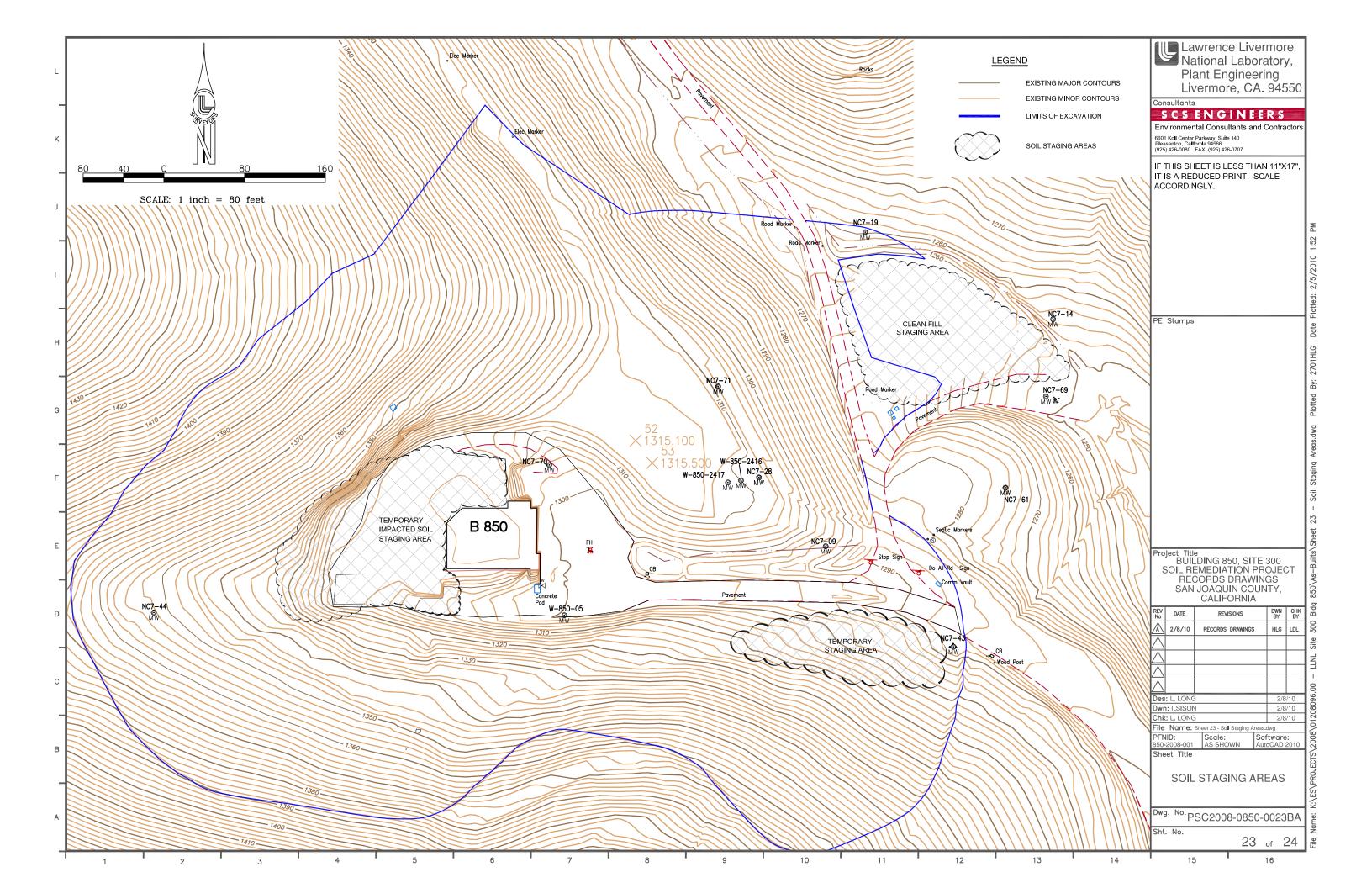


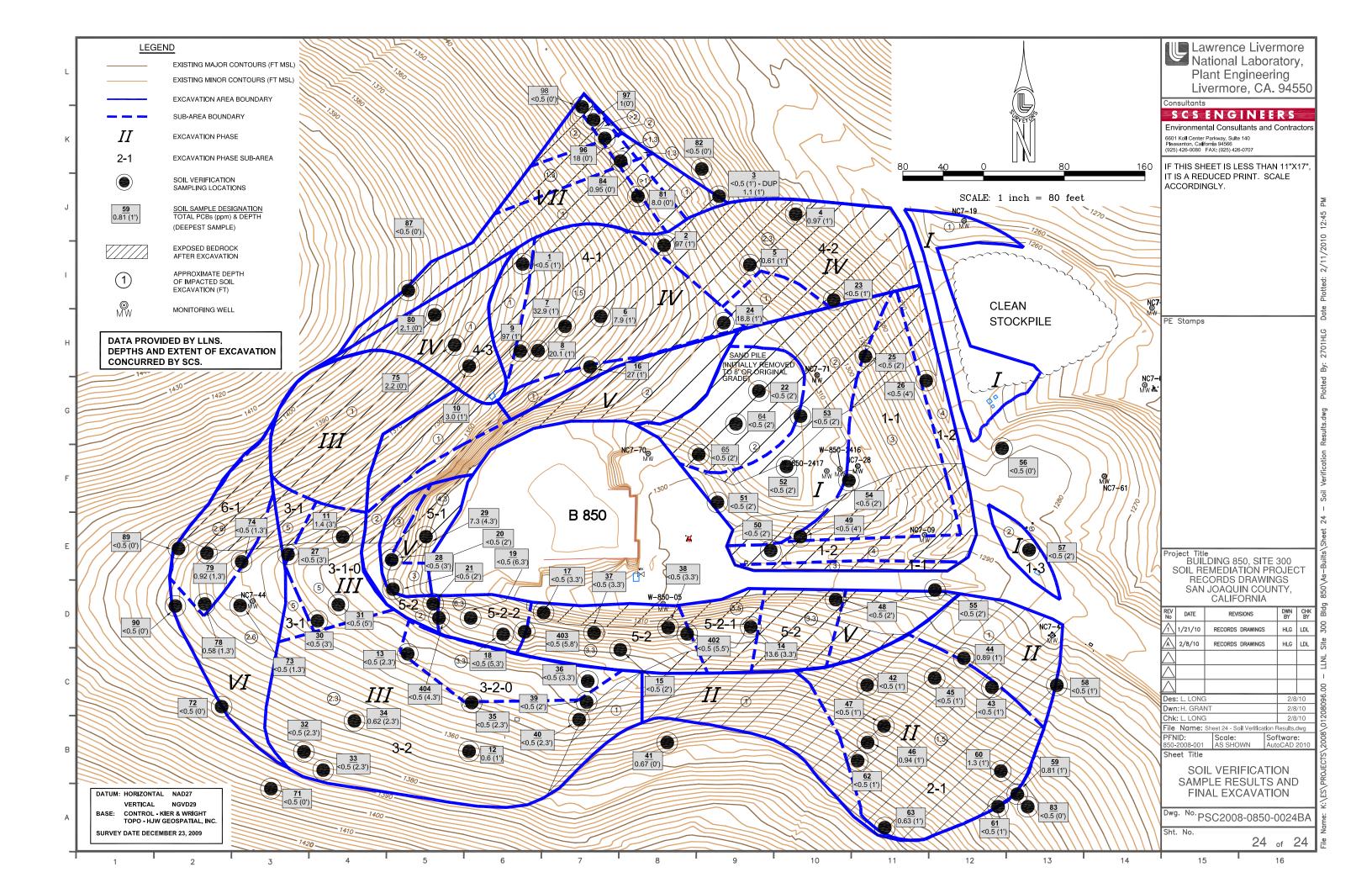
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Appendix D

Building 850 Soil Removal Action Verification Sampling and Analysis Result Reports

Building 850 Removal Action Verification Sampling and Analysis Status Report Phase 1: Dioxin/Furan Compound Results

INTRODUCTION

Remediation of PCB-, dioxin-, and furan-contaminated soil and sandpile at the Lawrence Livermore National Laboratory Site 300 Building 850 is being conducted as Non-Time Critical Removal Action under the Comprehensive Environmental Response, Compensation, and Liability Act.

The remedy selected in the Building 850 Soil Removal Action Memorandum (DOE, April 2008) consists of excavation and solidification of contaminated soil and the sandpile. A sampling and analysis plan to verify that the Building 850 area remedy has met cleanup standards was presented and approved in the Building 850 Engineering Evaluation/Cost Analysis (Dibley et al., February 2008).

In accordance with the approved verification sampling and analysis plan, the excavation for the Building 850 area was divided into 5 subareas, each containing 13 sampling locations (Figure 1), for a total of sixty-five randomly-selected sample locations throughout the entire excavation area. Soil samples for PCB and dioxin/furan analysis are being collected following the soil excavation to the prescribed depth(s) of anticipated contamination presented in the Building 850 Removal Action Design. The original sampling plan entails one sample from each location plus 6 interlaboratory duplicates being analyzed for PCBs for a total of 71 samples. The 13 sampling locations from each of the excavation phases will be composited and analyzed for dioxin/furans for a total of 5 samples.

The Interim Site-Wide Record of Decision (DOE, 2001) set PCB and dioxin/furan cleanup standards of 0.74 mg/kg and 1.6×10^{-5} mg/kg, respectively (U.S. EPA Preliminary Remediation Goal for soil at industrial sites). In areas where the PCB results do not meet these regulatory criteria, additional soil will be excavated, re-sampled, and analyzed until the criteria are met.

To evaluate the dioxin/furan results, the toxic equivalent concentration (TEC) for the composite sample will be calculated by multiplying the individual dioxin/furan compound concentration by the associated Toxicity Equivalence Factor (TEF). The TEF is defined as an order of magnitude estimate of the toxicity of the various dioxin and furan compounds relative to the toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). The sum of the resultant TECs is the total TEC for the sample. If the calculated 2,3,7,8-TCDD TEC concentration of the composited sample exceeds the dioxin/furan cleanup standard, additional soil will be excavated from the region, re-sampled, composited, and analyzed until the composited sample meets the dioxin/furan cleanup standard.

The sampling locations are being located using a Global Positioning System. At soil sampling locations where soil excavation has resulted in exposed bedrock, or the location poses too much risk to the samplers due to slipping or falling hazards, the sample location will be moved to the nearest exposed soil within the excavation phase area so that 13 samples are collected from each subarea.

PHASE 1 DIOXIN/FURAN COMPOUND RESULTS

Following the excavation of at least one foot of soil from the Phase 1 area, surface soil samples were collected from the newly exposed ground surface on June 11, 2009 for PCB and dioxin/furan analysis. The locations of samples collected from this area are shown on Figure 1. The location of samples 22, 26, 64, and 65 were moved to the nearest area of sufficient soil due to excavation to bedrock at their initial sampling plan locations. The thirteen dioxin/furan soil samples were stored in the refrigerator awaiting compositing until the PCB results were received.

The PCB Arochlor 1254 was detected at concentrations above the 0.74 milligrams per kilogram (mg/kg) PCB cleanup standard at sample locations 26 and 49 (Figure 1). Both of these sample locations were within the drainage way that runs south and then east of the Upper Corporation Yard and where sedimentation appears to have occurred over time. Two feet of additional soil was excavated in the area between the sample locations 26 and 49 and the nearest sample location with a result below the cleanup standard (Figure 2). An additional 2 feet of soil were removed along the drainage way to ensure all contaminated soil was removed, for a total of 4 feet (Figure 2). Following this additional excavation, surface soil samples were collected from locations 26, 49, and 57 on June 18, 2009 for PCBs and dioxin/furans analysis. PCBs were not detected at concentrations above either the 0.5 mg/kg detection limit or the 0.74 mg/kg PCB cleanup standard in any of the soil samples collected on June 18, 2009 following the second excavation. As a result, the cleanup of PCB-contaminated soil in the Phase 1 excavation is considered complete.

The samples collected from locations 22, 25, 50-54, 56, 57, 64 and 65 in the Phase 1 excavation area were composited and submitted to the analytical laboratory for dioxin/furan analysis by EPA Method 8290. Samples from locations 26 and 49 were not composited and were sent in individually for dioxin/furan analysis to verify whether any contamination remained in the streambed at these discrete locations. This is a variance from the original sampling plan in which all 13 samples were to be composited into one sample for dioxin/furan analysis. However, this alternate sampling and analysis is more conservative than the original plan in that it addresses the potential for dioxin/furan contamination in the drainage ways where the PCB concentrations exceeded cleanup standards.

To evaluate the dioxin/furan results, the toxic equivalent concentration (TEC) for the samples was calculated by multiplying the individual dioxin/furan compound concentration by the associated 1998 World Health Organization Toxicity Equivalence Factor (TEF). All three dioxin/furan sample TECs were below the dioxin/furan cleanup standard of 1.6×10^{-5} mg/kg (Tables 1 through 3). The cleanup of dioxin/furan-contaminated soil in the Phase 1 excavation is considered complete.

NEXT STEPS

With this verification/confirmation that the PCB-, dioxin-, and furan-contaminated soil has been removed from the Phase 1 area to meet the cleanup standards, DOE/LLNL plan to proceed with the overexcavation, backfilling, and compaction of the non-engineered clean fill under the planned footprint of the solidified soil Corrective Action Management Unit.

A status report summarizing PCB analytical results for the Phase 2 excavation area will be sent to the regulatory agencies upon receipt of those results.

Table 1. Sample location 3SS-850-349A dioxin/furan compound analytical results and toxicity equivalent concentration sampled on June 18, 2009.

	Toxic Equivalent	Measured Concentration	Toxicity Equivalent
Compound	Factor ^a	(mg/kg)	Concentration
2,3,7,8-TCDD	1.00E+00	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,7,8-PeCDD	1.00E+00	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,4,7,8-HxCDD	1.00E-01	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,6,7,8-HxCDD	1.00E-01	4.67E-07	4.67E-08
1,2,3,7,8,9-HxCDD	1.00E-01	7.00E-07	7.00E-08
1,2,3,4,6,7,8-HpCDD	1.00E-02	0.00E+00	0.00E+00
1,2,3,4,6,7,8,9-OCDD	1.00E-04	1.77E-06	1.77E-10
2,3,7,8-TCDF	1.00E-01	0.00E+00	0.00E+00
1,2,3,7,8-PeCDF	5.00E-02	0.00E+00	0.00E+00
2,3,4,7,8-PeCDF	5.00E-01	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDF	1.00E-01	0.00E+00	0.00E+00
1,2,3,6,7,8-HxCDF	1.00E-01	0.00E+00	0.00E+00
2,3,4,6,7,8-HxCDF	1.00E-01	0.00E+00	0.00E+00
1,2,3,7,8,9-HxCDF	1.00E-01	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDF	1.00E-02	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,4,7,8,9-HpCDF	1.00E-02	0.00E+00	0.00E+00
1,2,3,4,6,7,8,9-OCDF	1.00E-04	0.00E+00	0.00E+00
	Total t	oxicity equivalent concentration	1.17E-07

Cleanup standard = 1.6×10^{-5} mg/kg

Table 2. Sample location 3SS-850-326A dioxin/furan compound analytical results and toxicity equivalent concentration sampled on June 18, 2009.

	Toxic Equivalent	Measured Concentration	Toxicity Equivalent
Compound	Factor ^a	(mg/kg)	Concentration
2,3,7,8-TCDD	1.00E+00	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,7,8-PeCDD	1.00E+00	5.35E-07	5.35E-07
1,2,3,4,7,8-HxCDD	1.00E-01	0.00E+00	0.00E+00
1,2,3,6,7,8-HxCDD	1.00E-01	0.00E+00	0.00E+00
1,2,3,7,8,9-HxCDD	1.00E-01	1.02E-06	1.02E-07
1,2,3,4,6,7,8-HpCDD	1.00E-02	0.00E+00	0.00E+00
1,2,3,4,6,7,8,9-OCDD	1.00E-04	1.56E-06	1.56E-10
2,3,7,8-TCDF	1.00E-01	4.27E-07	4.27E-08
1,2,3,7,8-PeCDF	5.00E-02	2.39E-07	1.20E-08
2,3,4,7,8-PeCDF	5.00E-01	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDF	1.00E-01	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,6,7,8-HxCDF	1.00E-01	0.00E+00	0.00E+00
2,3,4,6,7,8-HxCDF	1.00E-01	0.00E+00	0.00E+00
1,2,3,7,8,9-HxCDF	1.00E-01	1.52E-06	1.52E-07
1,2,3,4,6,7,8-HpCDF	1.00E-02	0.00E+00	0.00E+00
1,2,3,4,7,8,9-HpCDF	1.00E-02	0.00E+00	0.00E+00
1,2,3,4,6,7,8,9-OCDF	1.00E-04	0.00E+00	0.00E+00
	Total t	oxicity equivalent concentration	8.44E-07

^a World Health Organization 1998 Toxic Equivalent Factor.

^a World Health Organization 1998 Toxic Equivalent Factor. Cleanup standard = 1.6×10^{-5} mg/kg

Table 3. Sample location 3SS-850-366 dioxin/furan compound analytical results and toxicity

equivalent concentration sampled on June 18, 2009.

	Toxic Equivalent	Measured Concentration	Toxicity Equivalent
Compound	Factor ^a	(mg/kg)	Concentration
2,3,7,8-TCDD	1.00E+00	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,7,8-PeCDD	1.00E+00	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,4,7,8-HxCDD	1.00E-01	$\mathbf{0.00E} {+} 00$	$\mathbf{0.00E} {+} 00$
1,2,3,6,7,8-HxCDD	1.00E-01	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,7,8,9-HxCDD	1.00E-01	$\mathbf{0.00E} {+} 00$	$\mathbf{0.00E} {+} 00$
1,2,3,4,6,7,8-HpCDD	1.00E-02	2.09E-06	2.09E-08
1,2,3,4,6,7,8,9-OCDD	1.00E-04	1.19E-05	1.19E-09
2,3,7,8-TCDF	1.00E-01	6.55E-06	6.55E-07
1,2,3,7,8-PeCDF	5.00E-02	9.86E-07	4.93E-08
2,3,4,7,8-PeCDF	5.00E-01	2.70E-06	1.35E-06
1,2,3,4,7,8-HxCDF	1.00E-01	7.51E-07	7.51E-08
1,2,3,6,7,8-HxCDF	1.00E-01	$\mathbf{0.00E} {+} 00$	0.00E+00
2,3,4,6,7,8-HxCDF	1.00E-01	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,7,8,9-HxCDF	1.00E-01	9.29E-07	9.29E-08
1,2,3,4,6,7,8-HpCDF	1.00E-02	5.59E-07	5.59E-09
1,2,3,4,7,8,9-HpCDF	1.00E-02	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,4,6,7,8,9-OCDF	1.00E-04	7.52E-07	7.52E-11
	Total to	oxicity equivalent concentration	2.25E-06

Sample location 3SS-850-366 is a composite of locations 22, 25, 50, 51, 52, 53, 54, 56, 57A, 64, and 65.

Notes: ^a World Health Organization 1998 Toxic Equivalent Factor. Cleanup standard = 1.6×10^{-5} mg/kg

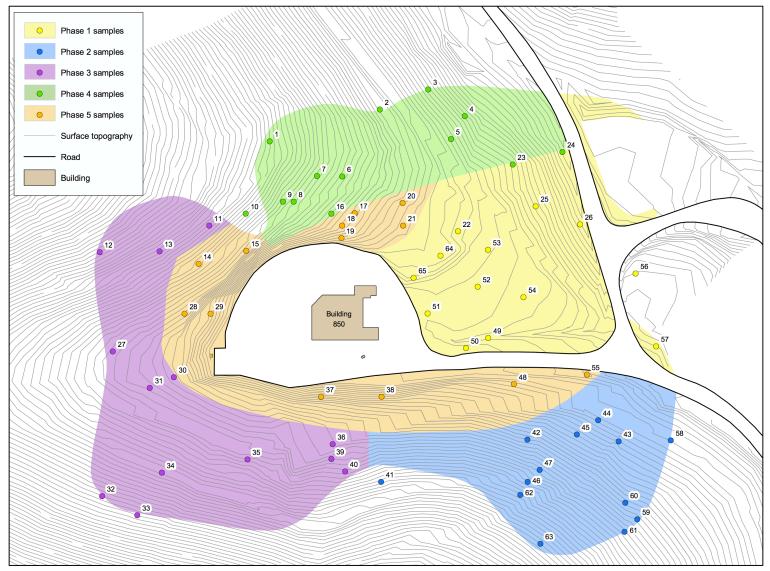


Figure 1. Soil Verification Sampling Plan

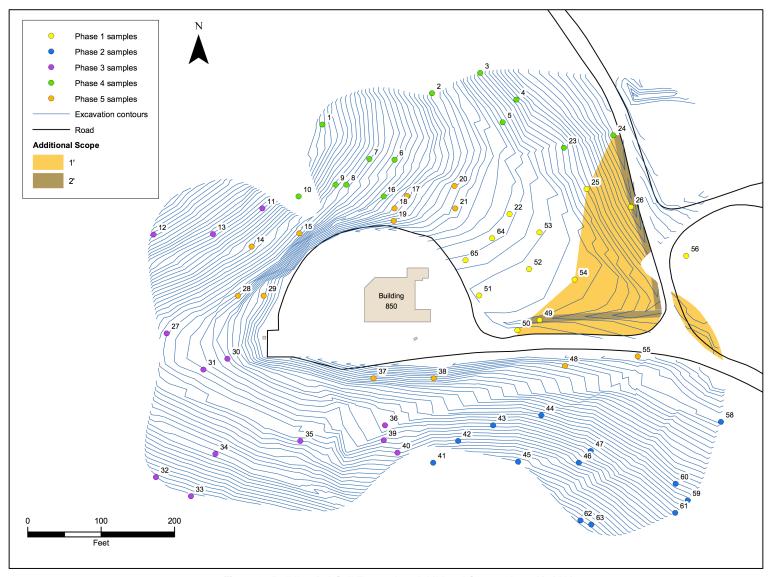


Figure 2. Building 850 Soil Excavation, Additional Scope - June 16, 2009

Building 850 Removal Action Verification Sampling and Analysis Status Report Phase 1: Polychlorinated Biphenyl (PCB) Results

INTRODUCTION

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The remedy selected in the Building 850 Soil Removal Action Memorandum (DOE, April 2008) consists of excavation and solidification of contaminated soil and the sandpile. A sampling and analysis plan to verify that the Building 850 area remedy has met cleanup standards was presented and approved in the Building 850 Engineering Evaluation/Cost Analysis (Dibley et al., February 2008).

In accordance with the approved verification sampling and analysis plan, the excavation for the Building 850 area was divided into 5 subareas, each containing 13 sampling locations (Figure 1), for a total of sixty-five randomly-selected sample locations throughout the entire excavation area. Soil samples for PCB and dioxin/furan analysis are being collected following the soil excavation to the prescribed depth(s) of anticipated contamination presented in the Building 850 Removal Action Design. The original sampling plan entails one sample from each location plus 6 interlaboratory duplicates being analyzed for PCBs for a total of 71 samples. The 13 sampling locations from each of the excavation phases will be composited and analyzed for dioxin/furans for a total of 5 samples.

The Interim Site-Wide Record of Decision (DOE, 2001) set PCB and dioxin/furan cleanup standards of 0.74 mg/kg and 1.6×10^{-5} mg/kg, respectively (U.S. EPA Preliminary Remediation Goal for soil at industrial sites). In areas where the PCB results do not meet these regulatory criteria, additional soil will be excavated, re-sampled, and analyzed until the criteria are met.

To evaluate the dioxin/furan results, the toxic equivalent concentration (TEC) for the composite sample will be calculated by multiplying the individual dioxin/furan compound concentration by the associated Toxicity Equivalence Factor (TEF). The TEF is defined as an order of magnitude estimate of the toxicity of the various dioxin and furan compounds relative to the toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). The sum of the resultant TECs is the total TEC for the sample. If the calculated 2,3,7,8-TCDD TEC concentration of the composited sample exceeds the dioxin/furan cleanup standard, additional soil will be excavated from the region, re-sampled, composited, and analyzed until the composited sample meets the dioxin/furan cleanup standard.

The sampling locations are being located using a Global Positioning System. At soil sampling locations where soil excavation has resulted in exposed bedrock, or the location poses too much risk to the samplers due to slipping or falling hazards, the sample location will be moved to the nearest exposed soil within the excavation phase area so that 13 samples are collected from each subarea.

PHASE 1 PCB RESULTS

Following the excavation of at least one foot of soil from the Phase 1 area, surface soil samples were collected from the newly exposed ground surface on June 11, 2009 for PCB and dioxin/furan analysis. The locations of samples collected from this area are shown on Figure 1. The location of samples 22, 26, 64, and 65 were moved to the nearest area of sufficient soil due to excavation to bedrock at their initial sampling plan locations. Thirteen soil samples collected from the Phase 1 area were submitted to the analytical laboratory for PCB analysis using EPA Method 8082. The dioxin/furan samples were stored in the refrigerator awaiting compositing until the PCB results were received. The PCB analytical results for the samples collected on June 11, 2009 are shown in Table 1.

The PCB Arochlor 1254 was detected at concentrations above the 0.74 milligrams per kilogram (mg/kg) PCB cleanup standard at sample locations 26 and 49 (Figure 1). Both of these sample locations were within the drainage way that runs south and then east of the Upper Corporation Yard and where sedimentation appears to have occurred over time. Two feet of additional soil was excavated in the area between the sample locations 26 and 49 and the nearest sample location with a result below the cleanup standard (Figure 2). An additional 2 feet of soil were removed along the drainage way to ensure all contaminated soil was removed, for a total of 4 feet (Figure 2). Following this additional excavation, surface soil samples were collected from locations 26, 49, and 57 on June 18, 2009 for PCBs and dioxin/furans analysis. While the first sample collected from location 57 did not contain PCBs above the cleanup standard, a second sample was collected from this location because an additional foot of soil was removed in the area. As shown in Table 1, PCBs were not detected at concentrations above either the 0.5 mg/kg detection limit or the 0.74 mg/kg PCB cleanup standard in any of the soil samples collected on June 18, 2009 following the second excavation. As a result, the cleanup of PCB-contaminated soil in the Phase 1 excavation is considered complete.

NEXT STEPS

The samples collected from locations 22, 25, 50-54, 56, 57, 64 and 65 in the Phase 1 excavation area were composited and submitted to the analytical laboratory for dioxin/furan analysis by EPA Method 8290. Samples from locations 26 and 49 were not composited and were sent in individually for dioxin/furan analysis to verify whether any contamination remained in the streambed at these discrete locations. This is a variance from the original sampling plan in which all 13 samples were to be composited into one sample for dioxin/furan analysis. However, this alternate sampling and analysis is more conservative than the original plan in that it addresses the potential for dioxin/furan contamination in the drainage ways where the PCB concentrations exceeded cleanup standards.

A status report summarizing the dioxin/furan analytical results will be sent to the regulatory agencies upon receipt of those results. These dioxin/furan results will be used to determine if excavation/cleanup of the Phase 1 area is complete or if additional soil excavation is required. In addition, a new sampling plan showing the new sampling locations for those samples that were moved will be included.

Table 1. PCB sample location and results.

Sample Location	Sample ID	PCB RESULTS (mg/kg)	Cleanup Standard (mg/kg)	Phase	Sample date	Notes
22	3SS-850-322	< 0.5	0.74	1	6/11/09	Field duplicate
22	3SS-850-322	< 0.5	0.74	1	6/11/09	
25	3SS-850-325	< 0.5	0.74	1	6/11/09	
26	3SS-850-326	1.5	0.74	1	6/11/09	PCB 1254
26	3SS-850-326A ^a	< 0.5	0.74	1	6/18/09	Resample, new depth
49	3SS-850-349	3.2	0.74	1	6/11/09	PCB 1254
49	3SS-850-349A ^a	< 0.5	0.74	1	6/18/09	Resample, new depth
50	3SS-850-350	< 0.5	0.74	1	6/11/09	
51	3SS-850-351	< 0.5	0.74	1	6/11/09	
52	3SS-850-352	< 0.5	0.74	1	6/11/09	
53	3SS-850-353	< 0.5	0.74	1	6/11/09	
54	3SS-850-354	< 0.5	0.74	1	6/11/09	
56	3SS-850-356	0.69	0.74	1	6/11/09	PCB 1254, Field duplicate
56	3SS-850-356	< 0.5	0.74	1	6/11/09	
57	3SS-850-357	0.66	0.74	1	6/11/09	PCB 1254
57	3SS-850-357A ^a	< 0.5	0.74	1	6/18/09	Resample, new depth
64	3SS-850-364	< 0.5	0.74	1	6/11/09	
65	3SS-850-365	< 0.5	0.74	1	6/11/09	

^a Indicates samples collected following second soil excavation.

Building 850 Removal Action Polychlorinated Biphenyl and Dioxin/Furan Compound Verification Sampling and Analysis Status Report

1. Introduction

This report summarizes polychlorinated biphenyl (PCB) and dioxin/furan compound verification sampling and analysis results for the Building 850 Removal Action. Verification sampling and analysis status reports for PCB and dioxin/furan compound results in the Phase 1 excavation area were submitted to the regulatory agencies on June 24 and June 25, 2009, respectively, confirming that the PCB and dioxin/furan compound cleanup in Phase 1 was complete. This report presents the verification sampling and analysis results for PCB and dioxin/furan compound analysis for the Phase 2 through 5 excavation areas and the new Phase 6 and 7 excavation areas.

Verification sampling and analysis has demonstrated that the PCB- and dioxin/furan compound-contaminated soil in the Phase 2 through 7 areas has been removed to meet cleanup standards.

2. Background

Remediation of PCB-, dioxin-, and furan-contaminated soil and sandpile material at the Lawrence Livermore National Laboratory Site 300 Building 850 area was conducted as a Non-Time Critical Removal Action under the Comprehensive Environmental Response, Compensation, and Liability Act.

The remedy selected in the Building 850 Soil Removal Action Memorandum (DOE, April 2008) consists of excavation and solidification of contaminated soil and the sandpile. A sampling and analysis plan to verify that the Building 850 area remedy has met cleanup standards was presented and approved in the Building 850 Engineering Evaluation/Cost Analysis (Dibley et al., February 2008).

In accordance with the approved verification sampling and analysis plan, the excavation for the Building 850 area was divided into 5 original excavation phase areas (1-5), each containing 13 sampling locations (Figure 1), for a total of sixty-five randomly-selected sample locations throughout the entire excavation area. Soil samples for PCB and dioxin/furan analysis were collected following the soil excavation to the prescribed depth(s) of anticipated contamination presented in the Building 850 Removal Action Design. The original sampling plan entailed one sample from each location plus 6 interlaboratory duplicates being analyzed for PCBs using EPA Method 8082B for a total of 71 samples. The plan specified that samples collected from the 13 sampling locations in each of the excavation phases be composited and analyzed for dioxin/furans using EPA Method 8290 for a total of 5 samples.

The Interim Site-Wide Record of Decision (DOE, 2001) set PCB and dioxin/furan cleanup standards of 0.74 milligrams per kilogram (mg/kg) and 1.6×10^{-5} mg/kg, respectively (U.S. EPA Preliminary Remediation Goals for soil at industrial sites). In areas where the PCB results did not meet these regulatory criteria, additional soil was excavated, re-sampled, and analyzed until the criteria were met.

To evaluate the dioxin/furan results, the toxic equivalent concentration (TEC) for the composite sample was calculated by multiplying the individual dioxin/furan compound concentration by the associated Toxicity Equivalence Factor (TEF). The TEF is defined as an order of magnitude estimate of the toxicity of the various dioxin and furan compounds relative to the toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). The sum of the resultant TECs is the total TEC for the sample. If the calculated 2,3,7,8-TCDD TEC concentration of the composited sample exceeds the dioxin/furan cleanup standard, additional soil will be excavated from the region, re-sampled, composited, and analyzed until the composited sample meets the dioxin/furan cleanup standard.

The sampling locations were located using a Global Positioning System. The lateral and vertical extents of all excavations were located using GPS and depth stakes. Final depths of all excavations were verified by GPS and field measurements. At soil sampling locations where soil excavation resulted in exposed bedrock, or the location posed too much risk to the samplers due to slipping or falling hazards, the sample locations were moved to the nearest exposed soil within the excavation phase area to ensure that 13 samples were collected from each subarea. Where PCBs or dioxin/furan compounds were detected above cleanup standards in the verification samples, the area was re-excavated to a new depth.

At the July 8, 2009 RPM meeting, the regulatory agencies agreed that:

- DOE did not have to move verification samples if the additional excavation exposed bedrock at the original verification sample location. Therefore, verification sample locations were not moved during subsequent excavation phases once bedrock was encountered.
- Areas in the remaining excavation phase areas (2, 3, 4, and 5) requiring additional
 excavation would be determined by extrapolating a contour around the sample locations
 below cleanup standards and those above cleanup standards. Additional verification
 samples could also be collected at the sidewall of the new excavation area. In general,
 we conservatively excavated to the nearest sample location that exhibited PCBs below
 cleanup standards.

The initial dioxin/furan samples were collected at the same time as the PCB samples and were stored in a refrigerator awaiting compositing upon receipt of PCB results. When the PCB results were above the cleanup standard, or holding times were exceeded, the dioxin/furan samples awaiting compositing were disposed of, and new samples were collected after the new excavation was completed unless bedrock was exposed at the sampling location.

During verification sampling of the Phase 3 and 4 areas, additional contamination was detected outside the original excavation contours. These areas were identified as Phases 6 and 7 (Figure 1). Figure 1 shows all excavation areas and final depths, soil sampling locations, and total PCB concentrations with depth. Figure 2 shows these features and the distribution of bedrock at ground surface when all excavation had been completed.

Soil excavation and sampling activities and PCB and dioxin/furan verification sampling analytical results for the Phases 2 through 7 areas are discussed in Section 3 through 8.

3. Phase 2 Excavation and Sampling Activities and Verification Sampling Results

Section 3.1 describes the two rounds of excavation performed in the Phase 2 area, the sampling conducted to verify achievement of the PCB cleanup standards, and the PCB sample

analytical results. Section 3.2 describes the sampling conducted in the Phase 2 area to verify achievement of dioxin/furan cleanup standards, and the dioxin/furan analytical results.

3.1 Phase 2 Excavation and Sampling Activities and PCB Verification Sampling Results

In the Phase 2 area, soil was excavated to a depth of at least one foot, or to bedrock, whichever was shallower. Following this soil excavation, the initial thirteen soil verification samples were collected on June 18, 2009 from locations 41, 42, 43, 44, 45, 46, 47, 58, 59, 60, 61, 62, 63, and 83 for PCB analysis and for later compositing for dioxin/furan analysis. These sample locations and total PCB concentrations are shown on Figure 1. The location of samples 42, 43, 44, 45, and 62 were moved to the nearest area of sufficient soil due to excavation to bedrock at their initial sampling plan locations. The location of samples 58 and 59 were moved because their original locations were found to fall outside the excavation area. The PCB analytical results for soil samples collected in the Phase 2 area are listed in Table 1. The PCB Aroclor 1254 was detected at concentrations above the 0.74 mg/kg PCB cleanup standard in samples collected from locations 44, 46, 59 and 60 (Table 1) following the first excavation.

A second excavation was conducted in the Phase 2 area, removing an additional 0.5 feet (ft) of soil (or less in zones of shallow bedrock) in the area denoted as Subarea 2-1 in Figure 1. The excavation of Subarea 2-1 included soil removal from sample locations 44, 46, 59 and 60 up to the nearest sample location with a result below the cleanup standard that still contained soil (Figure 1). Following the second excavation, bedrock was exposed (all soil was removed) throughout the entire Phase 2 area and a second set of verification samples could not be collected from locations 44, 46, 59 and 60 for PCBs. Because all the soil was removed (Figure 2), the cleanup of PCB-contaminated soil in the Phase 2 excavation area is considered complete.

3.2. Phase 2 Dioxin/Furan Compound Verification Sample Analytical Results

Soil from sample locations 41, 42, 43, 45, 47, 58, 61, 62, and 63 (Figure 1) were composited and submitted for dioxin and furan compound analysis on July 7, 2009, before completion of the second phase of excavation to bedrock throughout the Phase 2 area. The composite sample dioxin/furan TEC was below the cleanup standard of 1.6×10^{-5} mg/kg (Table 2). Soil from sample locations 44, 46, 59 and 60 were not included in a second composite sample because these areas were excavated to bedrock during the first excavation (Figure 2). The cleanup of dioxin/furan-contaminated soil in the Phase 2 excavation is considered complete.

4. Phase 3 Excavation and Sampling Activities and Verification Sampling Results

Section 4.1 describes the three rounds of excavation performed in the Phase 3 area, the sampling conducted to verify achievement of the PCB cleanup standards, and the PCB sample analytical results. Section 4.2 describes the sampling conducted in the Phase 3 area to verify achievement of dioxin/furan cleanup standards, and the dioxin/furan analytical results.

4.1. Phase 3 Excavation and Sampling Activities and PCB Verification Sampling Results

In the Phase 3 area, soil was excavated to a depth of at least one foot, except where bedrock was encountered at a shallower depth. Following this soil excavation, the initial thirteen soil verification samples were collected on June 25, 2009 from locations 11, 12, 13, 27, 30, 31, 32, 33, 34, 35, 36, 39, and 40 for PCB analysis and for later compositing for dioxin/furan analysis. These sample locations and total PCB results are shown on Figure 1. The location of samples 11, 12, 13, and 40 were moved to the nearest area of soil due to excavation to bedrock at their initial sampling plan locations. Sample location 30 was moved west of location 31 because its

original location was found to fall within the Phase 5 area. Sample locations 32 and 33 were moved because their original locations were found to fall outside the excavation area. The PCB analytical results for the soil samples collected in the Phase 3 area are listed in Table 1. PCBs were detected at concentrations above the 0.74 mg/kg cleanup standard in samples collected from locations 11, 13, 27, 30, 31, 32, 33, 34, 35, 36, and 40 following the first excavation. The majority of the PCBs were Aroclor 1254. However, Aroclor 1260 was also detected (Table 1).

A second excavation was conducted in the Phase 3 area, removing an additional 2 ft of soil (3 ft total) in the area denoted as Subarea 3-1 on Figure 1. The excavation of Subarea 3-1 included soil removal from sample locations 11, 27, 30, and 31 up to the nearest sample locations with results below the cleanup standard or to bedrock. An additional 1.3 ft (2.3 ft total) of soil was excavated in the area denoted as Subarea 3-2 on Figure 1. The excavation of Subarea 3-2 included soil removal from sample locations 12, 13, 30, 32, 33, 34, 35, 36, and 40 up to the nearest sample locations with results below the cleanup standard or bedrock (Figure 1). A second set of verification samples, including dioxin/furan samples for compositing, were collected on November 17, 2009 from sample locations 11, 12, 13, 27, 30, 31, 32, 33, 34, 35, 36, and 40 and submitted for PCB analysis. The second set of verification samples are listed in Table 1 with an "A" following the sample ID (i.e., 3SS-850-3XXA). PCBs were detected at concentrations above the cleanup standard in the samples collected from locations 11, 31, and 36 following the second excavation.

A third excavation was conducted in the Phase 3 area. An additional 2 feet of soil (5 ft total) was excavated where present to this depth or to bedrock in the area denoted as Subarea 3-1-0 in Figure 1. The excavation of Subarea 3-1-0 included the removal of soil at sample locations 11 and 31 up to the nearest sample locations with a result below the cleanup standard. An additional 1 ft (3.3 ft total) of soil was excavated in the area denoted as Subarea 3-2-0 in Figure 1. The excavation of Subarea 3-2-0 included the removal of soil at sample location 36 up to the nearest sample locations with results below the cleanup standard (Figure 1).

Following the third excavation, a third set of verification samples were collected from sample location 31 in Subarea 3-1-0 and from sample location 36 in Subarea 3-2-0 on November 23, 2009 for PCB analysis. Bedrock was exposed and a surface soil sample could not be collected from location 11. New dioxin/furan samples for compositing were also collected from these sample locations 31 and 36. The third set of verification samples are listed in Table 1 with a "B" following the sample ID (i.e., 3SS-850-3XXB). PCBs were not detected in the third set of verification samples at concentrations above the 0.5 mg/kg detection limit. As a result, the cleanup of PCB-contaminated soil in the Phase 3 excavation is considered complete.

4.2. Phase 3 Dioxin/Furan Compound Verification Sample Analytical Results

Soil from sample locations 12A, 13A, 27A, 30A, 31B, 32A, 33A, 34A, 35A, 36B, 39A, and 40A (Figure 1) were composited and submitted for dioxin and furan compound analysis on December 1, 2009. The sample from location 11 was not included in the composite because this area was excavated to bedrock during the third excavation (Figure 2).

The dioxin/furan composite sample TEC was below the dioxin/furan cleanup standard of 1.6×10^{-5} mg/kg (Table 3). Therefore, the cleanup of dioxin/furan-contaminated soil in the Phase 3 excavation area is considered complete.

5. Phase 4 Excavation and Sampling Activities and Verification Sampling Results

Section 5.1 describes the two rounds of excavation performed in the Phase 4 area, the sampling conducted to verify achievement of the PCB cleanup standards, and the PCB sample analytical results. Section 5.1 also describes the PCB sampling and excavation conducted in the area west of the original Phase 4 area. Section 5.2 describes the sampling conducted in the Phase 4 area to verify achievement of dioxin/furan cleanup standards, and the dioxin/furan analytical results.

5.1. Phase 4 Excavation and Sampling Activities and PCB Verification Sampling Results

In the Phase 4 area, soil was excavated to a depth of at least one foot, except where bedrock was encountered at a shallower depth. Following this soil excavation, the initial thirteen soil verification samples were collected on June 30, 2009 from locations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 16, 23, and 24 for PCB analysis and for later compositing for dioxin/furan analysis. These sample locations and total PCB results are shown on Figure 1. The location of samples 1, 2, 4, and 7 were moved to the nearest area of sufficient soil due to excavation to bedrock at their initial sampling plan locations. Sample locations 3, 23, and 24 were moved as their original locations were found to fall either outside the excavation area, or in the adjacent excavation phase. The PCB analytical results for soil samples collected in the Phase 4 area are shown in Table 1. PCBs were detected at concentrations above the 0.74 mg/kg cleanup standard in samples collected from locations 2, 3, 4, 6, 7, 8, 9, 10, 16, and 24 following the first excavation.

Because PCBs were detected above the cleanup standard in the initial Phase 4 verification sample collected from the un-excavated area west of Phase 4 (sample location 10), new sample locations 75, 80, and 87 (Figure 1) were located in the field and sampled for PCBs on July 7 and 16, 2009 to bound the lateral extent of PCB contamination to the west of the Phase 4 area. PCBs were detected at concentrations above the 0.74 mg/kg cleanup standard in surface soil samples from locations 75 and 80 (Table 1).

A second excavation was conducted in the Phase 4 area. An additional 0.5 feet of soil (1.5 ft total) was excavated, where present to this depth, in the area denoted as Subarea 4-1 in Figure 1. The excavation of Subarea 4-1 included the removal of soil at sample locations 6, 7, 8, 16, and 24 up to the nearest sample location with a result below the cleanup standard or bedrock. An additional 1.3 ft of soil (2.3 ft total) was excavated in the area denoted as Subarea 4-2 in Figure 1. The excavation of Subarea 4-2 included the removal of soil at sample locations 2 and 4 up to the nearest sample location with a result below the cleanup standard or bedrock. The area denoted as Subarea 4-3 in Figure 1, that encompassed sample locations 10, 75, and 80, was also excavated to 1 ft or less, resulting in exposed bedrock throughout this area (Figure 2). Following the second excavation, bedrock was exposed in all of the Phase 4 area and a second set of verification samples could not be collected from locations 2, 3, 4, 6, 7, 8, 9, 10, 16, 24, 75, and 80 for PCB analysis.

Because all the contaminated soil was removed, the cleanup of PCB-contaminated soil in the Phase 4 area is considered complete.

5.2. Phase 4 Dioxin/Furan Compound Verification Sample Analytical Results

Because the entire Phase 4 area was excavated to bedrock during the second excavation, samples collected from locations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 16, 23, and 24 following the first round of soil excavation were not composited and analyzed for dioxin and furan compounds and no dioxin/furan TEC was calculated (Figure 2). No samples were collected for compositing and dioxin/furan analysis from locations 75, 80, and 87 in Subarea 4-3 because this area was excavated to bedrock during excavation.

Because all the contaminated soil was removed, the cleanup of dioxin/furan-contaminated soil in the Phase 4 excavation area is considered complete.

6. Phase 5 Excavation and Sampling Activities and Verification Sampling Results

Section 6.1 describes the three rounds of excavation performed in the Phase 5 area, the sampling conducted to verify achievement of the PCB cleanup standards, and the PCB sample analytical results. Section 6.2 describes the sampling conducted in the Phase 5 area to verify achievement of dioxin/furan cleanup standards, and the dioxin/furan analytical results.

6.1. Phase 5 Excavation and Sampling Activities and PCB Verification Sampling Results

In the Phase 5 area, soil was excavated to a depth of at least one, two, or three feet, depending on the original excavation plan. Following this soil excavation, the initial thirteen soil verification samples were collected on September 10 and 15, 2009 from locations 14, 15, 17, 18, 19, 20, 21, 28, 29, 37, 38, 48, and 55 for PCB analysis and for later compositing for dioxin/furan analysis. These sample locations and PCB results are shown on Figure 1. The location of samples 14, 15, 17, 18, 19, 20, 21, 28, and 29 were moved to the nearest area of sufficient soil due to excavation to bedrock at their initial sampling plan locations. The location of sample 37 was moved upslope (south) due to safety concerns of working on the steep slope. The PCB analytical results for soil samples collected in the Phase 5 area are listed in Table 1. PCBs were detected at concentrations above the 0.74 mg/kg cleanup standard in samples collected from locations 14, 17, 18, 19, 29, 37 and 38 following the first excavation.

Due to the detection of PCBs at concentrations exceeding the cleanup standard at sample locations 14, 17, 18, 19, 29, 37 and 38, a second round of excavation was conducted in the Phase 5 area. An additional 1.3 feet of soil (4.3 ft total) was excavated, where present to this depth, in the area denoted as Subarea 5-1 in Figure 1. The excavation of Subarea 5-1 included the removal of soil at sample location 29 up to the nearest sample location with a result below the cleanup standard (sample location 28) and the edges of the original 3 ft cut area or bedrock. The southern extent of Subarea 5-1 was selected by projecting a line perpendicular from the western extent of the Phase 5 area west to sample point 28.

An additional 1.3 ft of soil (3.3 ft total) was excavated in the area denoted as Subarea 5-2 in Figure 1. The excavation of Subarea 5-2 included the removal of soil at sample locations 14, 17, 18, 19, 37 and 38 up to the nearest sample location with a result below the cleanup standard (samples location 21 on the west and 48 on the east, and the edges of the original northern and southern boundaries of the Phase 5 area or bedrock (Figures 1 and 2).

A second set of verification samples were collected from Subareas 5-1 and 5-2 on November 2 and 3, 2009 for PCB analysis. The second set of verification samples are listed in Table 1 with an "A" following the sample ID (i.e., 3SS-850-3XXA). PCBs were detected at concentrations above the 0.74 mg/kg cleanup standard in the samples from location 29A in

Subarea 5-1 and locations 14, 18, and 19 in Subarea 5-2. These PCB results indicated that further excavation was required in Subarea 5-1 and in two portions of Subarea 5-2.

A third round of excavation was conducted in which the entire extent of Subarea 5-1 was excavated to bedrock, thereby removing all PCB-contaminated soil (Figure 2.)

Subarea 5-2 was further subdivided into Subareas 5-2-1 containing sample locations 14 and 38, and Subarea 5-2-2 containing sample locations 18 and 19, in which a third round of soil excavation was conducted (Figure 1).

The third round of excavation conducted in Subarea 5-2-1 removed an additional 2.2 ft of soil (5.5 ft total or to bedrock) between sample locations 14 and 38. The depth and western extent of additional excavation in Subarea 5-2-1 was determined by digging a test pit at a location just east of sample location 38 where the extrapolation of the 0.74 mg/kg cleanup standard would fall (location 402 on Figure 1), and collecting samples from the side wall on November 11, 2009, just above the soil-bedrock contact at a total depth of 5.5 ft. The eastern extent of excavation was defined by sample location 14, where bedrock had been exposed at ground surface after the second excavation. PCBs were not detected in the location 402 sample. Therefore, location 402 was used to bound the western edge of Subarea 5-2-1. In a third phase of excavation, soil was excavated to a total depth of 5.5, or to bedrock) from location 402 eastward to sample location 14 where bedrock was exposed at the surface.

The depth and lateral extent of excavation to be conducted in Subarea 5-2-2 were determined by digging four test pits. Test pit 1 was located between sample locations 17 and 18 where the extrapolation of the 0.74 mg/kg cleanup standard would fall (shown as location 403 on Figure 1). Test pits 2 and 3 were located at sample locations 18 and 19, respectively. Test pit 4 was located between sample locations 19 and 21 where the extrapolation of the 0.74 mg/kg cleanup standard would fall (shown as sample location 404 on Figure 1).

On November 9, 2009, side wall samples were collected from the test pits as follows:

- Test pit 1 (sample location 403) sampled just below the contact of the upper alluvium and a lighter-colored soil horizon at a depth of 2.5 ft below ground surface at that point (total depth of 5.8 ft.)
- Test pit 2 (sample location 18) sampled in the same horizon at a depth of 2.0 ft from the current surface (total depth of 5.3 ft.)
- Test pit 3 (sample location 19) sampled in the same horizon at a depth of 2.5 ft from the current surface (total depth of 5.8 ft.)
- Test pit 4 (sample location 404 sampled in the same horizon at a depth of 1.0 ft below the current surface (total depth of 4.3 ft.)

The samples collected at sample locations 18 and 19 were the third set of verification samples collected at these locations, and thus are shown in Table 1 with a "B" following the sample ID (i.e., 3SS-850-3XXB).

In order to expedite the excavation activities in advance of the impending wet season, all soil was removed between locations 403 and 404 to a total depth of 5.8 ft (2.5 additional ft) prior to obtaining PCB results. It was later determined that PCBs were not detected in the samples collected at test pit 1 (location 403), test pit 2 (location 18), and test pit 4 (location 404) (Table 1). However, the sample collected in test pit 3 (location 19) contained PCBs above the cleanup standard. Therefore, an additional 0.5 ft was excavated from the entire 5-2-2 area. Following this fourth excavation, a surface soil verification sample was collected again at sample location

19 on November 17, 2009 at a total depth 6.3 ft. No PCBs were detected in the fourth verification sample (shown in Table 1 with a "C" following the sample ID [3SS-850-319C]).

As a result of these sampling, analysis, and excavation activities, the cleanup of PCB-contaminated soil in the Phase 5 excavation area is considered complete.

6.2. Phase 5 Dioxin/Furan Compound Verification Sample Analytical Results

Soil from sample locations 15, 17A, 18B, 19C, 20, 21, 28, 37A, 38A, 48, and 55 (Figure 1) were composited and identified as sample 3SS-850-370. In addition, soil from new sample locations 402, 403, and 404 (Figure 1) were composited and identified as sample 3SS-850-405. Both samples were submitted for dioxin and furan compound analysis on November 24, 2009. Sample locations 14 and 29 were not composited and analyzed for dioxin and furan compounds because these areas were excavated to bedrock during the third excavation (Figure 2).

The dioxin/furan TEC was below the dioxin/furan cleanup standard of 1.6×10^{-5} mg/kg in both sample 3SS-850-370 (Table 4) and 3SS-850-405 (Table 5). Therefore, the cleanup of dioxin/furan-contaminated soil in the Phase 5 excavation is considered complete.

7. Phase 6 Excavation and Sampling Activities and Verification Sampling Results

Section 7.1 describes the two rounds of excavation performed in the Phase 6 area, the sampling conducted to verify achievement of the PCB cleanup standards, and the PCB sample analytical results. Section 7.2 describes the sampling conducted in the Phase 6 area to verify achievement of dioxin/furan cleanup standards, and the dioxin/furan analytical results.

7.1. Phase 6 Excavation and Sampling Activities and PCB Verification Sampling Results

Because PCBs were detected in the initial Phase 3 verification sample from location 27, located at the western edge of the excavation area, new sample locations 71, 72, 73, 74, 78, 79, 89, and 90 (Figure 1) were sampled for PCBs on July 7, 2009 to bound the lateral extent of PCB contamination west of Phase 3. The PCB analytical results for soil samples collected in the Phase 6 area are listed in Table 1. PCBs were detected at concentrations above the 0.74 milligrams per kilogram (mg/kg) PCB cleanup standard at ground surface at sample locations 73, 74, 78, and 79.

As shown on Figure 1, the area around these new locations and bounded by sample locations 72, 89, and 90 and lines extending to the edges of the Phase 3 area was designated as Phase 6. Surface soil was excavated in the Phase 6 area to a depth of at least 1.3 feet. The initial verification samples were collected from the newly-exposed ground surface at sample locations 73, 74, 78, and 79 on November 17, 2009 for PCB and dioxin/furan analysis. The initial verification samples are shown in Table 1 with an "A" following the sample ID (i.e., 3SS-850-3XXA). PCB concentrations were below the 0.74 mg/kg PCB cleanup standard in samples from locations 73, 74, and 78 (Table 1), but above the cleanup standard at sample location 79 (Table 1).

A second excavation was conducted in Phase 6, removing an additional 1.3 feet of soil (2.6 ft total) in the area denoted on Figure 1 as Subarea 6-1. The excavation of Subarea 6-1 included soil removal from sample location 79 up to the nearest sample location with a result below the cleanup standard. Following the second excavation, bedrock was exposed and a second set of verification samples could not be collected from location 79 for PCB analysis. Because PCB verification samples results were below the PCB cleanup standard or contaminated soil was

removed to bedrock (Subarea 6-1), the cleanup of PCB-contaminated soil in the Phase 6 excavation is considered complete.

7.2. Phase 6 Dioxin/Furan Compound Verification Sample Analytical Results

Soil from sample locations 72A, 73A, 74A, 78A, 89A, and 90A (Figure 1) were composited as sample 3SS-850-400 that was submitted for dioxin and furan compound analysis on November 24, 2009. Soil from location 79 was not included in the dioxin and furan composite because this area was excavated to bedrock during the second excavation. Soil from location 71 was not included in the composite because soil from more proximal locations along the southwestern edge of Phase 6 were already included in the composite, i.e. locations 72A and 90A.

The dioxin/furan TEC in composite sample 3SS-850-400 was below the dioxin/furan cleanup standard of 1.6×10^{-5} mg/kg (Table 6). Therefore, the cleanup of dioxin/furan-contaminated soil in the Phase 6 excavation is considered complete.

8. Phase 7 Excavation and Sampling Activities and Verification Sampling Results

Section 8.1 describes the one round of excavation performed in the Phase 7 area, the sampling conducted to verify achievement of the PCB cleanup standards, and the PCB sample analytical results. Section 8.2 describes the sampling conducted in the Phase 7 area to verify achievement of dioxin/furan cleanup standards, and the dioxin/furan analytical results.

8.1. Phase 7 Excavation and Sampling Activities and PCB Verification Sampling Results

Because PCBs were detected above the cleanup standard in the initial Phase 4 verification sample from locations 2 and 3, located at the northern edge of the excavation area, new sample locations 81, 82, 84, 96, 97, and 98 (Figure 1) were located in the field and sampled for PCBs on July 13, 21, and 28, 2009 to bound the lateral extent of PCB contamination to the north-northwest of the Phase 4 area. PCBs were detected at concentrations above the 0.74 mg/kg cleanup standard in surface soil samples from locations 81, 84, 96, and 97 (Table 1).

As a result, soil was excavated to bedrock (1 to 2 ft total) in the area denoted on Figure 1 as Phase 7. The excavation of the Phase 7 area included soil removal from sample locations 81, 84, 96, and 97 and was bounded by projecting lines from the furthest sample location with PCB results below the cleanup standard (location 98). The first line was projected from sample location 98 southwest to a point between sample locations 87 and 80 and intersected the area excavated to bedrock at Subarea 4-3. The second line defining Phase 7 was projected along a steep break in topography from sample location 98 to sample location 3. Sample location 3 contained < 0.5 and 1.1 (in duplicate sample) mg/kg of PCBs and was also excavated to bedrock.

Because all soil was removed to bedrock, no additional verification samples were collected. Because all the soil was removed (Figure 2), the cleanup of PCB-contaminated soil in the Phase 7 excavation is considered complete.

8.2. Phase 7 Dioxin/Furan Compound Verification Sample Analytical Results

Because the Phase 7 area was excavated to bedrock, no samples could be collected from locations 81, 82, 84, 96, 97, and 98 from compositing and dioxin/furan analysis, and no dioxin/furan sample TEC was calculated.

Because all the contaminated soil was removed, the cleanup of dioxin/furan-contaminated soil in the Phase 7 area is considered complete.

9. Summary and Conclusions

Approximately one to six feet of soil were removed during one to three rounds of excavation in the Phase 2 through 7 excavation areas as part of the Building 850 Soil Removal Action Project. Verification samples were collected following the various rounds of excavation and submitted for PCB and dioxin/furan analysis, unless soil was excavated to bedrock. The PCB and dioxin/furan analytical results for these samples verify that cleanup standards for PCBs, dioxins, and furans as specified in the Building 850 Action Memorandum (DOE, 2008) have been met in the Phase 2 through 7 areas. The excavated PCB- and dioxin/furan-contaminated soil was solidified and consolidated in the Building 850 Corrective Action Management Unit (CAMU) and a cover consisting of clean soil mixed with 10% cement was placed on the top and sides of the CAMU. Because winter rains have commenced that could destabilize the excavated slopes surrounding Building 850, DOE/LLNL has completed restoration of these areas.

10. References

- Dibley, V., L. Ferry, M. Taffet, G. Carli, and E. Friedrich (2008), *Engineering Evaluation/Cost Analysis for PCB-, Dioxin, and Furan-contaminated Soil at the Building 850 Firing Table, Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (UCRL-AR-233862).
- U.S. DOE (2001), *Interim Site-Wide Record of Decision for Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (UCRL-AR-138470).
- U.S. DOE (2008), Action Memorandum for the Removal Action at the Building 850 Firing Table, Lawrence Livermore National Laboratory Site 300, Lawrence Livermore National Laboratory, Livermore, Calif. (LLNL-AR-403206).

Table 1. Building 850 Removal Action verification sample locations and PCB results.

	sunaing 850 Kei 	Depth	Aroclor	Aroclor	Total		
Sample	Sample ID	(ft)	1254	1260	PCB	Sample	Phase/
Location		(10)	(mg/kg)	(mg/kg)	(mg/kg)	date	Subarea
41	3SS-850-341	0	0.67	<0.5	0.67	6/18/09	2
42	3SS-850-342	1	< 0.5	< 0.5	< 0.5	6/18/09	2
43	3SS-850-343	1	< 0.5	< 0.5	< 0.5	6/18/09	2
44	3SS-850-344	1	0.89	< 0.5	0.89	6/18/09	2
44*	3SS-850-344	1	0.87	< 0.5	0.87	6/18/09	2
45	3SS-850-345	1	< 0.5	< 0.5	< 0.5	6/18/09	2
46	3SS-850-346	1	0.94	< 0.5	0.94	6/18/09	2
47	3SS-850-347	1	< 0.5	< 0.5	< 0.5	6/18/09	2
58	3SS-850-358	1	< 0.5	< 0.5	< 0.5	6/18/09	2
59	3SS-850-359	1	0.81	< 0.5	0.81	6/18/09	2
60	3SS-850-360	1	1.3	< 0.5	1.3	6/18/09	2
61	3SS-850-361	1	< 0.5	< 0.5	< 0.5	6/18/09	2
62	3SS-850-362	1	< 0.5	< 0.5	< 0.5	6/18/09	2
63	3SS-850-363	1	0.63	< 0.5	0.63	6/18/09	2
83	3SS-850-383	0	< 0.5	< 0.5	< 0.5	6/18/09	2
11	3SS-850-311	1	260	< 0.5	260	6/25/09	3
11	3SS-850-311A	3	1.4	< 0.5	1.4	11/17/09	3-1
12	3SS-850-312	1	0.61	< 0.5	0.61	6/25/09	3
13	3SS-850-313	1	0.78	< 0.5	0.78	6/25/09	3
13	3SS-850-313A	2.3	< 0.5	< 0.5	< 0.5	11/17/09	3-2
27	3SS-850-327	1.1	1.1	< 0.5	1.1	6/25/09	3
27	3SS-850-327A	3	< 0.5	< 0.5	< 0.5	11/17/09	3-1
30	3SS-850-330	1	30	4.7	34.7	6/25/09	3
30	3SS-850-330A	3	< 0.5	< 0.5	< 0.5	11/17/09	3-1
31	3SS-850-331	1	2	< 0.5	2	6/25/09	3
31	3SS-850-331A	3	2.2	< 0.5	2.2	11/17/09	3-1
31	3SS-850-331B	5	< 0.5	< 0.5	< 0.5	11/23/09	3-1-0
32	3SS-850-332	1	21	3.8	21	6/25/09	3
32*	3SS-850-332	1	23	< 0.5	23	6/25/09	3
32	3SS-850-332A	2.3	< 0.5	< 0.5	< 0.5	11/17/09	3-2
33	3SS-850-333	1	2.5	< 0.5	2.5	6/25/09	3
33	3SS-850-333A	2.3	< 0.5	< 0.5	< 0.5	11/17/09	3-2

Table 1. Building 850 Removal Action verification sample locations and PCB results (continued).

Sample Location	Sample ID	Depth (ft)	Aroclor 1254 (mg/kg)	Aroclor 1260 (mg/kg)	Total PCB (mg/kg)	Sample date	Phase/ Subarea
34	3SS-850-334	1	1.3	< 0.5	1.3	6/25/09	3
34	3SS-850-334A	2.3	0.62	< 0.5	0.62	11/17/09	3-2
35	3SS-850-335	1	2.7	< 0.5	2.7	6/25/09	3
35	3SS-850-335A	2.3	< 0.5	< 0.5	< 0.5	11/17/09	3-2
36	3SS-850-336	1	3.4	< 0.5	3.4	6/25/09	3
36	3SS-850-336A	2.3	8.3	1.3	9.6	11/17/09	3-2
36	3SS-850-336B	3.3	< 0.5	< 0.5	< 0.5	11/23/09	3-2-0
39	3SS-850-339	2	< 0.5	< 0.5	< 0.5	6/25/09	3
40	3SS-850-340	1	2.9	0.61	3.5	6/25/09	3
40	3SS-850-340A	2.3	< 0.5	< 0.5	< 0.5	11/17/09	3-2
1	3SS-850-301	1	< 0.5	< 0.5	< 0.5	6/30/09	4
2	3SS-850-302	1	83	14	97	6/30/09	4
3	3SS-850-303	1	< 0.5	< 0.5	< 0.5	6/30/09	4
3*	3SS-850-303	1	1.1	< 0.5	1.1	6/30/09	4
4	3SS-850-304	1	0.97	< 0.5	0.97	6/30/09	4
5	3SS-850-305	1	0.61	< 0.5	0.61	6/30/09	4
6	3SS-850-306	1	6.3	1.6	7.9	6/30/09	4
7	3SS-850-307	1	29	3.9	32.9	6/30/09	4
8	3SS-850-308	1	17	3.1	20.1	6/30/09	4
9	3SS-850-309	1	87	10	97	6/30/09	4
10	3SS-850-310	1	2.3	0.72	3.0	6/30/09	4
16	3SS-850-316	1	31	4.3	35.3	6/30/09	4
16*	3SS-850-316	1	27	0.74	27.74	6/30/09	4
23	3SS-850-323	1	<0.5	0.74	.74	6/30/09	4
24	3SS-850-324	1	17	1.8	18.8	6/30/09	4
18	3SS-850-318	2	31	4.4	35.4	9/15/09	5
18	3SS-850-318A	3.3	1.3	< 0.5	1.3	11/3/09	5-2
18	3SS-850-318B	5.3	< 0.5	< 0.5	< 0.5	11/9/09	5-2-2

Table 1. Building 850 Removal Action verification sample locations and PCB results (continued).

Sample Location	Sample ID	Depth (ft)	Aroclor 1254 (mg/kg)	Aroclor 1260 (mg/kg)	Total PCB (mg/kg)	Sample date	Phase/ Subarea
19	3SS-850-319	2	0.92	< 0.5	0.92	9/15/09	5
19	3SS-850-319A	3.3	5.6	0.52	7.1	11/3/09	5-2
19	3SS-850-319B	5.8	1.1	<0.5	1.1	11/9/09	5-2-2
19	3SS-850-319C	6.3	<0.5	<0.5	<0.5	11/17/09	5-2-2
20	3SS-850-320	2	<0.5	<0.5	<0.5	9/15/09	5
21	3SS-850-321	2	<0.5	<0.5	<0.5	9/15/09	5
28	3SS-850-328	3	< 0.5	< 0.5	< 0.5	9/10/09	5
29	3SS-850-329	3	8.9	1.5	10.4	9/10/09	5
29	3SS-850-329A	4.3	6.4	0.91	7.3	11/2/09	5-1
37	3SS-850-337	2	2.6	<0.5	2.6	9/15/09	5
37	3SS-850-337A	3.3	<0.5	< 0.5	< 0.5	11/2/09	5-2
38	3SS-850-338	2	6.9	1	7.9	9/15/09	5
38	3SS-850-338A	3.3	< 0.5	< 0.5	< 0.5	11/2/09	5-2
48	3SS-850-348	2	<0.5	<0.5	<0.5	9/15/09	5
55	3SS-850-355	2	< 0.5	< 0.5	< 0.5	9/15/09	5
402	3SS-850-402	5.5	< 0.5	< 0.5	< 0.5	11/9/09	5-2-1
403	3SS-850-403	5.8	< 0.5	< 0.5	< 0.5	11/9/09	5-2-2
404	3SS-850-404	4.3	< 0.5	< 0.5	< 0.5	11/9/09	5-2-2
71	3SS-850-371	0	< 0.5	< 0.5	< 0.5	7/7/09	6
72	3SS-850-372	0	< 0.5	< 0.5	< 0.5	7/7/09	6
73	3SS-850-373	0	0.91	< 0.5	0.91	7/7/09	6
73	3SS-850-373A	1.3	< 0.5	< 0.5	< 0.5	11/17/09	6-1
74	3SS-850-374	0	2.2	0.76	3.0	7/7/09	6
74	3SS-850-374A	1.3	< 0.5	< 0.5	< 0.5	11/17/09	6-1
78	3SS-850-378	0	1.8	0.57	2.4	7/7/09	6
78	3SS-850-378A	1.3	0.58	< 0.5	0.58	11/17/09	6-1
79	3SS-850-379	0	0.77	< 0.5	0.77	7/7/09	6
79	3SS-850-379A	1.3	0.92	< 0.5	0.92	11/17/09	6-1
89	3SS-850-389	0	< 0.5	< 0.5	< 0.5	7/16/09	6
90	3SS-850-390	0	< 0.5	< 0.5	< 0.5	7/16/09	6

Table 1. Building 850 Removal Action verification sample locations and PCB results (continued).

Sample Location	Sample ID	Depth (ft)	Aroclor 1254 (mg/kg)	Aroclor 1260 (mg/kg)	Total PCB (mg/kg)	Sample date	Phase/ Subarea
75	3SS-850-375	0	1.7	0.53	2.2	7/7/09	7
80	3SS-850-380	0	2.1	< 0.5	2.1	7/7/09	7
81	3SS-850-381	0	4.8	3.2	8.0	7/13/09	7
82	3SS-850-382	0	< 0.5	< 0.5	< 0.5	7/13/09	7
84	3SS-850-384	0	0.95	< 0.5	0.95	7/13/09	7
87	3SS-850-387	0	< 0.5	< 0.5	< 0.5	7/16/09	7
96	3SS-850-396	0	18	< 0.5	18	7/21/09	7
97	3SS-850-397	0	1.0	< 0.5	1.0	7/21/09	7
98	3SS-850-398	0	< 0.5	<0.5	<0.5	7/28/09	7

Notes:

ID = Identification

mg/kg = Milligrams per kilogram
PCB = Polychlorinated biphenyls
*= Field duplicate sample

Color Coding for Soil Sample Phase Excavation Area

Color Coul	Color Coung for Son Sample Fhase Excavation Area					
	Soil samples collected from Phase 2 excavation area					
	Soil samples collected from Phase 3 excavation area					
	Soil samples collected from Phase 4 excavation area					
	Soil samples collected from Phase 5 excavation area					
	Soil samples collected from Phase 6 excavation area					
	Soil samples collected from Phase 7 excavation area					

Table 2. Dioxin/furan compound analytical results and toxicity equivalent concentration for

composite sample 3SS-850-367° sampled on July 7, 2009 (Phase 2 area).

	Toxic Equivalent	Measured Concentration	Toxicity Equivalent
Compound	Factor ^b	(mg/kg)	Concentration
2,3,7,8-TCDD	1.00E+00	0.00E+00	0.00E+00
1,2,3,7,8-PeCDD	1.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDD	1.00E-01	5.61E-07	5.61E-08
1,2,3,6,7,8-HxCDD	1.00E-01	0.00E+00	0.00E+00
1,2,3,7,8,9-HxCDD	1.00E-01	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDD	1.00E-02	1.04E-05	1.04E-07
1,2,3,4,6,7,8,9-OCDD	1.00E-04	1.03E-04	1.03E-08
2,3,7,8-TCDF	1.00E-01	1.22E-05	1.22E-06
1,2,3,7,8-PeCDF	5.00E-02	1.45E-06	7.25E-08
2,3,4,7,8-PeCDF	5.00E-01	3.79E-06	1.90E-06
1,2,3,4,7,8-HxCDF	1.00E-01	1.02E-06	1.02E-07
1,2,3,6,7,8-HxCDF	1.00E-01	5.20E-07	5.20E-08
2,3,4,6,7,8-HxCDF	1.00E-01	3.45E-07	3.45E-08
1,2,3,7,8,9-HxCDF	1.00E-01	4.48E-07	4.48E-08
1,2,3,4,6,7,8-HpCDF	1.00E-02	9.14E-07	9.14E-09
1,2,3,4,7,8,9-HpCDF	1.00E-02	0.00E+00	0.00E+00
1,2,3,4,6,7,8,9-OCDF	1.00E-04	6.81E-07	6.81E-11
	Total t	oxicity equivalent concentration	3.60E-06

a Sample location 3SS-850-367 is a composite of samples collected from locations 41, 42, 43, 45, 47, 58, 61, 62, and 63. b World Health Organization 1998 Toxic Equivalent Factor.

Cleanup standard = 1.6 x 10⁻⁵ mg/kg (1.60E-05)

Table 3. Dioxin/furan compound analytical results and toxicity equivalent concentration for composite sample 3SS-850-368^a sampled on December 1, 2009 (Phase 3 area).

	Toxic Equivalent	Measured Concentration	Toxicity Equivalent
Compound	Factor ^b	(mg/kg)	Concentration
2,3,7,8-TCDD	1.00E+00	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,7,8-PeCDD	1.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDD	1.00E-01	$\mathbf{0.00E} {+} 00$	$\mathbf{0.00E} {+} 00$
1,2,3,6,7,8-HxCDD	1.00E-01	0.00E+00	0.00E+00
1,2,3,7,8,9-HxCDD	1.00E-01	2.11E-07	2.11E-08
1,2,3,4,6,7,8-HpCDD	1.00E-02	0.00E+00	0.00E+00
1,2,3,4,6,7,8,9-OCDD	1.00E-04	9.95E-07	9.95E-11
2,3,7,8-TCDF	1.00E-01	3.05E-06	3.05E-07
1,2,3,7,8-PeCDF	5.00E-02	6.21E-07	3.11E-08
2,3,4,7,8-PeCDF	5.00E-01	1.58E-06	7.90E-07
1,2,3,4,7,8-HxCDF	1.00E-01	5.77E-07	5.77E-08
1,2,3,6,7,8-HxCDF	1.00E-01	2.84E-07	2.84E-08
2,3,4,6,7,8-HxCDF	1.00E-01	2.18E-07	2.18E-08
1,2,3,7,8,9-HxCDF	1.00E-01	3.20E-07	3.20E-08
1,2,3,4,6,7,8-HpCDF	1.00E-02	3.24E-07	3.24E-09
1,2,3,4,7,8,9-HpCDF	1.00E-02	1.80E-07	1.80E-09
1,2,3,4,6,7,8,9-OCDF	1.00E-04	2.54E-07	2.54E-11
	Total t	oxicity equivalent concentration	1.29E-06

^a Sample location 3SS-850-368 is a composite of samples collected from locations 12A, 13A, 27A, 30A, 31B, 32A, 33A, 34A, 35A, 36B, 39A, and 40A.

b World Health Organization 1998 Toxic Equivalent Factor. Cleanup standard = 1.6×10^{-5} mg/kg (1.60E-05)

Table 4. Dioxin/furan compound analytical results and toxicity equivalent concentration for composite sample 3SS-850-370^a sampled on November 24, 2009 (Phase 5 area).

	Toxic Equivalent	Measured Concentration	Toxicity Equivalent
Compound	Factor ^b	(mg/kg)	Concentration
2,3,7,8-TCDD	1.00E+00	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,7,8-PeCDD	1.00E+00	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,4,7,8-HxCDD	1.00E-01	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,6,7,8-HxCDD	1.00E-01	2.10E-07	2.10E-08
1,2,3,7,8,9-HxCDD	1.00E-01	2.24 E-07	2.24E-08
1,2,3,4,6,7,8-HpCDD	1.00E-02	2.67E-06	2.67E-08
1,2,3,4,6,7,8,9-OCDD	1.00E-04	2.05E-05	2.05E-09
2,3,7,8-TCDF	1.00E-01	1.93E-05	1.93E-06
1,2,3,7,8-PeCDF	5.00E-02	4.45E-06	2.23E-07
2,3,4,7,8-PeCDF	5.00E-01	8.37E-06	4.19E-06
1,2,3,4,7,8-HxCDF	1.00E-01	2.28E-06	2.28E-07
1,2,3,6,7,8-HxCDF	1.00E-01	1.51E-06	1.51E-07
2,3,4,6,7,8-HxCDF	1.00E-01	6.40E-07	6.40E-08
1,2,3,7,8,9-HxCDF	1.00E-01	4.73E-07	4.73E-08
1,2,3,4,6,7,8-HpCDF	1.00E-02	9.15E-07	9.15E-09
1,2,3,4,7,8,9-HpCDF	1.00E-02	3.03E-07	3.03E-09
1,2,3,4,6,7,8,9-OCDF	1.00E-04	1.04E-06	1.04E-10
	Total t	oxicity equivalent concentration	6.91E-06

^a Sample location 3SS-850-370 is a composite of samples collected from locations 15, 17A, 18B, 19C, 20, 21, 28, 37A, 38A, 48, and 55.

b World Health Organization 1998 Toxic Equivalent Factor. Cleanup standard = 1.6×10^{-5} mg/kg (1.60E-05)

Table 5. Dioxin/furan compound analytical results and toxicity equivalent concentration for composite sample 3SS-850-405^a sampled on November 24, 2009 (Phase 5 area).

	Toxic Equivalent	Measured Concentration	Toxicity Equivalent
Compound	Factor ^b	(mg/kg)	Concentration
2,3,7,8-TCDD	1.00E+00	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,7,8-PeCDD	1.00E+00	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,4,7,8-HxCDD	1.00E-01	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,6,7,8-HxCDD	1.00E-01	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,7,8,9-HxCDD	1.00E-01	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,4,6,7,8-HpCDD	1.00E-02	2.22E-07	2.22E-09
1,2,3,4,6,7,8,9-OCDD	1.00E-04	8.44E-07	8.44E-11
2,3,7,8-TCDF	1.00E-01	0.00E+00	0.00E+00
1,2,3,7,8-PeCDF	5.00E-02	$\mathbf{0.00E} {+} 00$	0.00E+00
2,3,4,7,8-PeCDF	5.00E-01	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDF	1.00E-01	$\mathbf{0.00E} {+} 00$	$\mathbf{0.00E} \mathbf{+00}$
1,2,3,6,7,8-HxCDF	1.00E-01	$\mathbf{0.00E} {+} 00$	0.00E+00
2,3,4,6,7,8-HxCDF	1.00E-01	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,7,8,9-HxCDF	1.00E-01	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDF	1.00E-02	0.00E+00	0.00E+00
1,2,3,4,7,8,9-HpCDF	1.00E-02	0.00E+00	0.00E+00
1,2,3,4,6,7,8,9-OCDF	1.00E-04	1.00E-07	1.00E-11
·	Total t	oxicity equivalent concentration	2.31E-09

Notes: ^a Sample location 3SS-850-405 is a composite of samples collected from locations 402, 403, and 404. ^b World Health Organization 1998 Toxic Equivalent Factor. Cleanup standard = 1.6×10^{-5} mg/kg ($1.60\text{E}{-}05$)

Table 6. Dioxin/furan compound analytical results and toxicity equivalent concentration for composite sample 3SS-850-400^a sampled on November 24, 2009 (Phase 6 area).

	Toxic Equivalent	Measured Concentration	Toxicity Equivalent
Compound	Factor ^b	(mg/kg)	Concentration
2,3,7,8-TCDD	1.00E+00	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,7,8-PeCDD	1.00E+00	6.86E-08	6.86E-08
1,2,3,4,7,8-HxCDD	1.00E-01	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,6,7,8-HxCDD	1.00E-01	$\mathbf{0.00E} {+} 00$	0.00E+00
1,2,3,7,8,9-HxCDD	1.00E-01	4.13E-07	4.13E-08
1,2,3,4,6,7,8-HpCDD	1.00E-02	3.93E-07	3.93E-09
1,2,3,4,6,7,8,9-OCDD	1.00E-04	1.79E-06	1.79E-10
2,3,7,8-TCDF	1.00E-01	8.76E-06	8.76E-07
1,2,3,7,8-PeCDF	5.00E-02	1.56E-06	7.80E-08
2,3,4,7,8-PeCDF	5.00E-01	3.87E-06	1.94E-06
1,2,3,4,7,8-HxCDF	1.00E-01	9.63E-07	9.63E-08
1,2,3,6,7,8-HxCDF	1.00E-01	5.64E-07	5.64E-08
2,3,4,6,7,8-HxCDF	1.00E-01	3.64E-07	3.64E-08
1,2,3,7,8,9-HxCDF	1.00E-01	7.35E-07	7.35E-08
1,2,3,4,6,7,8-HpCDF	1.00E-02	3.36E-07	3.36E-09
1,2,3,4,7,8,9-HpCDF	1.00E-02	1.57E-07	1.57E-09
1,2,3,4,6,7,8,9-OCDF	1.00E-04	2.69E-07	2.69E-11
	Total to	oxicity equivalent concentration	3.27E-06

a Sample location 3SS-850-400 is a composite of samples collected from locations 72A, 73A, 74A, 78A, 89A, and 90A. b World Health Organization 1998 Toxic Equivalent Factor.

Cleanup standard = 1.6 x 10⁻⁵ mg/kg (1.60E-05)

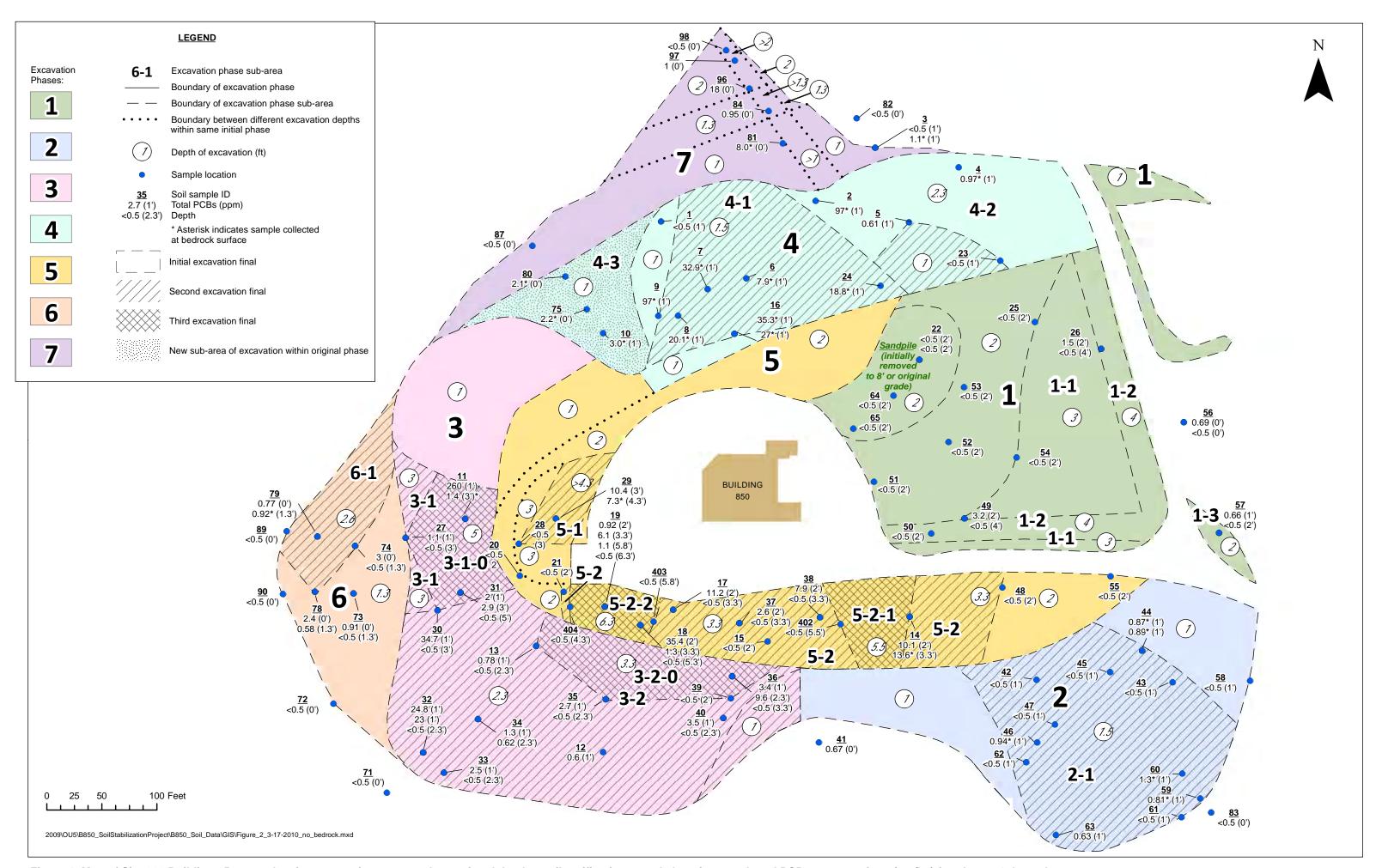


Figure 1. Map of Site 300 Building 850 area showing excavation areas and associated depths, soil verification sample locations, and total PCB concentrations (mg/kg) for phases 1 through 7.

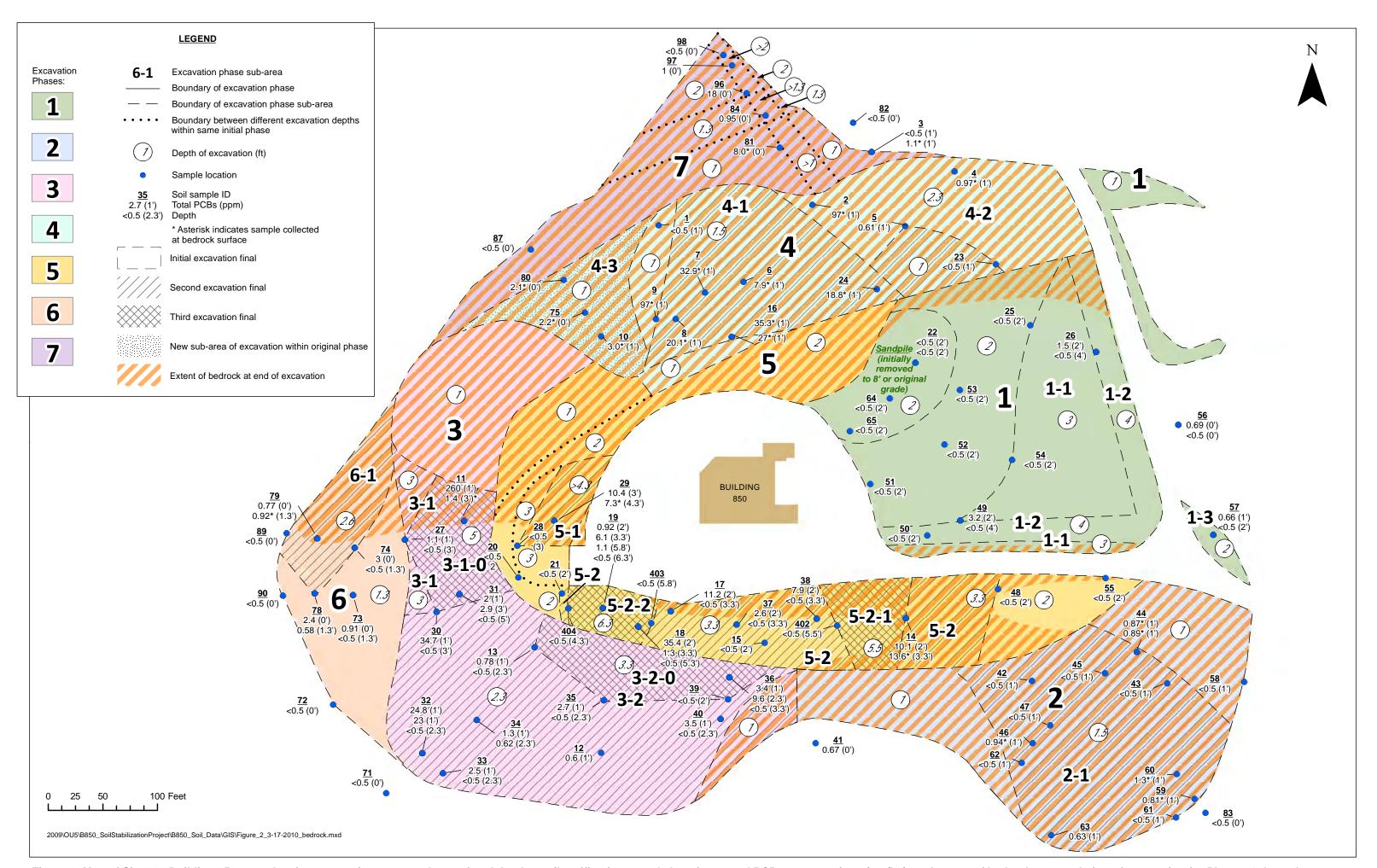


Figure 2. Map of Site 300 Building 850 area showing excavation areas and associated depths, soil verification sample locations, total PCB concentrations (mg/kg), and extent of bedrock at completion of excavation for Phases 1 through 7.

Appendix E

Building 850 Soil Removal Action Material and Product Description Sheets

FOOTHILL MATERIALS, INC.

P.O. BOX 147, VALLEY SPRINGS, CA 95252 3650 HOGAN DAM ROAD, VALLEY SPRINGS, CA 95252

> PHONE: (209) 728-8176 FAX: (209) 728-3475

ATTN:

No. OF SHEETS

FAX: 925 240-3629 FROM: Verry Middlet	PROJECT: Hogan Quarry PROJECT No.: 09-002
MESSAGE/COMMENTS: Hacked	you will find a
Submittal for our	- 5x12 Rip Rup
and some sudju	n syltate test results
	Am



File No. 20-2520-02.LAB November 10, 1997

Jerry Middleton Ford Construction Company, Inc. 639 E. Lockeford Street Lodi, CA 95240

Subject:

LABORATORY TEST RESULTS SODIUM SULFATE SOUNDNESS

PO #9460(100-14)

Dear Mr. Middleton:

At your request we performed a Sodium Sulfate Soundness test on crushed aggregate that was sampled and delivered on October 20, 1997 by your representative. The test was performed in accordance with the applicable ASTM and Caltrans standards. Presented in the following table are the test results.

ASTM C-88, Sodium Sulfate Soundness

Sample I. D. 1/2" X 3/8"

% Loss

0.64

L 15% OK

CTM 214, Sodium Sulfate Soundness

Sample I. D.

1/2" X 3/8"

% Loss 0.35

If you have any questions, please contact me.

Respectfully submitted,

KLEINFELDER, INC.

K. C. Crawford

Laboratory Supervisor

KC:kcc

Copyright Kleinfelder Inc. 1997

20-2520-02 LAB/2017L562 KLEINFELDER 2825 East Myrtle Street, Stockton, CA 95205-4794 (209) 948-1345

FOOTHILL MATERIALS, Inc.

P.O. Box 147 Valley Springs, CA 95252 (209) 728-8176

August 21, 2009

Hogan Quarry 5" x 12" Rip Rap Section 72 Rock Slope Protection (No. 2 Class RSP)

The Hogan Quarry 5" x 12" Rip Rap supplied by FOOTHILL MATERIALS Inc. conforms to the specification requirements of Caltrans Section 72, RSP for Number Two Backing. This Rip Rap is produced at the Hogan Rock Quarry in Calaveras County near the town of Valley Springs. The typical physical properties of the aggregate are summarized below.

Sieve Size	Hogan Quarry	% Larger Caltrans Section 72
		No. 2 Class RSP
75 pound	5 %	0 - 5
25 pound	61 %	25 - 75
5 pound	92 %	90 - 100
Specific Gravity	2.80	2.5 min
Absorption, %	0.1%	4.2% max
Durability Index	62	52 min
Abrasion Loss,	13.8% (1,000	revolutions)

If you have any questions, concerns, or need more information please call (209) 728-8176.

Sincerely,

Foothill Materials, Inc.

Jerry Middleton Project Manager

This data have been consolidated from information and tests of materials submitted to material laboratorics that are assumed to be representative of the materials to be used. All test have been made in compliance with current ASTM or applicable methods of testing. No liability arising out of the use of this data will be assumed by this corporation



SOLVENT WELD

SUBMITTAL AND DATA SHEET

PERFORATED UNDERDRAIN PIPE::

JM EAGLE™ PVC ASTM D3034 SOLVENT WELD SDR35 SEWER PIPE

JM EAGLE™ SOLVENT WELD SEWER PIPE CONFORMS TO SPECIFICATIONS PRIOR TO PERFORATION AND CELL CLASS 12454 OR 12364 AS DEFINED IN ASTM D1784

NOM	I. PIPE SIZE (IN)	O.D. (IN)	NOM. I.D. (IN)	MIN T. (IN)	APPROX. WEIGHT (LBS/FT)
	4"	4.215	3.961	0.120	1.022
4"	x 10' Perf	4.215	3.961	0.120	1.022
	6"	6.275	5.893	0.180	2.285
6"	x 10' Perf	6.275	5.893	0.180	2.285

- :: Standard Color: Green, Standard length: 10' or 20' Overall, Belled End Only
- :: Standard perforations for pipe are two rows of holes 1/2" in diameter on 5" centers and 120° angle apart.

Perforated pipe does not have ASTM designation on print line.

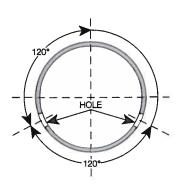
When using JM Eagle™ PVC ASTM D3034 Solvent Weld Sewer Pipe for septic tank fields, please install in accordance with ASTM D2321, and JM Eagle™ Publication JME-05B, "Gravity Sewer Installation Guide."

NO PRIMER

JM EAGLE™ PVC ASTM D2729 SOLVENT WELD DRAIN PIPE

UM EAGLE™ SOLVENT WELD DRAIN PIPE CONFORMS TO SPECIFICATIONS AND CELL CLASS

NOM. PIPE SIZE (IN)	O.D. (IN)	NOM. I.D. (IN)	MIN T. (IN)	APPROX. WEIGHT (LBS/FT)
3" Solid	3.250	3.102	0.070	0.465
3" Perf	3.250	3.102	0.070	0.465
4" Solid	4.215	4.056	0.075	0.648
4" Perf	4.215	4.056	0.075	0.648
6" Solid	6.275	6.063	0.100	1.300
6" Perf	6.275	6.063	0.100	1.300



- :: Standard Color: White, Standard length: 10' Overall, Belled End Only
- :: Standard perforations for pipe are two rows of holes 1/2" in diameter on 5" centers and 120° angle apart. Three perforation rows may be available.

When using JM Eagle™ PVC ASTM D2729 Solvent Weld Drain Pipe for septic tank fields, please install in accordance with ASTM F481, and JM Eagle™ Publication JME-05B, "Gravity Sewer Installation Guide."

* Prior to ordering or specifying, please consult JM Eagle™ for product and /or listing availability.

I.D.: Inside Diameter O.D.: Outside Diameter T.: Wall Thickness



September 28, 2009

RE:

JM Eagle PVC Pipe Manufactured in the USA

To Whom It May Concern:

This response is to confirm that JM Eagle's 4" SDR 35 Perforated PVC pipe is manufactured in the United States within the meaning of the Buy American provisions of the American Recovery and Reinvestment Act of 2009.

The resin used to produce our pipe is purchased on the open market in the USA from domestic producers. A majority of our resin is produced by our parent company in Texas, and ingredients used in compounding are also USA produced.

If you should have any further questions concerning the domestic content of our products, please feel free to contact me at extension 6233.

Sincerely,

William Luong

William Luong

Product Assurance Engineer



U.S. DEPARTMENT OF LABOR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

MATERIAL SAFETY DATA SHEET

DATE ISSUED: JANUARY 3, 2006

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME J-M Manufacturing Company, Inc.	EMERGENCY TELEPHONE NO. (973) 535-1633
ADDRESS (NUMBER, STREET, CITY, STATE, & ZIP CODE) 9 Peach Tree Hill Road, Livingston, NJ 07039	
CHEMICAL NAME AND SYNONYMS Polyvinyl Chloride [CAS #: 9002-86-2]	TRADE NAME AND SYNONYMS PVC plastic pipes
CHEMICAL FAMILY Polymer of Chlorinated Hydrocarbon	FORMULA (CH₂CHCI) _π

SECTION II - HAZARDOUS INGREDIENTS

Paints, Preservati	ves, Solvents	%	TLV	Alloys & Metallic Coating		%	TLV
Pigments	N/A			Base Metal	N/A		
Catalyst	N/A			Alloys	N/A		
Vehicle	N/A			Metallic Coatings	N/A		
Solvents	N/A			Filler Metal plus coating or core flux	N/A		
Additives	N/A			Others	N/A		
Others	N/A						

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV*
PVC [CAS #: 9002-86-2], A Nuisance Dust		10 mg/M ³
May/may not contain trace amounts of Vinyl Chloride Monomer		1 ppm
[CAS#: 75-01-4], A carcinogen determined by IARC and OSHA No		

^{*}TLVs refer to airborne concentrations over 8-hr TWA

SECTION III - PHYSICAL DATA

Boiling Point (°F)	N/A	Specific Gravity (H ₂ 0=1)	1.4
Vapor Pressure (mm Hg)	N/A	Percent Volatile by Volume	N/A
Vapor Density (Ar=1)	N/A	Evaporation Rate (=1)	N/A
Solubility in Water	Insol.	1	

Appearance & Odor: Pipes are green, blue, gray, white, brown, purple, buff, and are odorless.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): 734°F SELF-IGNITION: 850°F (ASTM D1929)
FLAMMABLE LIMITS: N/A

EXTINGUISHING MEDIA:

Water, carbon dioxide, or dry chemical (ABC only).

SPECIAL FIRE FIGHTING PROCEDURES:

Wear NIOSH approved, positive pressure, self-contained breathing apparatus, and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

PVC is nonflammable and nonexplosive under normal conditions of use. An external fire causes it to burn and Hydrogen Chloride gas is liberated.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE:

Shown on first page; no acute health effects associated with inhalation of PVC dust.

EFFECTS OF OVEREXPOSURE:

May cause eye, skin, nose, and throat irritation. Prolonged exposure may cause adverse effects on lungs.

EMERGENCY AND FIRST AID PROCEDURES:

No emergency situation is likely to arise from the routine handling of PVC pipes. However, should it happen: Eyes – immediately flush eyes with clean water for at least 15 minutes. Skin – wash affected area with soap and water. Inhalation – remove to fresh air. Ingestion – dilute swallowed material by drinking water and obtain medical attention. If symptoms develop, consult a physician.

SECTION VI - REACTIVITY DATA

STABILITY: XX CONDITIONS TO	STABLE UNSTABLE AVOID:
Do not heat t	o temperatures greater than 350°F, which causes slow darkening and n. Higher heat (>482°F) increases rate & evolution of HCI gas (an acidic &
INCOMPATIBILIT Fluorine, ace	Y (MATERIALS TO AVOID): yl, amine-containing materials, certain ketones & organic solvents.
HAZARDOUS DE	COMPOSITION PRODUCTS: mposition produces HCI, CO, and CO₂ (482°F).
HAZARDOUS POI CONDITIONS TO	YMERIZATION: May occurX_Will not occur AVOID: N/A

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

Remove sources of ignition, use adequate ventilation and wear a dust respirator. Sweep, vacuum or shovel up the spill.

WASTE DISPOSAL METHOD:

Handle in accordance with Federal, State and local environmental control regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

needed.	OTECTION (SPECIFY TYPE): Use NIOSH/	
VENTILATION:	LOCAL EXHAUST - YES	SPECIAL - N/A
	MECHANICAL (GENERAL) - N/A	OTHER - N/A
SKIN PROTECTIO	N: Minimize contact with product. Wear clothing.	gloves and/or suitable long sleeved
EYE PROTECTION	: Wear safety glasses with side shields against dust.	, goggles or face shield for protection
OTHER PROTECT	VE EQUIPMENT: Not required for ordinar	y handling.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

Use with adequate ventilation. Avoid contact with eyes and skin. Electrostatic charge may build up during handling. Grounding of equipment is recommended. Store in a cool dry, well-ventilated area silo away from sources of heat, flame, and sparks. When opening railcar for unloading, ventilate before entering.

OTHER PRECAUTIONS:

All tools, which may create PVC dust in excess of the exposure limits, shall be provided with local exhaust ventilation systems.

Note: This information is given without warranty, representation, inducement or license of any kind, except that it is accurate to the best of our knowledge or obtained from sources believed by us to be accurate, and we do not assume any legal responsibility for use or reliance upon it.



CERTIFICATE OF COMPLIANCE

8/27/09

S C S Engineers

Attn: Lenard Long

This is to certify that the 12"& 21" 16ga Corrugated Metal Pipe with Band Couplers, and Flared End Sections, supplied by Pacific Corrugated Pipe Co, to S C S Engineers, for the LLNL Site 300 Bldg 850 project complies in all respects with Caltrans Sect. 66 & 70, AASHTO Bridge Sect 12, M-36 & M-218 as well as ASTM A796 & A929 including mechanical property requirements. Further more, we certify that all manufacturing processes for all steel materials occurred within the United States.

Copies of certified mill test reports showing the chemical analysis and weight of coating for each heat, lift, coil number, gauge, size and type of material used to fabricate this material, are on_file and available at any time in the steel manufacturer's office.

Glenn Horner

Pacific Corrugated Pipe Co.

5" diam Sch 80 PVC Well Cashy (Blink)

45-ft Long Sections (New ones)

4 5-ft Long Sections

PVC Pressure And Strength Tables

Pipe Size	Collapse Pre	ssure (psi)	Burst Pre	essure (psi)	Tensile St	rength (lb)
(inches)	Sch. 40	Sch. 80	Sch. 40	Sch. 80	Sch. 40	
1/2	1,100	2,700	300	425	264	Sch. 80
3/4	630	1,590	240	345	362	487
1	520	1,270	225	315	581	727
1-1/4	300	770	185	260	859	878
1-1/2	220	590	165	235	954	1,225
2	140	390	140	200	942	1,542
2-1/2	180	450	150	210	2,093	2,890
3	120	320	130	185	2,786	3,839
4	70	210	110	160	4,119	5,823
5	50	150	95	145	5,491	6,864
6	40	140	90	140	7,165	11,384
8	30	100	80	. 125	10,387	17,332
10	20	85	70	115	15,086	25,124
12	16	80	65	115	19,548	34,430

COLLAPSE PRESSURE Pounds per square inch of external hydrostatic pressure that can be safely applied.

BURST PRESSURE

Pounds per square inch of internal hydrostatic pressure that can be safely applied.

TENSILE STRENGTH
The suspended weight
the threaded joint can
sustain in a vertical
position without causing
stretching or failure.

Manufactured By:

Bear Industrial Supply & Manufacturing

1600 E. 33rd St., Unit A, Long Beach, California 90807

562.989.6080 Phone 562.989.6090 Fax

Monoflex Product Catalog

Quality well screen and sampling equipment from the leading manufacturer of groundwater monitoring products since 1973





Monoflex Flush Thread Screens and Casings are used for groundwater monitoring, leak detection, recovery systems, water wells, etc. CNC computerized lathes are used to machine the threads to 2 TPI, 4 TPI, and 8 TPI (ASTM F-480) recommendations. Monoflex-designed automated slotting machines maintain continuous slot spacing and accuracy. Flush thread PVC is "Enviro-wrapped" as a standard procedure. In addition to the many popular screens and casings listed in this catalog, Monoflex offers a full range of other product combinations, (see charts below). Chart Key: (S) Standard, (O) Optional.

DIAMETERS	STA	NDARD	LENG	THS		SCH 40 ADS PER		SLOT WIDTHS	EN	RATED IDS _ABLE	_	PACIN F SLO	_
	2.5'	5'	10'	20'	2TPI	4TPI	8TPI	.006500*	PLUG	POINT	1/8"	1/4"	3/16"
1/2"	S	S	S	N/A			S	.006500*	0	N/A	S	0	0
3/4"	S	S	s	N/A			S	.006500*	0	N/A	S	0	0
1"	S	S	s	S			S	.006500*	0	0	S	0	0
1-1/4"	S	S	s	S			S	.006500*	0	0	S	0	0
1-1/2"	S	S	S	S		0	S	.006500*	0	0	S	0	0
2"	S	S	S	S	S	0	0	.006500*	0	0	S	0	0
2-1/2"	S	S	S	S	S	0	0	.006500*	0	N/A	S	0	0
3"	S	S	S	S	S	0	0	.006500*	0	0	S	0	0
4"	S	S	S	S	S	0	0	.006500*	0	0	S	0	0
5"	S	S	S	S	S	0	0	.006500*	0	N/A	S	0	0
6"	S	S	S	S	S	0	0	.006500*	0	N/A	0	S	0
8"	S	S	S	S	s			.015500*	0	N/A	N/A	S	N/A
10"	S	S	S	S	S			.020500*	0	N/A	N/A	S	N/A
12"	S	S	S	S	S			.020500*	0	N/A	N/A	S	N/A
14"	S	S	S	S	S			.050500*	0	N/A	N/A	S	N/A
16"	S	S	S	S	S			.060500*	0	N/A	N/A	S	N/A

DIAMETERS	STA	NDARI	LENG	THS		SCH 80 NDS PEI		SLOT WIDTHS	EN	RATED IDS _ABLE	_	PACIN F SLO	
	2.5'	5'	10'	20'	2TPI	4TPI	8TPI	.006500*	PLUG	POINT	1/8"	1/4"	3/16"
1/2"	S	s	S	N/A			S	.006500*	0	N/A	S	0	0
3/4"	S	S	S	N/A	-	S	0	.006500*	0	N/A	S	0	0
1"	S	S	S	S		S	0	.006500*	0	0	S	0	0
1-1/4"	S	S	S	S	S		0	.006500*	0	0	S	0	0
1-1/2"	S	S	S	S	S	0	0	.006500*	0	0	S	0	0
2"	S	S	S	S	S	0	0	.006500*	0	0	S	0	0
2-1/2"	S	S	S	S	S	0	0	.010500*	0	N/A	S	0	0
3"	S	s	s	S	S	0	0	.010500*	0	0	S	0	0
4"	s	s	S	S	S	0	0	.010500*	0	0	S	0	0
5"	s	s	S	S	S	0	0	.015500*	0	N/A	S	0	0
6"	S	S	S	S	S	0	0	.020500*	0	N/A	0	S	0
8"	s	s	s	S	S			.020500*	0	N/A	N/A	S	N/A
10"	s	s	S	s	S			.020500*	0	N/A	N/A	S	N/A
12"	s	s	S	S	S			.030500*	0	N/A	N/A	S	N/A
14"	s	s	S	S	S	1		.050500*	0	N/A	N/A	S	N/A
16"	S	S	S	s	S			.060500*	0	N/A	N/A	S	N/A

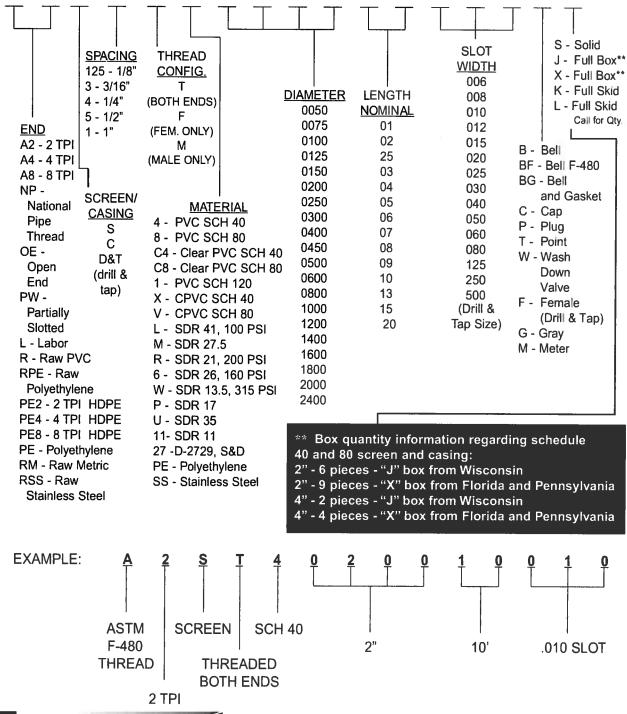
Lengths are measured as "laying length", (not including male thread length), in 2" and 4" diameters, Sch. 40 and Sch. 80 and 6" Sch. 80. All other diameters and schedules are measured end to end. Standard slot widths are .010, .012, .015, .020, .030 and .040 inch. Standard slot spacing is 1/8", 3/16" and 1/4". * Slot sizes .040 to .100 are manufactured at a minimum of 1/4" slot spacing. Slot sizes larger than .100 are manufactured at a minimum of 1/2" to 1" slot spacing Many custom slot widths and patterns are available upon request, (please call regarding setup charges). Standard flush thread PVC screens and casings are male x female. National Pipe Taper thread (NPT) is also available

Not all slot sizes and pipe diameters may be available from all plants.



MONOFLEX PART NUMBERING SYSTEM

(SCREEN, CASING, RAW PIPE AND CUSTOM DRILL & TAP ONLY)



VC PIPE SPECIFICATIONS

	PV	/C Sch	edule	40	
Nominal Pipe Size (in.)	O.D.	Average I.D.	Min. Wall	Nominal Wt./ft.	Max. W.P. PSI*
1/8	.405	.261	.068	.045	810
1/4	.540	.354	.088	.081	780
3/8	.675	.483	.091	.109	620
1/2	.840	.608	.109	.161	600
3/4	1.050	.810	.113	.214	480
1	1.315	1.033	.133	.315	450
1-1/4	1.660	1.364	.140	.426	370
1-1/2	1.900	1.592	.145	.509	330
2	2.375	2.049	.154	.682	280
2-1/2	2.875	2.445	.203	1.076	300
3	3.500	3.042	.216	1.409	260
3-1/2	4.000	3.520	.226	1.697	240
4	4.500	3.998	.237	2.006	220
5	5.563	5.017	.258	2.726	190
6	6.625	6.031	.280	3.535	180
8	8.625	7.943	.322	5.305	160
10	10.750	9.976	.365	7.532	140
12	12.750	11.890	.406	9.949	130
14	14.000	13.072	.437	11.810	130
16	16.000	14.940	.500	15.416	130
18	18.000	16.809	.562	20.112	130
20	20.000	18.743	.593	23.624	120
24	24.000	22.544	.687	32.873	120

	PV	/C Sch	edule	80	
Nominal Pipe Size (in.)	O.D.	Average I.D.	Min. Wall	Nominal Wt./ft.	Max. W.P. PSI*
1/8	.405	.203	.095	.058	1230
1/4	.540	.288	.119	.100	1130
3/8	.675	.407	.126	.138	920
1/2	.840	.528	.147	.202	850
3/4	1.050	.724	.154	.273	690
1	1.315	.935	.179	.402	630
1-1/4	1.660	1.256	.191	.554	520
1-1/2	1.900	1.476	.200	.673	470
2	2.375	1.913	.218	.932	400
2-1/2	2.875	2.289	.276	1.419	420
3	3.500	2.864	.300	1.903	370
3-1/2	4.000	3.326	.318	2.322	350
4	4.500	3.786	.337	2.782	320
5	5.563	4.767	.375	3,867	290
6	6.625	5.709	.432	5.313	280
* 8	8.625	7,565	.500	8.058	250
^ 10	10.750	9.492	.593	11.956	230
12	12.750	11.294	.687	16.437	230
14	14.000	12.410	.750	19.790	220
16	16.000	14.214	.843	25.430	220
18	18.000	16.014	.937	31.830	220
20	20.000	17.814	1.031	40.091	220
24	24.000	21.418	1.218	56.882	210

	PV	'C Scho	edule	120	
Nominal Pipe Size (in.)	O.D.	Average I.D.	Min. Wall	Nominal Wt./ft.	Max. W.P. PSI*
1/2	.84	.480	.170	.223	1010
3/4	1.050	.690	.170	.295	770
1	1.315	.891	.200	.440	720
1-1/4	1.660	1.204	.215	.614	600
1-1/2	1.900	1.423	.225	.744	540
2	2.375	1.845	.250	1.052	470
2-1/2	2.875	2.239	.300	1.529	470
3	3.500	2.758	.350	2.184	440
4	4.500	3.572	.437	3.516	430
6	6.625	5.434	.562	6.759	370

SDR 2	1 - W.P	. 200 PSI	(Water (a 73.4°F.)
Nominal Pipe Size (in.)	O.D.	Average I.D.	Min. Wall	Nominal Wt./ft.
3/4	1.050	.910	.060	.129
1	1.315	1.169	.063	.170
1-1/4	1.660	1.482	.079	.263
1-1/2	1.900	1.700	.090	.339
2	2.375	2.129	.113	.521
2-1/2	2.875	2.581	.137	.754
3	3.500	3.146	.167	1.106
3-1/2	4.000	3.596	.190	1.443
4	4.500	4.046	.214	1.825
5	5.563	5.001	.265	2.792
6	6.625	5.955	.316	3.964
8	8.625	7.755	.410	6.679

SDR	26 - W.I	P. 160 PS	l (Water (a 73.4°F.)
Nominal Pipe Size (in.)	O.D.	Average I.D.	Min. Wall	Nominal Wt./ft.
1	1.315	1.175	.060	.164
1-1/4	1.660	1.512	.064	.221
1-1/2	1.900	1.734	.073	.284
2	2.375	2.173	.091	.432
2-1/2	2.875	2.635	.110	.622
3	3.500	3.210	.135	.915
3-1/2	4.000	3.672	.154	1.183
4	4.500	4.134	.173	1.494
5	5.563	5.109	.214	2.288
6	6.625	6.085	.255	3.228
8	8.625	7.921	.332	5.468
10	10.750	9.874	.413	8.492
12	12.750	11.710	.490	11.956
14	14.000	12.860	.538	14.430
16	16.000	14.696	.615	18.810
18	18.000	16.534	.692	23.860
20	20.000	18.370	.769	29.470
24	24.000	22.043	.923	42.520

	LEA				
C	LEA		PVC S	Schedu	le 40
Nominal Pipe Size (in.)	O.D.	Average I.D.	Min. Wall	Nominal Wt./ft.	Max. W.P. PSI*
1/4	.540	.354	.088	.081	390
3/8	.675	.483	.091	.109	310
1/2	.840	.608	.109	.161	300
3/4	1.050	.810	.113	.214	240
1	1.315	1.033	.133	.315	220
1-1/4	1.660	1.364	.140	.429	180
1-1/2	1.900	1.592	.145	.509	170
2	2.375	2.049	.154	.682	140
2-1/2	2.875	2.445	.203	1.076	150
3	3.500	3.042	.216	1.409	130
3-1/2	4.000	3.520	.226	1.697	120
4	4.500	3.998	.237	2.006	110
6	6.625	6.031	.280	3,535	90
6 x 1/8	6.625	6.355	.125	1.647	45
8	8.625	7.943	.322	5.305	80

Note: Clear PVC Schedule 80 is available in 1/4" through 4" pipe diameters.

Bell and Gasket PVC Pipe is available in Schedules 40, 80, 120 and SDR's 21, 26, 35, 41 and C-900. Compounds used in the manufacture of PVC and CPVC Pipe meet ASTM Standard D-1784. Schedules 40, 80 and 120 PVC Pipe meet ASTM Standard D-1785. Pressure Rated (SDR Series) PVC Pipe meets ASTM Standard D-2241.

ASTM Standard D-1784 classification equivalents: PVC Normal Impact = Type I Grade I = PVC 1120 = Cell Classification 12454-B For more complete information, request "Condensed Catalog HPB-103-A&B" * Note: All pressure ratings are for water at 73.4° F with solvent cemented joints.

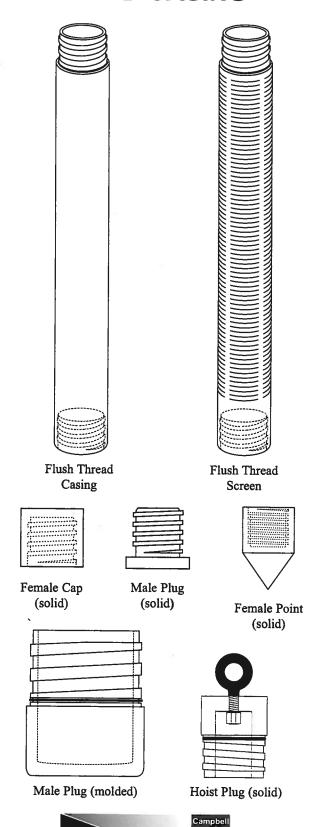


FLUSH THREAD PVC SCREEN AND CASING

- ✓ Monoflex CNC computer lathed flush threads follow ASTM F-480 recommendations for reliable, consistent results on the job site.
- ✓ Our close tolerances provide a strong connection while retaining ease of assembly.
- ✓ Manufactured from quality PVC pipe, Monoflex flush thread screens and casings are available in diameters of 1/2" through 16" with 2, 4, or 8 threads per inch in Sch. 40 & Sch. 80. Other schedules and SDR's are available in PVC and high density polyethylene.
- ✓ Lengths are measured as "laying length", (not including male thread length), in 2" and 4" diameters, Sch. 40 and Sch. 80 and 6" Sch. 80. All other diameters and schedules are measured end to end. Custom lengths are available in all diameters.
- ✓ All standard Monoflex PVC threads are compatible with other materials threaded to ASTM F-480 recommendations, with the same TPI. Note: Threads on 14" and 16" Monoflex screens and casings are not ASTM F-480 as the flush thread guideline does not specify pipe diameters larger than 12".
- ✓ All standard screens provide maximum net open area. A wide variety of slot sizes and spacings are available to adapt to various site conditions and applications.
- √ 1/2" through 6" Sch. 40 and Sch. 80 screens and casings are provided with Buna-N O-rings. O-rings may be installed or packaged separately depending on size. O-rings for all other sizes and schedules are sold separately. Please specify if O-rings are required when placing order.
- ✓ All flush thread screens and casings are Envirowrapped and hermetically sealed at both ends as a standard practice.

The following pages list flush thread PVC screens and casings along with the appropriate Buna-N Orings, and flush thread caps, plugs, and points. Custom lengths, threads and adapters are available.

Please specify part number when ordering.



ENGINEERING SPECIFICATIONS

PVC FLUSH THREAD MONITOR WELL SCREENS AND CASINGS

- 1. All PVC well screens and casings used on this project shall be manufactured by Monoflex and conform to ASTM F-480: "Standard Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), SCH 40 and SCH 80."
- PVC materials used to produce the raw PVC pipe shall meet ASTM Standard D-1784: "Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds for PVC Normal Impact, Type I Grade I (1120), cell classification 12454-B."
- 3. The finished schedules 40, 80, and 120 raw pipe shall meet the requirements of ASTM Standard D-1785: "Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120." In addition, both the raw material and the finished raw pipe shall be approved by the National Sanitation Foundation (NSF) for use in potable water applications.
- 4. The PVC pipe used to produce the well screens and casings shall be made from virgin plastic produced by the original compounder.
- 5. The pipe shall be homogeneous throughout and essentially uniform in color, opacity and density. The inside and outside surfaces shall be glossy in appearance and free of chalking, sticky or tacky material and visually free of oils, grease, dust and marks imparted as a result of the manufacturing process. In addition the pipe walls shall be free of ink, cracks, holes, blisters, voids, foreign inclusions, or other defects that are visible to the naked eye and that may affect the wall integrity. Machined slots or holes deliberately placed in the pipe are acceptable.
- 6. The outside diameters, wall thicknesses and out of roundness tolerances shall fall within the guidelines of Tables 1 & 2 of the ASTM F-480 Standard Specification when measured in accordance with Test Method D-2122.
- 7. All flush thread materials must be slotted and threaded without the use of any type of liquid coolant. Air is the only acceptable coolant.
- 8. Well screens 1/2" through 5" are to be slotted on 1/8" spacing. Well screens 6" and larger are to be slotted on 1/4" spacing unless otherwise specified. ALL well screens .040 slot and larger will be slotted on 1/4" spacing unless otherwise specified.
- 9. All screens and casings shall be nominal length except for 2" and 4" sch. 40 and 6" sch. 80 which shall be laying length. The term "laying length" refers to the overall length less the length required to complete the assembly.
- 10. The threads per inch for the various diameters and schedules of flush thread materials shall be the same as that produced by Monoflex, Bechtelsville, Pennsylvania or approved equal.
- 11. All flush thread screens & casings shall be supplied in individual polyethylene bags hermetically sealed at BOTH ends. Said products shall be shipped in cardboard boxes with properly secured ends. Each box shall display a color coded label containing a full description of the product inside. Said label must indicate the number of pieces per box, the threads per inch, the date of packaging, the signatures of the packer and QC inspector and show a drawing of the product.



N/A

♦ 4 INCH - PVC - SCHEDULE 80 ♦ CLASS (02)

4" Schedule 80 Buna-N O-rings are included with screen and casing orders at no additional charge. Replacement Buna-N O-rings may be purchased separately.

PART NUMBER	Flush Thread Casing	PIECES PER BOX
A2CT8040025	4" x 2.5' Casing	***
A2CT8040005	4" x 5' Casing	***
A2CT8040010	4" x 10' Casing	***
A2CT8040020	4" x 20' Casing	N/A
PART NUMBER	Flush Thread Screen	PIECES PER BOX
A2ST8040025_*	4" x 2.5' Screen	***
A2ST8040025 * A2ST8040005 *	4" x 2.5' Screen 4" x 5' Screen	***

* Specify Slot Size

PART NUMBER	DESCRIPTION	PIECES PER BOX
ORING155	4" Buna-N O-ring	N/A
MLDCAPA2F80400	4" Flush Thread Cap - Molded	20
MLDPLGA2M80400	4" Flush Thread Plug - Molded	20
PNTA2_†_80400	4" Flush Thread Point	20
MLDPNTA2	4" Flush Thread Point - Molded	20
PLGA2M80400HS	4" Hoist Plug - Male - Solid	N/A

4" x 20' Screen

† Specify M or F

♦ 5 INCH - PVC - SCHEDULE 80 ♦ CLASS (02)

5" Schedule 80 Buna-N O-rings are included with screen and casing orders at no additional charge. Replacement Buna-N O-rings may be purchased separately.

PART NUMBER	FLUSH THREAD CASING	PIECES PER BOX
A2CT8050025	5" x 2.5' Casing	1
*A2CT8050005	5" x 5' Casing	1
A2CT8050010	5" x 10' Casing	1
A2CT8050020	5" x 20' Casing	N/A

PART NUMBER	FLUSH THREAD SCREEN	PIECES PER BOX
A2ST8050025 *	5" x 2.5' Screen	1
A2ST8050005 *	5" x 5' Screen	1
A2ST8050010 *	5" x 10' Screen	1
A2ST8050020 *	5" x 20' Screen	N/A
* C		

* Specify Slot Size

PART NUMBER DESCRIPTION

CAPA2F80500 5" Flush Thread Cap
PLGA2M80500 5" Flush Thread Plug
PLGA2M80500HS 5" Hoist Plug - Male - Solid

*** For these items, see page 5 for Box Quantity Information



♦ 6 INCH - PVC - SCHEDULE 80♦ CLASS (02)

6" Schedule 80 Buna-N O-rings are included with screen and casing orders at no additional charge. Replacement Buna-N O-rings may be purchased separately.

PART NUMBER

FILISH THREAD CASING.

PROCES PER POY

 PART NUMBER
 FLUSH THREAD CASING
 PIECES PER BOX

 A2CT8060025
 6" x 2.5' Casing
 1

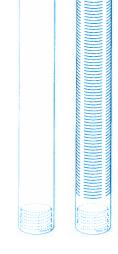
 A2CT8060005
 6" x 5' Casing
 1

 A2CT8060010
 6" x 10' Casing
 1

 A2CT8060020
 6" x 20' Casing
 N/A

PART NUMBER FLUSH THREAD SCREEN PIECES PER BOX A2ST8060025 * 6" x 2.5' Screen 1 A2ST8060005 * 6" x 5' Screen 1 A2ST8060010 * 6" x 10' Screen 1 A2ST8060020 * 6" x 20' Screen N/A * Specify Slot Size

PART NUMBERDESCRIPTIONORING2516" Buna-N O-ringCAPA2F806006" Flush Thread CapPLGA2M806006" Flush Thread Plug



♦ 8 INCH - PVC - SCHEDULE 80 ♦ CLASS (02)

A2CT8080005 8" x 5' Casing A2CT8080010 8" x 10' Casing A2CT8080020 8" x 20' Casing

 PART NUMBER
 FLUSH THREAD SCREEN

 A2ST8080025 *
 8" x 2.5' Screen

 A2ST8080005 *
 8" x 5' Screen

 A2ST8080010 *
 8" x 10' Screen

 A2ST8080020 *
 8" x 20' Screen

 * Specify Slot Size

PART NUMBER

ORING262

CAPA2F80800

PLGA2M80800

PLGA2M80800

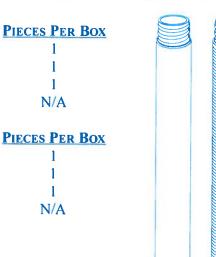
DESCRIPTION

8" Buna-N O-ring

8" Flush Thread Cap

PLGA2M80800

8" Flush Thread Plug

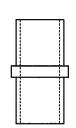




PVC SLIP FITTINGS & AD

<u>Male</u>		
ADAPTERS	SIZE	
40MA2	1/2"	
40MA3	3/4"	
40MA4	1"	
40MA5	1-1/4"	
40MA6	1-1/2"	
40MA8	2"	
40MA12	3"	
40MA16	4"	
40MA24	6"	
40MA32	8"	

FEMALE		
ADAPTERS	<u>Size</u>	
40FA2	1/2"	
40FA3	3/4"	\$=======\$
40FA4	1"	
40FA5	1-1/4"	
40FA6	1-1/2"	1
40FA8	2"	
40FA12	3"	
40FA16	4"	
40FA24	6"	
40FA32	8"	



INTERNAL SLIP COUPLINGS		Q TY
SCH 40 x SCH 40	<u>Size</u>	<u>Box</u>
ISC11/4S4	1-1/4" x 1-1/4"	10
ISC11/2S4	1-1/2" x 1-1/2"	10
ISC2S4	2" x 2"	10

INTERNAL SLIP COUPLINGS SCH 40 x SDR 26 <u>Size</u> ISC11/2S4XS160 1-1/2" x 1-1/2"

APTERS	CLASS (07)		
SLIP		_	
COUPLINGS	SIZE		
40SC2	1/2"		
40SC3	3/4"		
40SC4	1"		
40SC5	1-1/4"		
40SC6	1-1/2"		
40SC8	2"		
40SC12	3"		
40SC16	4"		
40SC20	5"		
40SC24	6"		
40SC32	8" 🦂	805432	
40SC40	10"	6 8" diam S	
40SC48	12"		
		consting	
SLIP CAPS		2	
SCH 40	<u>Size</u>		
40CAP2	1/2"		
40CAP3	3/4"		
40CAP4	1"		
40CAP5	1-1/4"		
40CAP6	1-1/2"		
40CAP8	2"		
40CAP10	2-1/2"		
40CAP12	3"	T	
40CAP16	4"	Larger sizes	
40CAP24	6"	available	
A0CAP32	8"	# 40 CAP20	
40CAP40	10"	7 11 11	

10"

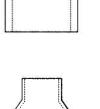
12"

REDUCING	
COUPLING	SIZE
RDCP4X2SXS	4" x 2"

40CAP40

40CAP48

REDUCING	
COUPLING	SIZE
RDCP4X2CL	4" x 2"
Clean line style	



45" diam slip (ap (sch 40)



PVC SURGE BLOCKS

CLASS (06)

Monoflex PVC surge blocks are used for well development or well rehabilitation. All units are constructed of solid PVC and machined to match the applicable inside diameter of Schedule 40 PVC wells. Internally threaded with female pipe thread for use with steel pipe extensions.

PART NUMBER	DESCRIPTION	LBS. EA.
SB2XFPT3/4	2" Solid Surge Block with 3/4" female NPT	.35
SB4XFPT1	4" Solid Surge Block with 1" female NPT	1.65
SB6XFPT11/4	6" Solid Surge Block with 1-1/4" female NPT	4.00



STAINLESS STEEL CENTRALIZERS

CLASS (08)

Monoflex adjustable centralizers hold screens and casings in place to eliminate off center placement during installation. Constructed from high quality spring stainless steel, Monoflex centralizers resist corrosion and will not contaminate the well. Stainless steel worm gears tighten easily for quick attachment to the screens and casings.

PART NUMBER	DESCRIPTION	LBS. EA.
SSC2X12	2" Adjusts up to 12" diameter hole	.40
SSC3X12	3" Adjusts up to 12" diameter hole	.55
SSC4X12	4" Adjusts up to 12" diameter hole	.60
SSC5X12	5" Adjusts up to 12" diameter hole	.60
SSC6X20	6" Adjusts up to 20" diameter hole	.70
★ SSC8X24	8" Adjusts up to 24" diameter hole	1.00
SSC10X26	10" Adjusts up to 26" diameter hole	1.00
SSC12X28	12" Adjusts up to 28" diameter hole	1.00

POROUS PIEZOMETERS/SPARGE POINTS CLASS (09)

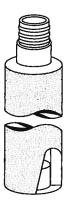
Monoflex manufactures porous polyethylene piezometers for water level measurements, water sampling and air sparging. They do not include any transducers or measuring equipment. The bottom has a PVC plug and the top is fitted with a 1" PVC Sch. 80 male (4 TPI) flush thread. Available in 12" and 24" lengths. The piezometers have a .935 inside diameter and a 50 micron pore size.

PART NUMBER	DESCRIPTION
PIEZPLY1.6X1X12	Porous Polyethylene Piezometer, 1.6" x 12"
PIEZPLY1.6X1X24	Porous Polyethylene Piezometer, 1.6" x 24"

Note: If Schedule 40 flush thread casing is to be used, a Sch. 40 x Sch. 80 adapter must be purchased separately. With sufficient notice, units can be made with your choice of Sch. 40 male (8TPI) flush thread, male NPT thread or plain end PVC pipe.

Other diameters, lengths, pore sizes and top fittings can be custom built to your specifications. Call for prices and availability.









Monoflex's four U.S. manufacturing facilities are strategically located to provide our high quality products on a timely basis throughout North America, South America, and overseas.

Monoflex Northeast Bechtelsville, Pennsylvania

Monoflex Southeast

Largo, Florida

Monoflex Midwest

Prairie du Sac, Wisconsin

Monoflex Southwest



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D.50	ount Codes	
020	Irrigation Specialty Products	
040	PVC Schedule 40 White Molded Fittings Thru 8"	
044	PVC Schedule 40 White Molded Fittings 10" and Larger	
13	PVC Schedule 40 Gray Molded Fittings	
046	PVC Schedule 40 Molded Reinforced Fittings	
047	PV Schedule 40 White Fabricated Fittings	
080	P) C Schedule 80 Molded Fittings Thru 8"	
001	PVC Schedule 80 Molded Fittings 10" and Larger	
082	PVC Schedule 80 Fabricated Pressure Fittings	
18	PVC Schedule 80 Molded Reinforced Fittings	
40	PVC & PP Insert Fittings 3/8" - 4"	
320	100# PIP (SDR41) Fabricated Fittings	
361	PVC Class 125 Molded Fittings 10" and Larger	

PVC White Schedule 40 Fittings, Unions & Saddles





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PRICE SCHEDULE 40-1-0308 Effective March 26, 2008 Supersedes: 40-1-0306A









PVC White Schedule 40 Fittings, Unions & Saddles

HOW TO USE THIS CATALOG

Spears® PVC White Schedule 40 Fittings, Unions & Saddles catalog has been arranged for easy use in selection of desired products according to part number, size, packaging and pricing information. A complete listing of content is located at the end of this catalog. Additional information on individual product dimensions can be found in Spears® publication 40-4, PVC White Schedule 40 Fittings, Unions & Saddles Weights & Dimensions.

ORGANIZATION

Products in this catalog are listed in columns by type and configuration. Similar configuration types are grouped together, such as Tees, then Elbows, etc.

COLUMN HEADER INFORMATION

Each product column header label identifies the following product particulars:

Part Number the number used to order the part.

Size nominal diameter of pipe with which the fitting is to be used. NOTE: Fittings may be same size (only one size designation) or reducing

(multiple sizes designated).

Standard Pack (Std Pk) the quantity of parts packaged in an individual box or bag.

Master Carton (Mstr Ctn) the total quantity of parts contained in individual boxes or bags which are packaged together.

Discount Code (Disc Code)

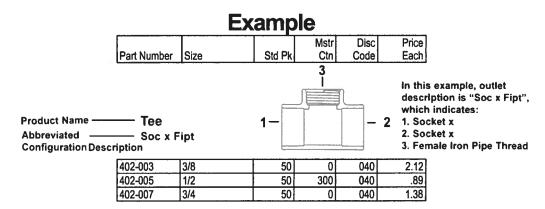
identification code for applicable discount to the list price of the product. NOTE: This is a Product Group code and is not a calculation of

discount. Discount codes are not the same for all products contained in this price schedule.

Price Each the designated list price of the product.

PRODUCT CONFIGURATION

Each group of product configuration types is headed by the product's name and an abbreviated configuration description of the fitting outlet connections. Configuration descriptions are defined on the following page. Line drawing illustrations are general representations of the fittings in the group, but may not be an exact depiction of all configurations listed. Line drawings are correlated to the configuration description. The drawing is read left to right for Elbow and Adapter configurations. Tees have an additional outlet branch and are read left to right (run) then top (branch). Drawings for Wyes and Crosses are read top to bottom then left to right and bushings drawings are read as outside x inside configuration. The configuration description also correlates to the size designation. As with the nominal size designations, only one description is given when all outlets are the same. Reducing sizes list run configuration x branch configuration. Refer to illustration below.



PVC White Schedule 40 Fittings, Unions & Saddles



		Std	Mstr	Disc	Price
Part Number	Size	Pk	Ctn	Code	Each

Coupling Soc



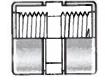
	Tata	T 501	2001	040	07
429-003	3/8	50	300	040	.97
429-005	1/2	50	600	040	.36
429-005N	1/2	50	600	040	.36
429-007	3/4	50	400	040	.49
429-007N	3/4	50	400	040	.49
429-010	1	50	0	040	.86
429-010N	1	50	0	040	.86
429-012	1-1/4	25	150	040	1.18
429-015	1-1/2	25	0	040	1.26
429-020	2	25	0	040	1.93
429-025	2-1/2	12	0	040	4.27
429-030	3	10	0	040	6.68
429-040	4	6	0	040	9.66
429-045F	4-1/2	1	10	047	43.02
429-050	5	5	0	040	17.70
429-060	6	5	0	040	30.56
429-080	8	8	0	040	57.07
429-100	10	1	1	041	166.33
429-100F	10	1	36	047	75.27
429-120	12	1	1	041	331.40
429-120F	12	1	0	047	110.80
429-140	14	1	0	041	484.54
429-140F	14	1	0	047	179.91
429-160F	16	- 1	0	047	200.66
429-180F	18	1	0	047	342.20
429-200F	20	1	0	047	596.97
429-240F	24	1	0	047	829.07

Coupling Fipt



430-005	1/2	50	600	040	.68
430-005G	1/2	50	500	043	.77
430-007	3/4	50	400	040	1.26
430-010	1	50	0	040	1.66
430-012	1-1/4	10	120	040	5.59

Special Reinforced Coupling SR Fipt - Stainless Steel Collar



430-005SR	1/2	25	300	046	3.10
430-007SR	3/4	25	300	046	4.41

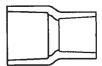
		S	d	Mstr	Disc	Price
Part Number	Size	<u> </u> F	k	Ctn	Code	Each

Special Reinforced Coupling (continued)

SR	Fipt	• ;	Stainless	Steel	Collar	
----	-------------	-----	-----------	-------	--------	--

430-010SR	1	25	200	046	4.71
430-012SR	1-1/4	10	120	046	5.87
430-015SR	1-1/2	10	60	046	12.99
430-020SR	2	10	0	046	13.62

Reducer Coupling Soc



429-101	3/4X1/2	50	200	040	.89
429-130 ¹	1X1/2	25	200	040	2.12
429-131	1X3/4	50	0	040	1.52
429-166 ¹	1-1/4X1/2	25	0	040	4.01
429-167 ¹	1-1/4X3/4	8	48	040	4.01
429-168	1-1/4X1	25	0	040	2.56
429-209 ¹	1-1/2X1/2	8	64	040	3.34
429-210	1-1/2X3/4	25	0	040	2.71
429-211 ¹	1-1/2X1	25	0	040	4.18
429-212	1-1/2X1-1/4	25	0	040	2.71
429-247 ¹	2X1/2	10	0	040	5.89
429-248 ¹	2X3/4	10	0	040	5.89
429-249 ¹	2X1	25	0	040	5.71
429-250 ¹	2X1-1/4	10	0	040	5.89
429-251	2X1-1/2	10	40	040	4.31
429-291 ¹	2-1/2X1-1/2	10	0	040	11.52
429-292	2-1/2X2	10	0	040	8.87
429-335 ¹	3X1	10	0	040	26.12
429-337 ¹	3X1-1/2	8	0	040	26.12
429-338	3X2	8	0	040	23.19
429-339 ¹	3X2-1/2	8	0	040	19.67
429-416 ¹	4X3/4	10	0	040	30.32
429-417 ¹	4X1	8	0	040	48.16
429-420	4X2	4	0	040	28.08
429-421 ¹	4X2-1/2	6	0	040	35.37
429-422	4X3	4	0	040	28.96
429-460F	4-1/2X4	1	4	047	46.18
429-486F	5X2	1	24	047	102.39
429-487F	5X2-1/2	1	10	047	88.58
429-488F	5X3	1	6	047	78.82
429-490F	5X4	1	6	047	50.89
429-491F	5X4-1/2	1	15	047	48.83
429-528F	6X2	1	4	047	75.43
429-530F	6X3	1	15	047	66.13
429-532	6X4	4	0	040	38.22
429-533F	6X5	1	15	047	58.31
429-534F	6X4-1/2	1	15	047	70.46
429-578F	8X2	1	4	047	167.90
429-580F	8X3	1	4	047	150.23

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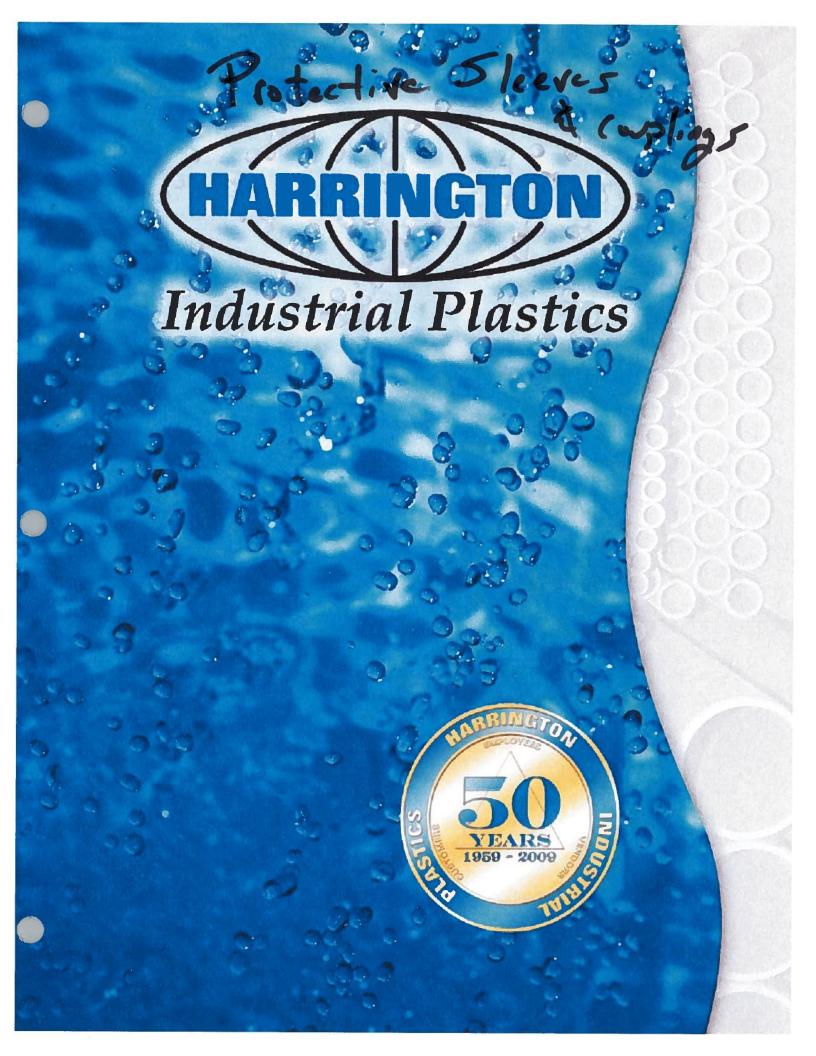
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Opposi

IIIIIIII

Do not test or use PVC piping for air or compressed gases. Care should be taken to avoid ketones, chlorinated hydrocarbon and aromatic solvents.

- IPS-sized (inches) 1/4" through 24".
- Schedule 40 pipe is not suitable for threading.
- Pipe sizes ¼" and ¾" are gray in color. All other pipe is normally white.
- Available in larger sizes on request.



Pipe Size (In.)	Part Number	Ust Price/Ft. (\$)	Approx. W1/100 Ft. (Lbs.)	Maximum Working Pressure ∰ 73.4*F	Outside Diameter (In.)	Minimum Wali Thickness (in.)
36 ·	400-001	1.44	5.1	810	.405	.068
14	400-002	1.14	8.6	780	540	.088
1/8	400-003	1.54	11.5	620	.675	.091
1/2	400-005	.84	17.0	600	.840	.109
34	400-007	1.04	22.6	480	1.050	.113
1	400-010	1.47	33.3	450	1.315	.133
114	400-012	1.91	45.0	370	1.660	.140
11/2	400-015	2.14	53.7	330	1.900	.145
2	400-020	2.78	72.0	280	2.375	.154
21/2	400-025	4.78	113.6	300	2.875	.203
3	400-030	5.84	148.8	260	3.500	.216
4	400-040	8.03	211.8	220	4.500	.237
5	400-050	14.96	287.4	190	5.563	.258
6	400-060	15.24	373.3	180	6.625	.280
8	400-080	24.21	561.9	160	8.625	.322
10	400-100	35.43	796.6	140	10.750	.365
12	400-120	47.28	1053.4	130	12.750	.406
14	400-140	58.54	1246.2	130	14.00	.437
16	400-160	75.81	1628.6	130	16.00	.500
18	400-180	98.02	2058.7	130	18.00	.562
20	400-200	124.68	2418.3	120	20.00	.593
24	400-240	176.93	3365.2	120	24.00	.687

PVC Fittings —— SCHEDULE 40 MOLDED -

HIII

Scr Toll PVC	Size (In.)	Part Number	List Price (
Wye	%	475-005	2.31
wye	34	475-007	3.63
		475-010	5.09
	11/4	475-012	7.82
	11/2	475-015	10.03
	2	475-020 475-030	30.10 50.70
	4	475-040	95.83
	6	475-060	202.32
	8	475-080	325.42
	10	475-100	1,078.29
	12 10x6	475-120	1,593.23
	10x8	475-626 475-628	924.07 1,026.74
Counting	34	429-003	0.97
Coupling	1/2	429-005	0.36
	*	429-007	0.49
1	1	429-010	0.86
	134	429-012 429-015	1.18 1.26
	2	429-020	1.20
	21/2	429-025	4.27
	3	429-030	6.68
	4	429-040	9.66
	5	429-050	17.70
	6	429-060	30.56
**	10	429-080 429-100	57.07 166.33
1	12	429-120	331.40
*	14	429 140	484.54
Coupling			
FPT	1/2	430-005	.61
	H 1	430-007	1.13
	11/4	430-010 430-012	1.49 5.03
Reinforced Coupli	na		
R FPT	У1	430-005SR	3.10
	74	430-007SR	4.41
		430-010SR	4,71
	1%	430-012SR	5.87
	11/2	430-015SR 430-020SR	12.99 13.62
Reduçer	16 x 16	429-101	0.89
Coupling	1x%	429-131	1.52
Coupling	1% x 1	429-168	2.56
	1½ x ¼ 1½ x 1¼	429-210 429-212	2.71 2.71
CONTRACTOR OF THE PARTY OF THE	2 x 1½	429-212	4.31
	2½ x 2	429-292	8.87
	3 x 2	429-338	23.19
	4x2	429-420	28.08
	4 x 3	429-422 429-532	28.96 38.22
	6x4		
Female Adanter	6x4		
	36	435-003	1.98
	36 32	435-005	0.60
	36 3/2 3/4	435-005 435-007	0.60 0.77
Female Adapter SXFPT	36 32	435-005	0.60

10		301122022	TO MOLOC
SCHOOL PVC	Size (In.)	Part Number	List Price (\$)
Female Adapter	2	435-020	2.12
SxFPT	21/5	435-025	5.37
Continued	3	435-030	7.22
Contained	4	435-040	11.97
	5	435-050	30.98
	6	435-060	44.02
	8	435-080	83.00
Reinforced Female Adapter	34	435-002SR	4.69
Female Adanter	16	435-0035R	4.69
SxSR FPT	1/2	435-005SR	2.60
SASKERI	34	435-0075R	3.79
		435-0105R	5.64
	134	435-0125R	9.12
	11/3	435-015SR	11.22
	2	435-020SR	19.57
	21/2	435-025SR	30.88
	3	435-0305R	34.80
	4	435-0405R	59.80
Reducing Female Adapter			
Adoptor	12x14	435-072	1.09
		435-073	1.09
SxFPT	1/2×1/4	435-074	1.09
	36x35	435-101	1.09
	34x1	435-102	1.44
	1x1/2	435-130	1.44
	1x34 1x11/2	435-131 435-133	1.44 2.90
		433-133	2.50
Reinforced Reduc	ing		
Female Adapter	1/2×34	435-0745R	3.79
SxSR FPT	14x1/2	435-1015R	3.79
JAJN FF1	Bix1	435-102SR	5.64
	1x1/2	435-130SR	5.64
	1x14	435-1315R	5.64
Outrat Famola			
Spigot Female	1/2	478-005	0.68
Adapter	34	478-007	0.80
	1	478-010	1.27
SPIGXFPT	134	478-012	1.78
	13/2	478-015	2.20
The Real Property lies	2	4/8-020	3.23
	3	478-030	10.96
	4	478-040	18.19
Reinforced Spigot		478-005SR	3.43
Female Adapter	lá.	478-0075R	4.04
	1	478-0105R	6.22
SPIGxSR FPT	1%	478-0125R	9.91
	135	478-015SR	11.87
	2	478-0205R	19.77
	3	478-0305R	36.33
	4	478-0405R	61.68
Key to Abbreviat	ione		

Key to Abbreviations

S Socket

FPT Fernate Iron Pipe Thread

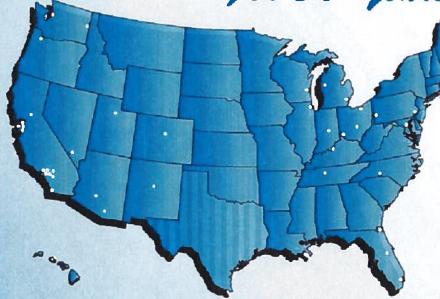
MPT Male Iron Pipe Thread

SPIG Spigot

Special Reinforced SR

Pipe Outside Diameter OD

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Ecology Controls M-Binder Mulch Tackifier-Soil Stabilizer

What Is Ecology Controls M-Binder?

Ecology controls M-Binder is composed of the finely ground outer coating of a seed. Nature has designed this protective coating to perpetuate this particular species. The plant produces a seed head which eventually drops to the ground. Moisture dampens the muciloid outer coating enough to fasten or stick the seed to the ground until germination starts.



Ecology Controls has selected this particular material for use as a tackifier in hydroseeding after many years of research. Ecology Controls M-Binder utilizes the natural property of the muciloid coating for the exact purpose nature intended: to bind seed and soil together until germination and growth begin.

Features:

- COST EFFECTIVE increases plant density and seed rention
- IMPROVES slurry suspension and slurry flow
- DURABLE forms a firm, resilient, rewettable membrane which fastens seed to soil surface
- · EASY to handle, easy to apply and easy to cleanup
- SAFE all organic-non-toxic, non-corrosive for animals and plant material
- VERSATILE used for Dust Abatement, Hydroseeding, Straw and Fiber Tackifying

Usage:

Ecology Controls M-Binder may be applied as a dry powder or as a wet slurry to dry or wet surfaces. It does not require set-up or drying time because when wet it is a heavy muciloid material and when dry it is a firm but rewettable membrane. It may even be applied during rain.

Ecology Controls M-Binder, whether used alone as a dust control product, or in combination with straw, fibers, seed and fertilizers in hydroseeding keeps materials where you want them.

Proven Results:

In a test of seven stabilizers by University of California at Davis (Agronomy progress report #49, Ag Experiment Station) Ecology Controls M-Binder proved to be superior in seed retention, promoting germination and controlling erosion.



Competitive Product



M-Binder



Fiber only, 1,000 lbs. per acre

Note: The above left and center illustrations soil has not cracked, fiber only has soil movement. Observe heaviest growth in the center photo M-Binder test. All treatments

contained wood fiber.



Haiku, Oahu, Hawaii Rainfall in excess of 200 inches per year



Southern California
Excellent soil retention, exceptionally uniform
germination (no irrigation)

TECHNICAL

GENERAL APPLICATION	RATES:*	SPECIFICATIONS:	
M-Binder	80-200 lbs.	Protein content	1.62
Water	as required for slurry flow	Ash content	2.70
Wood or Paper Fiber	as specified	Fiber	4.00
Seed	as specified	PH of 1% solution	6.80
*Rates vary depending on jo your specific needs.	b site-consult your Ecology Controls supplier for	Settleable Solids	5.00

Shipping Information:

Packed in 50 lb. polywoven-lined paper bags with loading instructions on the bag. All palletized shipments shrink wrapped and banded (2000 lbs./pallet).

Typical Specifications:

Wood Fiber shall be derived from Hemlock, Aspen or Alder chips dyed green in 50 lb. balcs. Applied at the rate of 1,000 to 2,000 lbs. per acre.

Soil Stabilizer shall be Ecology Controls M-Binder applied at the rate of 40 to 160 lbs. per acre. Add slowly to avoid lumping.

Fertilizer shall be as specified by architect, agency, or argronomist knowledgeable of existing soil conditions. Generally between 400 and 800 lbs. per acre.

Seed shall be of commercial quality and of the best standard of purity available and shall be free of noxious weeds. The weights of the various materials to be used in the slurry shall be determined from marked weights per sack and sack count or by weighing on approved scalos.

Mixing: The slurry shall be prepared by mixing mulch, seed, fertilizer, Ecology Controls M-Binder and water in the mixer in the proper proportions specified. The materials shall be loaded into the mixer and mixed in such sequence as to provide a thoroughly mixed, homogeneous slurry. The slurry shall have the proper consistency to adhere to the earth slopes without lumping or running.

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Seed Mixex: Wildflowers | Turfgrasses | Reclamation / Erosion

Other Products | New! Erosion Control Blankets



Earth Saver Rice Straw Wattle

Standard Configurations

🖸 Fiber

- 100% Noxious Weed Free Rice Straw
- Certified under Food & Agriculture Code Sections 5101 & 5205

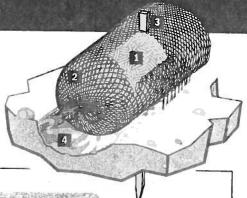
Netting Choices Anchor

- Photodegradable
- Biodegradable, natural fiber

■ 1x wood center stake

Trenching

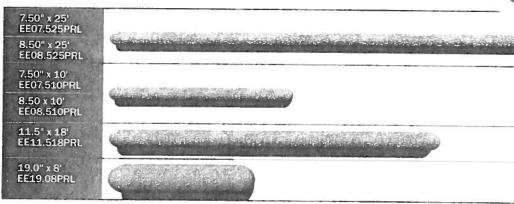
2-3 inch anchor furrow

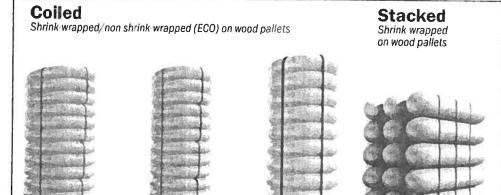


To meet ever changing project

specifications, Earth Saver® offers four

distinctive sizes. The first is the tried and true 7.5" dia. (190mm), meeting the Caltrans 175mm specification and an 8.5"dia. (216mm) wattle, again well-exceeding the minimum 200 mm Caltrans specification. The 12" nominal wattle is tagged 11.5" (292mm) and the 20" nominal wattle is tagged 19"





8.50" x 25' 8.00" x 25' (BIO)

12 wattles = 300 lin.ft.

EE07.525PRP-12 EE08.525PRP-12 EE0825BRP-12

Wrapped ES07.525PRP-12 ES08.525PRP-12 ES0825BRP-12

7.50" x 10' 8.50" x 10' 8.00" x 10' (BIO)

24 wattles = 240 lin.ft. (2 wattles per coil)

EE07.510PRP-24 EE08.510PRP 24 EE0810BRP 24

Wrapped ES07.510PRP 24 ES08.510PRP-24 ES0810BRP-24

11.5" x 18' 12.0" x 18' (BIO)

10 wattles = 100 lin.ft.

EE11 518BRP-8 EE11.518PRP-10 EE1218BRP-10

Wrapped

ES11 518PRP 8 ES11.518PRP-10 EE1218BRP 8 EE1218BRP-10

19" x 8'

15 wattles = 120 lin.ft. (Biodegradable net available)

Wrapped ES1908PRP-15

Material Ordering P - Net type (Photo) Nomenclature ... (Burlap) - Fiber type (Rice) i.g. ES07.525PRP-12 P - Packaging (Pallet) Loose -12 · Number of wattles/pallet 07.5 25 P Ρ 25 Length 07.5 - Diameter Shrink-wrapped w/cap E - ECO (minimal shrink wrap w/o cap) E - Manufacturer (Earth Saver)

(482mm) diameter.

Custom pallet quantities also available

1-866-WATTLES (928-8537) www.earth-savers.com



Earth Saver Rice Straw Wattle

Standard Configurations

II Fiber

- 100% Noxious Weed Free Rice Straw
- Certified under Food & Agriculture Code Sections 5101 & 5205

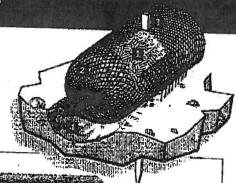
2 Netting Choices El Anchor

- Photodegradable
- Biodegradable: natural fiber

1x wood center stake

M Trenching

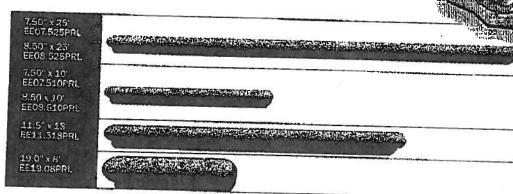
2-3 inch anchor furrow



To meet ever changing project

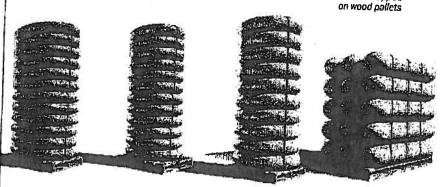
specifications, Earth Saver® offers four

distinctive sizes. The first is the tried and true 7.5" dia. (190mm), meeting the Caltrans 175mm specification and an 8.5"dla. (216mm) wattle, again well-exceeding the minimum 200 mm Caltrans specification. The 12" nominal wattle is tagged 11.5" (292mm) and the 20" nominal wattle is tagged 19"





Shrink-wrapped/non shrink-wrapped (ECO) on wood pallets



8.00" x 25" (EIO)

12 wattles = 300 lln.ft.

Eco EE07.525PRP-12 EE08.525PRP-12 EE0825BRP-12

Wrapped ES07.525PRP-12 ES08.525PRP-12 ES0825BRP-12

Custom pallet quantities

7.50" x 10" 8.50" x 10" (BIO) 8.00" x 10" (BIO)

24 wattles = 240 lin.ft. (2 wattles per colf)

ECO EE07.510PRP-24 EE08.510PRP-24 EE0810BRP-24

Wrapped ES07.510PRP-24 ES08.510PRP-24 ES08108RP-24

EE11.5188RP-8 EE11.518PRP-10 EE1218BRP-10

J.1,5" x 18' 12.0" x 18' (BIO)

10 wattles = 100 lin.ft.

Wrapped ES11.518PRP-A ES11.518PRP-10 EE1218BRP-9 EE1218BRP-10

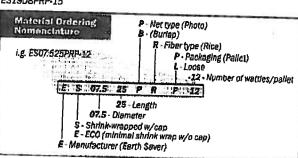
19" x 8"

Stacked

Shrink-wrapped

15 wattles - 120 lin.ft.

Wrapped ES1908PRP-15



(482mm) diameter.



CAL-VISTA EROSION CONTROL PRODUCTS

Specifications for STRAW WATTLES VARIATIONS

UV-8 & UV-12 Straw Wattles

The UV-8 and UV-12 Straw Wattles are manufactured from rice straw or other specified straw, and are wrapped in a tubular plastic netting. The netting has a strand thickness of 0.03 inch, and a knot thickness of 0.055 and a weight of 0.35 ounce per foot (each +/- 10%) and is made from 85% high density polyethylene, 14% ethyl vinyl acetate and 1% color for UV inhibition.

The UV-8 Straw Wattles are 8 inches in diameter (+/- one inch), and have a density weight of approximately 1.8 pounds per foot (+/- 10%). Maximum length is 25 feet long (+/- 0.5 feet).

The UV-12 Straw Wattles are 12 inches in diameter (+/- one inch), and have a density weight of approximately 4 pounds per foot (+/- 10%). Maximum length is 12 feet long (+/- 0.5 feet).

Bio-8 Straw Wattles

The Bio-8 Straw Wattles are manufactured from rice straw or other specified straw, and are wrapped in a 100% Biodegradable tubular 7 oz. Plain Burlap. The burlap is Medium Weight Natural Burlap with a 8 x 8 Warp & Fill and weigh 7 oz. per square yard.

The Bio-8 Straw Wattles are eight inches in diameter (4/- one inch), and have a density weight of approximately 1.6 pounds per foot (+/- 10%). Maximum length is 25 feet (+/- 0.5 feet).

Email: Info@CalVistaErosion.com • Websita: www.CalVistaErosion.com



P.O. Box 954 * Arbuokle, California 95912 Office: (530) 476-0706 * Fax: (530) 476-2554

Certificate of Compliance

Project:

April 27, 2009

Cal Vista Erosion Control Products, LLC Submittal

We certify that our Straw Wattles meet the requirements in Section 20-3, "Erosion Control," and specified dimensions in Section 20-2, "Materials" of the Caltrans Standard Specifications for fiber rolls.

The BIO-8 Type 2 Straw Wattles are manufactured from 100% noxious weed free rice straw and are wrapped in tubular 100% biodegradable 7 oz plain burlap. The burlap is medium weight natural burlap with a 8 x 8 warp & fill and weigh 7 oz. per square yard. The BIO-8 straw wattles are eight inches in diameter (+/- one inch), and have a density weight of approximately 1.6 pounds per foot (+/- 10%). Maximum length is 25 feet (+/- 0.5 feet).

Stakes shall be fir or pine and shall be a minimum of 25 mm imes 25 mm imes 600 mm in length.

Gerald Shadinger

Cal-Vista Erosion Control Products, LLC

Maccaferri reserves the right to amend product specifications without notice and specifiers are requested to check as to the validity of the specifications they are using

Table—Sizes for Reno mattresses						
L=Length ft (m)	W=Width ft (m)	H=Height in. (mm)	# of cells			
9 (2.7)	6 (1.8)	6 (150)	3			
12 (3.6)	6 (1.8)	6 (150)	4			
9 (2.7)	6 (1.8)	9 (230)	3			
12 (3.6)	6 (1.8)	9 (230)	4			
12 (3.6)	6 (1.8)	12 (300)	4			

All sizes and dimensions are nominal. Tolerances of ± 5% of the width, length, and ± 10% of the height shall be permitted.

Quantity	Request
Qualitity	vednesi

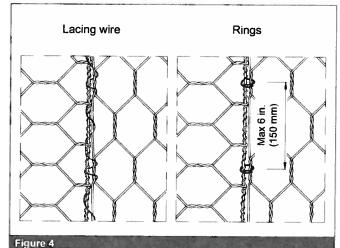
When requesting a quotation, please specify:

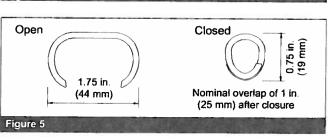
- number of units,
- size of units (length x width x height, see Fig. 1),
- type of mesh,
- type of coating.

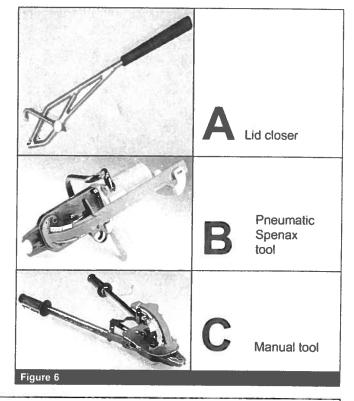
EXAMPLE: No. 100 Reno mattresses, 9x6x9, Mesh type 6x8, Wire diam. 0.087 in. (2.20 mm) Galvanized.

ndard mesh-wire		
D in. (mm)	Tolerance	Wire Dia in. (mm)
2.5 (64)	±10%	0,087 (2.20)
		D in. (mm) Tolerance

Table 3—Standard wire dia	ameters			
		Lacing Wire	Mesh Wire	Selvedge Wire
Wire Mesh Diameter	ø in.	0.087	0.087	0.106
	mm	(2.20)	(2.20)	(2.70)
Wire Tolerance	(±) ø in.	0.004	0.004	0.004
	mm	(0.10)	(0.10)	(0.10)
Minimum Quantity of Zinc	oz/ft²	0.70	0.70	0.80
	g/m²	(214)	(214)	(244)









Headquarters:

10303 Governor Lane Boulevard Williamsport, MD 21795-3116 Tel: 301-223-6910

Fax: 301-223-6134

website: www.maccaferri-usa.com email: hdqtrs@maccaferri-usa.com MACCAFERRI INC.

Area Offices:

AZ, Phoenix CA, Sacramento

FL, Coral Gables NJ, Ramsey

KY, Lexington MD, Williamsport

NM, Albuquerque PR, Caguas TX, Lewisville

TECHNICAL DATA SHEET

Rev: 01, Issue Date 04.01.2008

RENO MATTRESS

GALVANIZED

American Units

Product Description

The Reno mattress is a structure made of 6x8 double twisted hexagonal woven steel wire mesh type as per ASTM A975-97 (Fig. 1 and 2). Reno mattresses are filled with stones at the project site to form flexible and permeable, monolithic structures such as river bank protection and channel linings for erosion control.

The steel wire used in the manufacture of the mattress is heavily zinc-coated soft temper steel. The standard specifications of mesh and wire are shown in Table 2.

To reinforce the structure, all mesh panel edges are selvedged with a wire having a greater diameter (Table 3).

Reno mattresses are divided into cells by internal diaphragms. Dimensions and sizes of Reno mattresses are shown in Table 1.

Wire

All tests on wire must be performed prior to manufacturing the mesh. All wire should comply with ASTM A975-97, style 1 coating. Wire used for the manufacture of Reno mattresses and the lacing wire, shall have a maximum tensile strength of 75,000 psi (515 MPa) as per ASTM A641/A641M-03, soft temper steel.

Woven Wire Mesh Type 6x8

The mesh and wire characteristics shall be in accordance with ASTM A975-97 Table 1, Mesh type 6x8. The nominal mesh opening D = 2.5 in. (64 mm) as per Fig. 2.

The minimum mesh properties for strength and flexibility should be in accordance with the following:

- Mesh Tensile Strength shall be 2300 lb/ft (33.6 kN/m) minimum when tested in accordance with ASTM A975-97 section 13.1.1.
- Punch Test resistance shall be a minimum of 4000 lb (17.8 kN) when tested in compliance with ASTM A975-97 section 13.1.4.
- Connection to Selvedges should be 700 lb/ft (10.2 kN/m) when tested in accordance with ASTM A975-97.

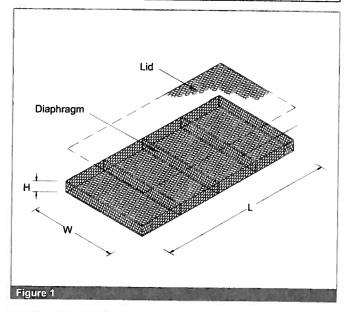
Lacing, Assembly and Installation

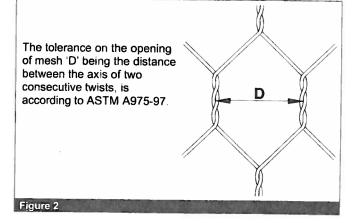
Reno mattresses are assembled and connected using lacing wire specified in Table 3 and described in Fig. 4. Galvanized steel ring fasteners can be used instead of, or to complement, lacing wire (Fig. 5 and Fig. 6).

Galvanized steel rings for galvanized Reno mattresses shall be in accordance with ASTM A975-97 section 6.3.

Spacing of the rings shall be in accordance with ASTM A975-97 Table 2, Panel to Panel connection, Pull-Apart Resistance. In any case, ring fasteners spacing shall not exceed 6 in. (150 mm) (Fig. 4).

Steel fasteners can be placed using pneumatic or manual tools (Fig. 6). For full details please see the Reno Mattress Product Installation Guide.







TECHNICAL DATA SHEET

Rev: 01, Issue Date 03.01.2007

American Units

GABION GALFAN®

Product Description

Gabions are baskets manufactured from 8x10 double twisted hexagonal woven steel wire mesh, as per ASTM A975-97 (Figs. 1, 2). Gabions are filled with stones at the project site to form flexible, permeable, monolithic structures such as retaining walls, channel linings, and weirs for erosion control projects.

The steel wire used in the manufacture of the gabion is heavily Galfan® (zinc-5% aluminum-mischmetal [Zn-5 Al-MM] alloy) coated soft temper steel. The standard specifications of meshwire are shown in Table 2.

The gabion is divided into cells by diaphragms positioned at approximately 3 ft (0.9 m) centers (Fig.1). To reinforce the structure, all mesh panel edges are selvedged with a wire having a greater diameter (Table 3). Dimensions and sizes of Galfan® gabions are shown in Table 1.

Gabions shall be manufactured and shipped with all components mechanically connected at the production facility.

Wire

All tests on wire must be performed prior to manufacturing the mesh. All wire should comply with ASTM A975-97, style 2 coating. Wire used for the manufacture of Gabions and the lacing wire, shall have a maximum tensile strength of 75,000 psi (515 MPa) as per ASTM A856-03, soft temper steel.

Woven Wire Mesh Type 8x10

The mesh and wire characteristics shall be in accordance with ASTM A975-97 Table 1, Mesh type 8x10. The nominal mesh opening D = 3.25 in. (83 mm) as per Fig. 2.

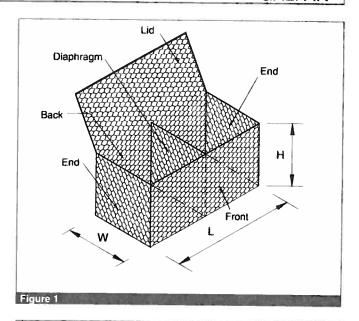
The minimum mesh properties for strength and flexibility should be in accordance with the following:

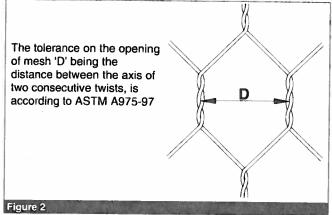
- Mesh Tensile Strength shall be 3500 lb/ft (51.1 kN/m) minimum when tested in accordance with ASTM A975-97 section 13.1.1.
- Punch Test resistance shall be a minimum of 6000 lb (26.7 kN) when tested in compliance with ASTM A975-97 section 13.1.4.
- Connection to Selvedges should be 1400 lb/ft (20.4 kN/m) when tested in accordance with ASTM A975-97.

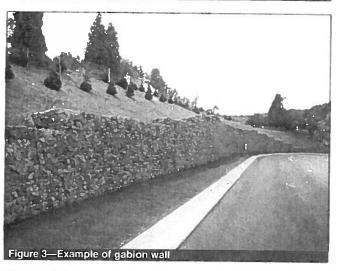
Lacing, Assembly and Installation

Gabion units are assembled and connected to one another using lacing wire specified in Table 3 and described in Fig. 4. MacTie preformed stiffeners or lacing wire can be used as internal connecting wires when a structure requires more than one layer of gabions to be stacked on top of each other. Internal connecting wires with lacing wire shall connect the exposed face of a cell to the opposite side of the cell. Internal connecting preformed stiffeners shall connect the exposed face of a cell to the adjacent side of the cell. Preformed stiffeners are installed at 45° to the face/side of the unit, extending an equal distance along each side to be braced (approximately 1 ft. (300 mm)). An exposed face is any side of a gabion cell that will be exposed or unsupported after the structure is completed.

Stainless steel ring fasteners can be used instead of, or to complement, the lacing wire (Fig. 5).







Maccaferri reserves the right to amend product specifications without notice and specifiers are requested to check as to the validity of the specifications they are using.

Table 1—Sizes for Gabions							
L=Length ft (m)	W=Width ft (m)	H=Height ft (m)	# of cells				
6 (1.8)	3 (0.9)	3 (0.9)	2				
9 (2.7)	3 (0.9)	3 (0.9)	3				
12 (3.6)	3 (0.9)	3 (0.9)	4				
6 (1.8)	3 (0.9)	1.5 (0.45)	2				
9 (2.7)	3 (0.9)	1.5 (0.45)	3				
12 (3.6)	3 (0.9)	1.5 (0.45)	4				
6 (1.8)	3 (0.9)	1 (0.3)	2				
9 (2.7)	3 (0.9)	1 (0.3)	3				
12 (3.6)	3 (0.9)	1 (0.3)	4				
4.5 (1.4)	3 (0.9)	3 (0.9)	1				

All sizes and dimensions are nominal Tolerances of \pm 5% of the width, height, and length of the gabions shall be permitted.

Stainless steel rings for Galfan® gabions shall be in accordance with ASTM A975-97 section 6.3.

Spacing of the rings shall be in accordance with ASTM A975-97 Table 2, Panel to Panel connection, Pull-Apart Resistance. In any case, ring fasteners spacing shall not exceed 6 in. (150 mm) (Fig. 4).

The rings can be installed using pneumatic or manual tools (Fig. 6).

For full details, please see the Gabion Product Installation Guide.

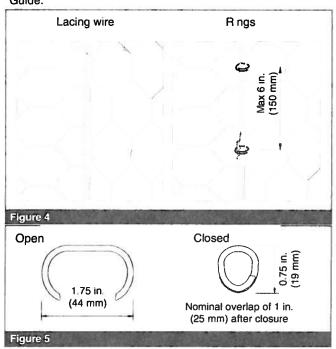


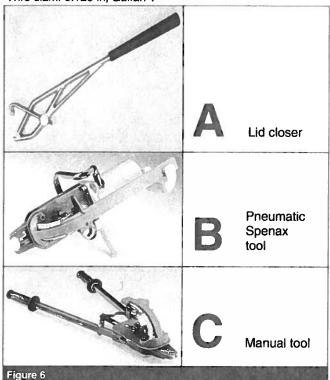
Table 2—Standard m	esh-wire		Will all the letter		
Туре	D in. (mm)	Tolerance	, Wire Dia in. (mm)		
8x10/ Galfan®	3.25 (83)	±10%	0.12 (3.05)		
Table 3—Standard wi	ire diameters				
	Lacing Wire	Mesh Wire	Selvedge Wire / Preformed Stiffeners		
Mesh Diameter ø in. (mm)	0.087 (2.20)	0.120 (3.05)	0.153 (3.90)		
Wire Tolerance (±) ø in. (mm)	0.004 (0.10)	0 004 (0 10)	0.004 (0.10)		
Minimum Quantity/Galfan oz/ft² (g/m²)	0.70 (214)	0 85 (259)	0 90 (275)		

Quantity Request

When requesting a quotation, please specify

- number of units,
- size of units (length x width x height, see Table 1),
- type of mesh,
- · type of coating.

EXAMPLE: No. 100 gabions, 6x3x3, Mesh type 8x10, Wire diam. 0.120 in, Galfan®.



MACCAFERRI

Headquarters:

10303 Governor Lane Boulevard Williamsport, MD 21795-3116 Tel: 301-223-6910

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MACCAFERRI INC.

Area Offices:

AZ, Phoenix KY, CA, Sacramento MD FL, Coral Gables NJ,

KY, Lexington MD, Williamsport NJ, Ramsey

NM, Albuquerque PR, Caguas TX, Lewisville



Gabions

Retaining Walls

Reno Mats

Engineering Services

Geogrids

Rockfall Mesh

Filter Fabrics

Erosion Control Products

llong@scsengineers.com

April 7, 2009

3650 Seaport Blvd.

Tel.: (916) 371-5805

Fax: (916) 371-0764

West Sacramento, CA 95691

Qte 28

Lenard D. Long, P.E., V.P.

SCS Engineers

6601 Koll Center Parkway, Ste. #140

Pleasanton, CA 94566

Tel.: (925) 240-5152, Ext. 22 Fax: (925) 240-5629

Project:

Tracy, CA 95304

To Supply:

Galvanized Gabions, Hog Rings and Pneumatic Tool

THE QUANTITIES FURNISHED ARE INTENDED ONLY TO ASSIST THE CONTRACTORS IN DOING THEIR OWN

Quantity	Unit	Description	Unit Price	Total
1	EA	Galvanized wire mesh gabion 6' x 3' x 3'		
2	EA	Galvanized wire mesh gabion 12' x 3' x 3'		
2	EA	Galvanized wire mesh gabion 12' x 3' x 1.5'		
2	EA	12' x 6' x 1' Reno Mattress Galv. (6x8) base&lid		
11	BX	Spenax Hog Rings - Galvanized (1600/box)		
1	EA	Spenax SC-50 Air Gun - Tool Rental (\$22.86/daily)		
		(\$1,000.00 deposit required for rental tool)		
	_			
		Subtotal		
		Tax		
		Freight		
		Total		

NOTES:	This is not a guaranteed bill of materials but our interpretation of the requirements of the pro-					
	Any variation to the quantities may be subject of a price revision.					
	Freight is a present fair estimate and will be charged as per actual at the time of delivery.					
Terms: Price valid for :	30 days from the date of this quotation					
Sales Tax:	? Included ? Excluded					
F.O.B.:	West Sacramento, CA ▼					
A	undament harmon and an additional broads					

Accepted in accordance terms and conditions herein Unless accepted by buyer within thirty (30) days expressed - subject to award of contract to the from date of issue, this quote will be subject to undersigned. revision.

By:

Title:

Firm: By: Title: Date:

Area Manager Website: www.maccaferri-usa.com E-mail: nhansen@maccaferri-usa.com

Neil Hansen







Mirafi® N-Series Nonwoven Polypropylene Geotextiles for Soil Separation and Drainage

TenCate™ develops and produces materials that function to increase performance, reduce costs and deliver measurable results by working with our customers to provide advanced solutions.

The Difference Mirafi® N-Series Nonwoven Geotextiles Make:

- Construction. Mirafi® N-Series polypropylene nonwoven geotextiles easily conform to the ground or trench surface for troublefree installation.
- Strength. Mirafi® N-Series geotextiles withstand installation stresses with high puncture and tear resistance.
- Drainage. High permittivity properties provide high water flow rates while providing excellent soil retention.
- Environmental. Mirafi® N-Series geotextiles are chemically stable in a wide range of aggressive environments.
- Cost Effective. Mirafi® N-Series geotextiles provide economical solutions to many civil engineering applications including a cost-effective alternative to graded-aggregate filters.

APPLICATIONS

Mirafi® N-Series nonwoven geotextiles are used in a wide variety of applications including soil separation and drainage applications. Lightweight nonwovens are predominantly used for subsurface drainage applications along highways, within embankments, under airfields, and athletic fields. For these drainage structures to be effective, they must have a properly designed protective filter.

Mirafi® N-Series nonwoven geotextiles eliminate the problems of determining the aggregate gradation required to match soil conditions, finding a convenient and economical source of a specific aggregate gradation, transporting and placing graded aggregate, and assuring that the in-place aggregate gradation provides effective filter performance.

Heavyweight nonwovens are used in critical subsurface drainage systems, soil separation, permanent erosion control, and geomembrane liner protection within landfills. These geotextiles provide the required strength and abrasion resistance to withstand installation and application stresses to



Mirafi® N-Series Nonwoven Geotextiles

create an effective, long-term drainage solution.

INSTALLATION GUIDELINES*

French and Trench Drains Geosynthetic Placement Cut geosynthetic to proper width prior to placement. Width should be enough to conform to the trench perimeter with at least a 15cm (6in) top overlap. Place the geosynthetic roll over the trench, and unroll enough geosynthetic that the geosynthetic can be placed down into the trench. Anchor the edges of the geosynthetic with heavy objects to prevent the geosynthetic from falling into the trench. Where overlaps are necessary between rolls, allow for 1m (3ft) overlap from the upstream to the downstream roll.

* These guidelines serve as a general basis for installation.

Detailed instructions are available from your TenCate™ representative.



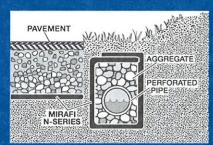


Mirafi® N-Series Nonwoven Polypropylene Geotextiles for Soil Separation and Drainage

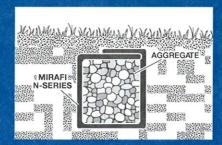
Property / Test Method	Units	140NL	140NC	140N	160N	170N	180N	1100N	1120N	1160N
MECHANICAL PROPERTIES										
Grab Tensile Strength ASTM D 4632										
Strength @ Ultimate Elongation @ Ultimate Trapezoidal Tear Strength ASTM D 4533 Puncture Strength ASTM D 4833 CBR Puncture Strength ASTM D 6241	kN (lbs) % kN (lbs) kN (lbs) kN (lbs) kN (lbs)	0.40 (90) 50 0.18 (40) 0.25 (55) 1.11 (250)	0.45 (100) 60 0.20 (45) 0.29 (65) 1.12 (250)	0.54 (120) 50 0.22 (50) 0.29 (65) 1.34 (300)	0.71 (160) 50 0.27 (60) 0.42 (95) 1.78 (400)	0.80 (180) 50 0.33 (75) 0.47 (105) 2.00 (450)	0.91 (205) 50 0.36 (80) 0.49 (110) 2.23 (500)	1.12 (250) 50 0.45 (100) 0.69 (155) 3.14 (700)	1.34 (300) 50 0.52 (115) 0.78 (175) 3.58 (800)	1.69 (380) 50 0.62 (140) 1.05 (235) 4.45 (1000)
UV Resistance after 500 hrs. ASTM D 4355	% strength	70	70	70	70	70	70	70	70	70
HYDRAULIC PROPERTIES										
Apparent Opening Size (AOS)	US Sieve	60	70	70	70	100	80	100	100	100
ASTM D 4751 Permittivity ASTM D 4491	mm sec ⁻¹	0.25 2.0	0.212 1.9	0.212 1.8	0.212 1.4	0.15 1.2	0.180 1.1	0.149 1.0	0.149 0.8	0.150 0.54
Flow Rate ASTM D 4491	l/min/m² (gal/min/ft²)	5907 (145)	5704 (140)	5500 (135)	4481 (110)	4278 (105)	3870 (95)	3056 (75)	2648 (65)	2037 (50)
Packaging										
Roll Width	m (ft)	3.8 (12.5) 4.5 (15.0)	3.8 (12.5) 4.5 (15.0)	3.8 (12.5) 4.5 (15.0)	4.5 (15.0)	4.5 (15.0)	4.5 (15.0)	4.5 (15.0)	4.5 (15.0)	4.5 (15.0)
Roll Length	m (ft)	110 (360)	110 (360)	110 (360)	91 (300)	91 (300)	91 (300)	91 (300)	91 (300)	91 (300)
Est. Gross Weight	kg (lbs)	60 (133) 70 (160)	69 (152) 83(182)	74 (164) 89 (197)	99 (217)	110 (242)	113 (250)	154 (339)	175 (386)	205 (453)
Area	m² (yd²)	418 (500) 502 (600)	418 (500) 502 (600)	418 (500) 502(600)	418 (500)	418 (500)	418 (500)	418 (500)	418 (500)	418 (500)

^{*}NOTE: Mechanical Properties and Hydraulic Properties shown are Minimum Average Roll Values (MARV). Apparent Opening Size (AOS) properties shown are Maximum Average Roll Values. (Values and methods could change witout notice)

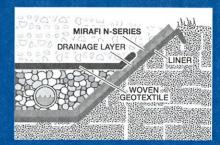
Mirafi® N-Series Nonwoven Geotextiles



Cut-off/Inceptor Drain Along a Roadway Or Another Critical Struction



French Drain Without Pipe



Liner Protection Within a Landfill

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Mirafi® is a registered trademark of TenCate™ Geosynthetics North America.

PDS.N0208

365 South Holland Drive Tel 800 685 9990 Fax 706 693 4400 Pendergrass, GA 30567 Tel 706 693 2226 www.mirafi.com









MATERIAL SAFETY DATA SHEET

DO NOT USE THIS PRODUCT UNTIL YOU HAVE READ THIS INFORMATION

MSDS Prepared By:

Chemtrec Emergency:

Ten Cate Nicolon

24-hour Phone:

(800) 424-9300

365 South Holland Drive Pendergrass, GA 30567 Ten Cate Nicolon Phone:

(770) 689-2627

Date Prepared

December 2003

Revised:

Section 1: General Information

Trade Names and Synonyms: Mirafi® Products:

N-Series and S-Series, Mirapave,

Mirascape, Furniture Nonwoven Fabrics

Chemical Names and Family: Polypropylene nonwoven fabrics

Product Use: Construction Products

HMIS Ratings: Health 0, Fire 1, Reactivity 0, PPE (see section 8)

Section 2: Hazardous Ingredients/Identity Information

Ingredient (Chemical Name, CAS#, and Common Name)	OSHA PEL or TWA	ACGIH TLV	Weight %
Polypropylene resin(9003-07-0)	n/a	n/a	98 – 100 %
Minor Additives (Mixture) Carbon Black(1333-86-4)	n/a 3.5 mg/cm	n/a 3.5 mg/cm	< 1% < 1%
	TWA	TWA	

Section 3: Hazards Identification/Potential Effects

Overview:

Based upon pertinent data available, polypropylene cloth products are not hazardous

under OSHA Hazard Communication Standard (29 CFR 1910.120).

Routes of Exposure:

Inhalation:

Not likely, under normal use

Skin contact:

Yes

Skin absorption:

No

Eye Contact:

Yes

Symptoms of Acute Overexposure: Product may contain surface applied process lubricants that may cause skin to dry out.

Symptoms of Chronic Overexposure: No known health effects have been observed with normal use.

Medical Conditions Aggravated By Exposure: Persons with preexisting skin disorders may be susceptible to effects of the material.

Carcinogenity: See Section 11

Section 4: First Aid Procedures

Eye Contact: As with any foreign object, flush with water. If pain or irritation persists, consult physician.

Skin Contact: Wash with soap and water. In case of irritation, consult physician.

Ingestion: N/A

Section 5: Fire and Explosion Hazard Data

Flash Point (Method Used): Greater than 300°C Flammable Limits: LEL: N/A UEL: N/A

Extinguishing Media: x Water Fog x Carbon Dioxide

x Regular Foam x Dry Chemical Other

Special Fire Fighting Procedures: Material will not burn unless preheated. Over heated or molten material may burn slowly with dense smoke. As with any fire, wear approved self-contained breathing apparatus.

Unusual Fire and Explosion Hazards: Not applicable

Section 6: Accidental Release Measures

No environmental threat is expected from release.

Section 7: Handling and Storage

Storage: Store away from oxidizing materials, in cool dry area. Avoid direct sunlight.

Handling: No special handling unless large rolls are used. Use lifting devices as necessary. If product is molten, avoid contact with skin or eyes

Section 8: Exposure Controls/ Rolls may be heavy; use lifting devices for moving Personal Protection

Ventilation Requirements: Not required for normal use. If process generates dust, use ventilation to keep exposure below exposure limit.

Personal Protective Equipment:

Eye Protection: Not normally required.

Skin Protection: Not normally required. Persons with exposure sensitivity may need

suitable gloves.

Respiratory Protection: Not required, unless dust generated

Section 9: Physical and Chemical

Boiling Point: N/A **Specific Gravity** (H₂O=1): Less than 1 **Vapor Pressure (mm Hg.)**: N/A **Evaporation Rate (Butyl Acetate=1)**: N/A

Vapor Density (Air =1): N/A Melting Point: about 320 degrees F

Solubility in Water: Not soluble

Appearance and Odor: Fabric wound on a cardboard core.

Section 10: Stability and Reactivity

Stability: x Stable Unstable

Conditions to Avoid: Keep away from sparks or flame Incompatibility (Materials to Avoid): Strong oxidizers.

Hazardous Polymerization: x May Occur Will Not Occur

Hazardous Decomposition Products (Including Combustion Products): carbon dioxide, carbon

monoxide, hydrocarbons, etc.

Section 11: Toxicological Information

Eye Effects: Not toxic Skin Effects: Not toxic Target Organs: None

Carcinogenity: Carbon black is classified as a Group 2B possible human carcinogen. When

encapsulated in a plastic matrix, risk of exposure is minimized.

Mutagenitive and Reproductive Effects: Not considered to be a hazard

Section 12: Ecological Information

Environmental Data: Not expected to be hazardous to the environment in present form.

Section 13: Disposal Considerations

Disposal: Spent material should be recycled or disposed according to current regulations

RCRA Hazard Class: Does not contain RCRA regulated materials.

Section 14: Transport information

DOT Classification: Non-hazardous

Section 15: Regulatory Information

This product may contain ingredients in the fiber lubricant and additives in "De Minimus" quantities, which would be listed in SARA 311/313: Acute Health Hazard. At levels under 0.01% by weight, no "Reportable Quantities" will be reached with typical fabric inventories.

The information and recommendations contained in this publication have been compiled from sources believed to be reliable and to represent the best current opinion on the subject at the time of publication. Since we cannot anticipate or control the many different conditions under which this information or our products may be used, we make no guarantee that the recommendations will be adequate for all individuals or situations. Each user of the product described herein should determine the suitability of the described product for his particular purpose and should comply with all federal and state rules and regulations concerning the described products.



2093340619

Jackson Valley Quarry

Product:

 $5" \times 3"$ Crushed

Sione C	unalysis	CTM 202	1		
ize	% Passing	Specs	4		
160					
6"	100				
6 ^x	80	<u> </u>	4		
4"	79	<u></u>	· ·		
3"	37		4		
2"	9		-	-	
1-1/2"	3		-	j	
17	1		7		
3/4"	11		1		
		<u> </u>	-{	_,,,,,,,	
			Durability	CTM 229	OK
	<u> </u>		Coarse	86	1.
					
<u> </u>			7		
					,
				% Loss	
			LA Rattler	2,9	OK
	1		CTM 214 @ 100 Rev.	13,3	OK
Unit Weight		CTM 212	CTM 214 @ 500 Rev. ASTM C535 @ 1000 Rev.	15.8	APPROVA
Dry - Loose) }	90 pcf	ASTIVI COSO @ 1000 (100)		707
Dry - Rodde	ed .	98 pcf	<u>_</u>	1	KNGNK
D13 - 11000	•				The state of the s
			1		
Specific Gra	vity	CTM 208/208, ASTM C1	<u> </u>		1
Fine Bulk C)ry	2.76 2.77	-		
Fine Bulk S	39D	2.78	Crushed Particles	CTM 205	_
Fine Appar	ent	0.3%		100%	_
Fine Absor	ption	U, <u>37</u> 0	- - 		***************************************
			\		1
					1
			\ - ,		
1				•	1

TurfMaker Job Analysis Worksheet

JOB NAME:

September 28, 2009

Building 850, Site 300, LLNL

ACTUAL JOB SIZE

Square feet = 435,800

Acres = 10.01

Square Yds = 48,422

MATERIALS PREFERENCES or SPECIFICATIONS

Materials

Pounds Per Acre

Bermuda Tackifler

Hydromulch 16-20-0 w/sulfur Slicky Sticky

557 000 000 000 000 000 000

MATERIALS INFORMATION and REQUIREMENTS

Pounds in Each Bag

88888888388 5003 0.00 0.00 0.00 0.00 30,016.5 2,501.4 0.0 0.0 0.0 540.3 0.0 0.0 0.0

Hydromutch
16-20-0 w/suffur
Slicky Sticky
Bernuda
Tackifler
Seed
Other
Other
Other

Page 1

9/28/2009

MSDS Material Safety Data Sheet

TerraMatrix TM

Revision Date: 6/11/08 Page 1 of a

PRODUCT AND COMPANY IDENTIFICATION

MSDS Number: CON040

Menufacturer

PROFILE Products, LLC 750 LAKE COOK ROAD SUITE 440 BUFFALO GROVE, IL 60089

Telephone Number: (847) 215-1144
FAX Number: (847) 215-0577
E-Mail: profileproducts.com
Web www.profileproducts.com

Product Name: Revision Date: MSDS Number: CAS Number: Product Use:

TerraMatrix™ 8/11/08 CON040 Not applicable Enraion control muich for hydraulic seeding

Product Description: Green dyed wood fibers and a proprietary binder mixture

HAZARDS IDENTIFICATION

Route of Entry: Target Organs: Inhalation:

Inhalation, skin contact, eye contact

Wood may cause sneezing, inflation, and dryness of the nose end throat. Dust may aggravate pre-existing respiratory conditions.

Wood dust can cause inflation. Skin absorption is not known to occur.

Wood dust can irritate the eyes.

Skin Contact: Eye Contact:

No reports of human ingestion.

NFPA-ratings (scale 0-4): Health \approx 1, Fire \approx 2, Reactivity \approx 0

OSHA Classification: Wood dust is a hazardous substance as defined by the Hazard Communication Standard 29CFR 1910.1200

COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients:

9000300

PROPRIETARY | VEGETABLE HYDRO-COLLOID

MSDS Material Safety Data Sheet

Profile

VISDS Number: CON040

orraMatrix M

Revision Oate: 6/11/08

Page 4

TRANSPORT INFORMATION

Normally can be disposed of as a weed residue. Ensure disposal is in compilance with local, provincial (state), and tederal regulations.

DISPOSAL CONSIDERATIONS

DOT Class: Not regulated #

REGULATORY KEY DESCRIPTIONS

COMPONENT / (CAS/PERC) / CODES

REGULATORY INFORMATION

MASS = MA Massachusetts Hazardous Sübstances List NRC = Nationally Recognized Carcinogens OSHAWAC = OSHA Workplace Air Contaminants PA = PA Right-To-Know List of Hazardous Substances TXAIR = TX Air Contaminants with Health Effects Screening Level

CERCLA = Superfund clean up substances
CERHS = Clean Water Act Hazardous substances
EKS3D2 = Extremely Hazardous Substances
EPORAMPC = EPORA Water Priority Chemicals
HAP = Hazardous Afr Pollutants
NJENS = NJ Extraordinarily Hazardous Substances
NJENS = NJ Extraordinarily Hazardous Substances
OSHAPSM = OSHA Chemicals Requiring process safety management
SARA313 = SARA 313 Title III Toxic Chemicals

OTHER INFORMATION

END OF MSDS DOCUMENT

V

69/11/2009 08:51 9259736855

09/11/2009 06:62 BG/82/2989 14:55 9252405529 9251730855

\$8/92/2889 10:47

9252405529

PACIFIC COAST SEED

BCS ENGINEERS

754 23 PAGE 03/83

766 73 PAGE #2/82

SCENERAL SCS

PACIFIC COAST SEED

The initial need talk front the LLNL biologist (with bushes standard per LLNL sequent) is parameted in the Table 6 balow. The Regress is a best growing statist when gains and the second tent is startly when gains and the second tent is startly when gains and the second tent is startly and the startly tent is called three deep roots and will take sevently years to establish. Subcompanies and obviate from this past such its approved by the project thologist. If this constitution evan is burned following the first two years of new second

application, additional ancies by the considerations of the new way

Thysidium tridentation, Tom Out Clover (herb) Poa scabarnila/scando, Niktivo Pina Bluegnes Malisa californica, California Ontonymus Kimus glaucus Nesselle pulchra, Futple Needlegaas Elymus & Tristanos, Ruginos hdpia miarawachyn, Three Weeks Fescos aphne bleadar, Dove Lupine Table 6 Proposed Vageleties Seed NUx for Site 300 \$ | BB | 8% 90/70 91/73 95/75 25.28 25.28 25.28 25.28

Norm: Bood, Min on previded by Col Pibble of Lint for Bite 300 Area (with beshow removed by Lind breast of February 10, 2006 as anti-med by Lind breat of February 10, 2006 as anti-med by Lind breat of February 10, 2006 as anti-med by Lind breat of State o 色思思

Rydraulic Melch (CASQA EC-3)

The gross seed above will be placed with hydraulic finich to protect the seed and provide cover for germination. Further information reporting the Hydraulic Malch Shar (CASQA EC.-3) can be found in Appendix D.

Valualty Dissipation Davison (SASSA SC-10)

New outpett pipes are enthalpated with the remedial design. As such, the pipe entiest will be proceeded with reals valcoily dissipated devices. Further information regarding the Vetocity Dissipation Devices EARP (CASCA EC-10) saw he found in Appendix D.

Fiber Rolls (CASQA SE-S)

First rolls are recommended for placement slong the full-side areas after extension activities are complete. The fiber rolls serve two payesses; to reduce storm water velocity as it flows down the billieda, so it entry sections at the rolling of price serve water. The fiber rolls are a temporary messario to reduce extension tutil vegetation threshops. The fiber rolls should be 100% bloodegendation and whetlifts-fiberally. Any of the following fiber rolls are acceptable:

9

Appendix F

Pit 7-Source Ground Water Extraction and Treatment System As-Built Variations from Design Specifications

Table F-1. Pit 7-Source Ground Water Extraction and Treatment System Configuration Summary.

	Remedy Proposed in the Remedial Design Report	Current (March 2010) Remedial System
Number of Ground Water Extraction and Treatment Systems	1	1
Number of Soil Vapor Extraction and Treatment Systems	0	0
COC/Treatment Technology	Uranium/IX ^a	Uranium/IX ^a
	VOCs/GAC ^b	VOCs/GAC ^b
	Nitrate/IX ^c	Nitrate/IX ^c
	Perchlorate/IX ^c	Perchlorate/IX ^c
	Tritium/Not treated by facility (Monitored natural attenuation remedy selected)	Tritium/Not treated by facility (Monitored natural attenuation remedy selected)
Discharge Method	Tritiated water discharged into unsaturated alluvium via infiltration trench	Tritiated water discharged into unsaturated alluvium via infiltration trench
Number of Extraction Wells	7 ^d	6 ^{d, e}
Extraction wells, Hydrostratigraphic unit	NC7-25, Tnbs ₀	NC7-25, Tnbs ₀
	NC7-63, Qal/WBR	NC7-63, Qal/WBR
	NC7-64, Qal/WBR	NC7-64, Qal/WBR
	W-PIT7-1918, Qal/WBR	W-PIT7-2305, Qal/WBR and Tnbs ₀
	W-PIT7-2305, Qal/WBR and Tnbs ₀	W-PIT7-2306, Qal/WBR
	W-PIT7-2306, Qal/WBR	W-PIT7-2307, Qal/WBR
	W-PIT7-2307, Qal/WBR	
Anticipated Pumping Rate/ Maximum Design Capacity	2 gpm/3 gpm	2 to 3 gpm ^f /10 gpm

Notes:

COC = Contaminant of Concern.

GAC = **Granular** activated carbon.

gpm = Gallons per minute.

IX = Ion-exchange.

Three 2.5 cubic feet canisters in series (USF A-284).

Three 2.5 cubic feet canisters in series (GAC).

^c Three 2.5 cubic feet canisters in series (Sybron SR7).

d Three additional extraction wells may be drilled at a later date based on information collected after operation of the hydraulic diversion system.

W-PIT7-1918 was an existing monitor well to be converted to an extraction well as part of the original wellfield design. However, the well was later deemed to be unsuitable for use as an extraction well because did not yield sufficient water, and the small (2-inch) well casing would not allow for the deployment of the required extraction and monitoring equipment.

F Pumping rate anticipated to increase as additional wells are added to the extraction wellfield.

Table F-2. Pit 7-Source Ground Water Extraction and Treatment System Variations from Remedial Design Specifications.

Description of Change	Justification
Ground Water Extraction Wellfield	
Original Design: NC7-25, NC7-63, NC7-64, W-PIT7-1918, W-PIT7-2305, W-PIT7-2306, and W-PIT7-2307, with three additional extraction wells to be drilled and added later. Modified Design: NC7-25, NC7-63, NC7-64, W-PIT7-2305, W-PIT7-2306, and W-PIT7-2307, with three additional extraction wells to be drilled and added later.	W-PIT7-1918 was an existing monitor well to be converted to an extraction well as part of the original wellfield design. However, the well was later found to be unsuitable for use as an extraction well because it did not yield sufficient water, and the small (2-inch) well casing would not allow for the installation of the required extraction and monitoring equipment. Note: Ground water is not currently being extracted from well NC7-25. This well is completed in the Tnbs ₀ /Tnbs ₁ hydrostratigraphic unit (HSU) and will only be pumped when ground water elevations in the overlying Qal/WBR HSU are sufficiently low to avoid pulling depleted uranium and other contaminants in the Qal/WBR HSU into the Tnbs ₀ /Tnbs ₁ HSU.
The wellhead seal and downhole equipment were redesigned, and cycle counters were added to wells. In addition, a rigorous standard operating procedure was implemented to measure and capture water level data in all monitoring and extraction wells.	The new design allows for both manual water level and electronic water level measurements in the extraction wells, allowing calibration of water level transducers. The new pumps have a smaller diameter and allow implementation of the new downhole equipment design. Cycle counters provide additional verification of flow totals. The new standard operating procedure ensures that reliable water and verifiable water level data is now being collected.
Original Design: Air from pneumatic submersible pump was discharged into the wellhead space. Modified Design: Air from submersible pump is discharged to atmosphere. A coalescent filter was installed to return condensate to the well.	In the original design, air from pneumatic submersible pump discharged back to the well, which was affecting the water level data and causing instrument measurement errors. As a result of the change in the air discharge location, the water level data is now accurate.
The flow manifold was redesigned to prevent backflow into wells by removing the loop that bypassed the check valve. The flow meter and water filter were relocated, the check valve was replaced and re-positioned vertically, and the anti-siphon valves were upgraded.	The original flow manifold design allowed water to flow back into the extraction wells and the flow meter location resulted in discrepancies in flow rate measurements. The relocation of the flow meter to a vertical position allows for a more accurate flow reporting. The upgraded check valve allows all water to drain to the facility; whereas the original design did not. The upgraded anti-siphon valve seals well during non-pumping conditions and allows pumped water to gravity feed to the facility. The overall footprint of the manifold was reduced, allowing easier access and maintenance.

Table F-2. Pit 7-Source Ground Water Extraction and Treatment System Variations from Remedial Design Specifications (continued.)

Description of Change	Justification
Ground Water Extraction Wellfield continued	
Original Design: Bag filter with 8.25 in bags by Pentek.	The type of particulate filter was changed to accommodate the manifold design change.
Modified Design: Pentek 5-micron cartridge filter.	
Ground Water Treatment System	
Original Design: 1.5 HP, 30 gallon, 115V, 60 Hz, 1 pz GAST compressor (model 7HDD-11TM750X).	The original design for the air compressor that drives the water pumping system, was determined to be undersized and failed multiple times during first system testing and verification.
Modified Design: A high capacity, dual 5 HP module oil-less Scroll compressors with 100% duty cycle, with a larger compressor housing with cooling capabilities and an 80 gallon storage tank.	Because the compressor was identified as a single point of failure and may not meet maximum process requirements, a new higher capacity compressor with backup capability (e.g., operator can easily switch to the backup compressor motor) was specified and installed.
	In addition, the higher compressor capacity allows future wellfield/facility expansion, if needed.
The freeze protection scheme was evaluated and additional features were designed and implemented to insure full system freeze protection.	The previous design relied on gravity drains for freeze protection. The treatment facility would shut down and drain at temperatures below 32°F and would require manual restart by a facility operator.
	The new design allows the Program Logic Controller to automatically shut down the system just before freezing conditions. This protects the pipes and equipment from damage. The system will automatically restart once the temperature reaches 35 degrees. In addition, a temperature freeze protection valve was added at the flow manifold to protect the flow section, and a vacuum breaker was installed to allow water to feed to the tank in the facility enclosure.
Original Design: Three 2.5 cubic feet ion-exchange (Sybron SR7) canisters for perchlorate removal.	The manufactor (Sybron) of the SR7 ion-exchange resin has gone out of business since the original uranium ion-exchange resin was placed in the treatment facility. The SR7 resin, once spent, will be replaced with Purolite A-532E ion-exchange
Modified Design: Three 2.5 cubic feet Sybron SR7 ion-exchange canisters are currently in-place for perchlorate removal. However, when the resin is spent, it will be replaced with Purolite A-532E ion-exchange resin.	resin.

Table F-2. Pit 7-Source Ground Water Extraction and Treatment System Variations from Remedial Design Specifications (continued.)

Description of Change	Justification
Treated Effluent Discharge Infiltration Trench	
Original Design: Infiltration trench configuration/capacity - 4 ft X 10 ft X 80 ft (7,000 gallon capacity [assuming 30% pore space]). Modified Design: Infiltration trench configuration/capacity - 4 ft X 10 ft X 100 ft (9,000 gallon capacity [assuming 30% pore space])	During construction of the infiltration trench, it was decided to increase the length of the trench to increase its capacity because: 1. The increased capacity will allow for more flexibility if additional extraction wells are needed to optimize cleanup in the future. 2. Once installed, this component of the system is not easily modified later.

Notes:

ft = feet.

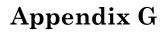
HP = Horsepower.

HSU = Hydrostratigraphic unit.

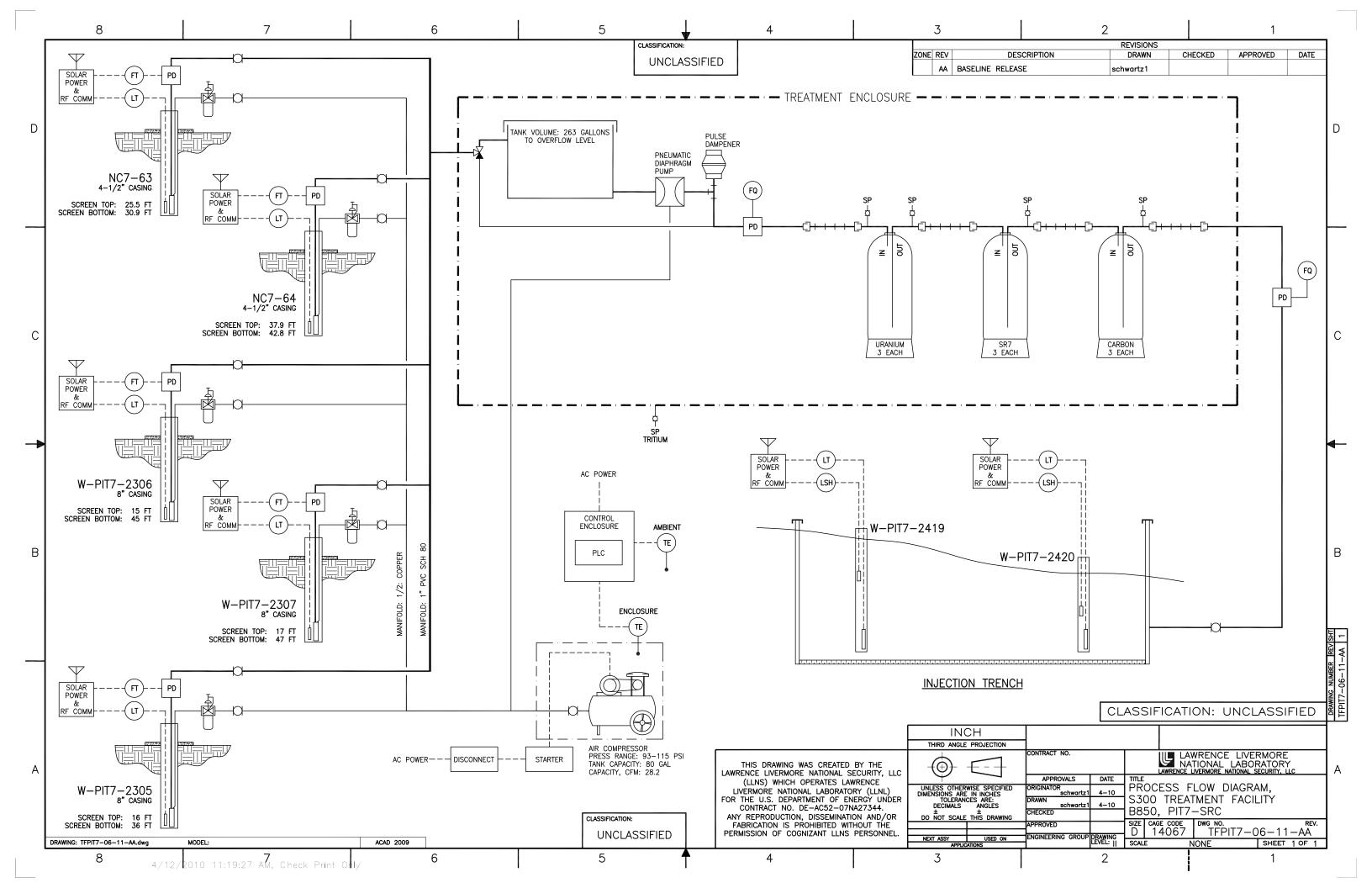
Hz = Hertz.

Qal/WBR = Quaternary alluvium/weathered bedrock.

V = Volt.



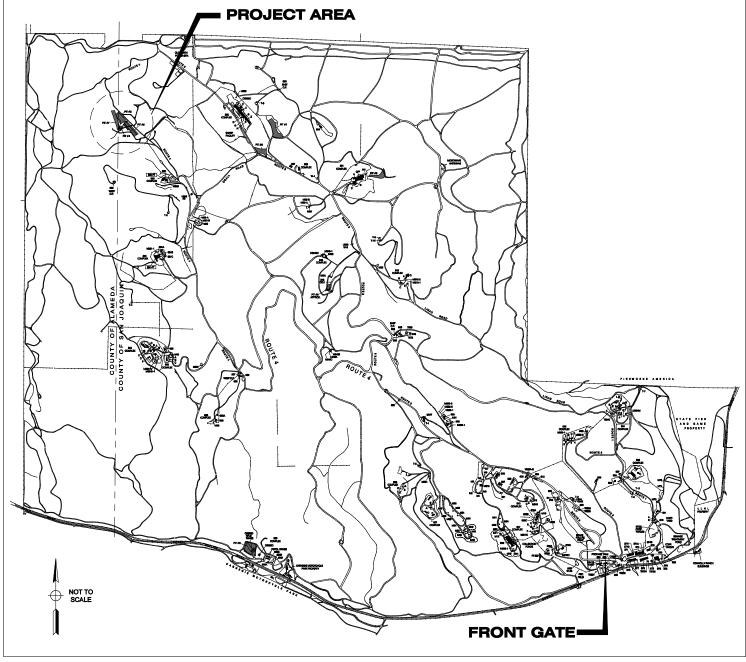
Pit 7-Source Ground Water Extraction and Treatment System As-Built Drawings



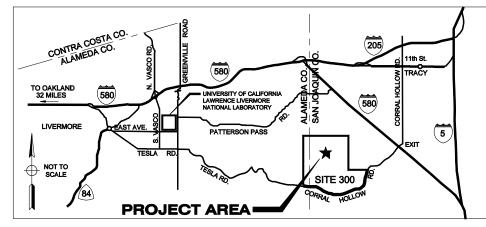
Appendix H

Pit 7 Complex Drainage Diversion System As-Built Drawings

PIT 7 COMPLEX DRAINAGE DIVERSION SYSTEM



LOCATION MAP - SITE 300



VICINTY MAP

DRAWING INDEX

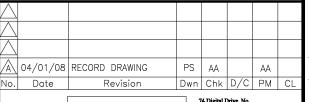
DRAWING NO.	SHEET NO.	DRAWING TITLE
PSZ2007-0300-0001DA	T-1	VICINITY MAP, LOCATION MAP, AND DRAWING INDEX
PSZ2007-0300-0002DA	C-1	SITE IMPROVEMENT PLAN
PSZ2007-0300-0003DA	C-2	DRAINAGE PLAN AND PROFILE
PSZ2007-0300-0004DA	C-3	DRAINAGE PLAN AND PROFILE
PSZ2007-0300-0005DA	C-4	CIVIL DETAILS
PSZ2007-0300-0006DA	C-5	CIVIL DETAILS
PSZ2007-0300-0007DA	C-6	CIVIL DETAILS
PSZ2007-0300-0008DA	C-7	CIVIL DETAILS
PSZ2007-0300-0009DA	C-8	CIVIL DETAILS
PSZ2007-0300-0010DA	S-1	ABBREVIATIONS, LEGEND, AND GENERAL STRUCTURAL NOTES
PSZ2007-0300-0011DA	S-2	TYPICAL STRUCTURAL DETAILS
PSZ2007-0300-0012DA	S-3	SETTLING BASIN PLAN
PSZ2007-0300-0013DA	S-4	STRUCTURAL DETAILS

RELEASED FOR CONSTRUCTION

E Dept. Head: MARK SUEKSDORF | Date: 9/21/07

APPROVED BY				
Client:	LESLIE FERRY	Date: 9/20/07		
Proj. Manager:	JUDY HOUDESHELL	Date: 9/20/07		
Design:	MEL VILLEGAS	Date: 9/20/07		
CONSTRUCTION MA	ANAGER: STEVEN SH	IH 9/20/07		

REVIEWED BY		
M & O:	ERIC FRAHM	Date: 9/20/07
Haz. Ctrl:	JIM FORTE	Date: 9/20/07
Security	PAUL FINK	Date: 9/20/07
S & S P:	SUE BYARS	Date: 9/21/07



WINZLER & KELLY

CONSULTING ENGINEERS
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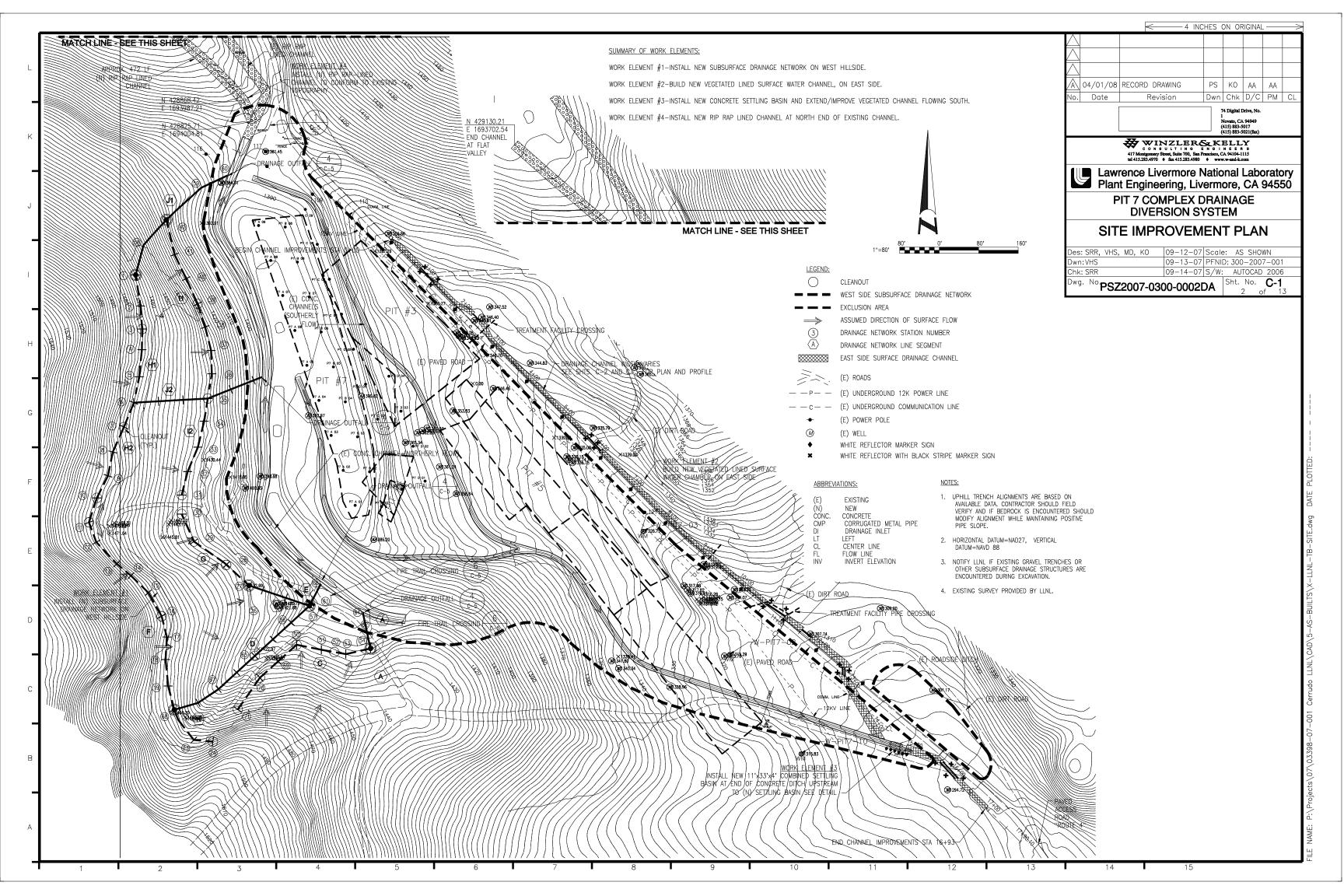
Lawrence Livermore National Laboratory Plant Engineering, Livermore, CA 94550

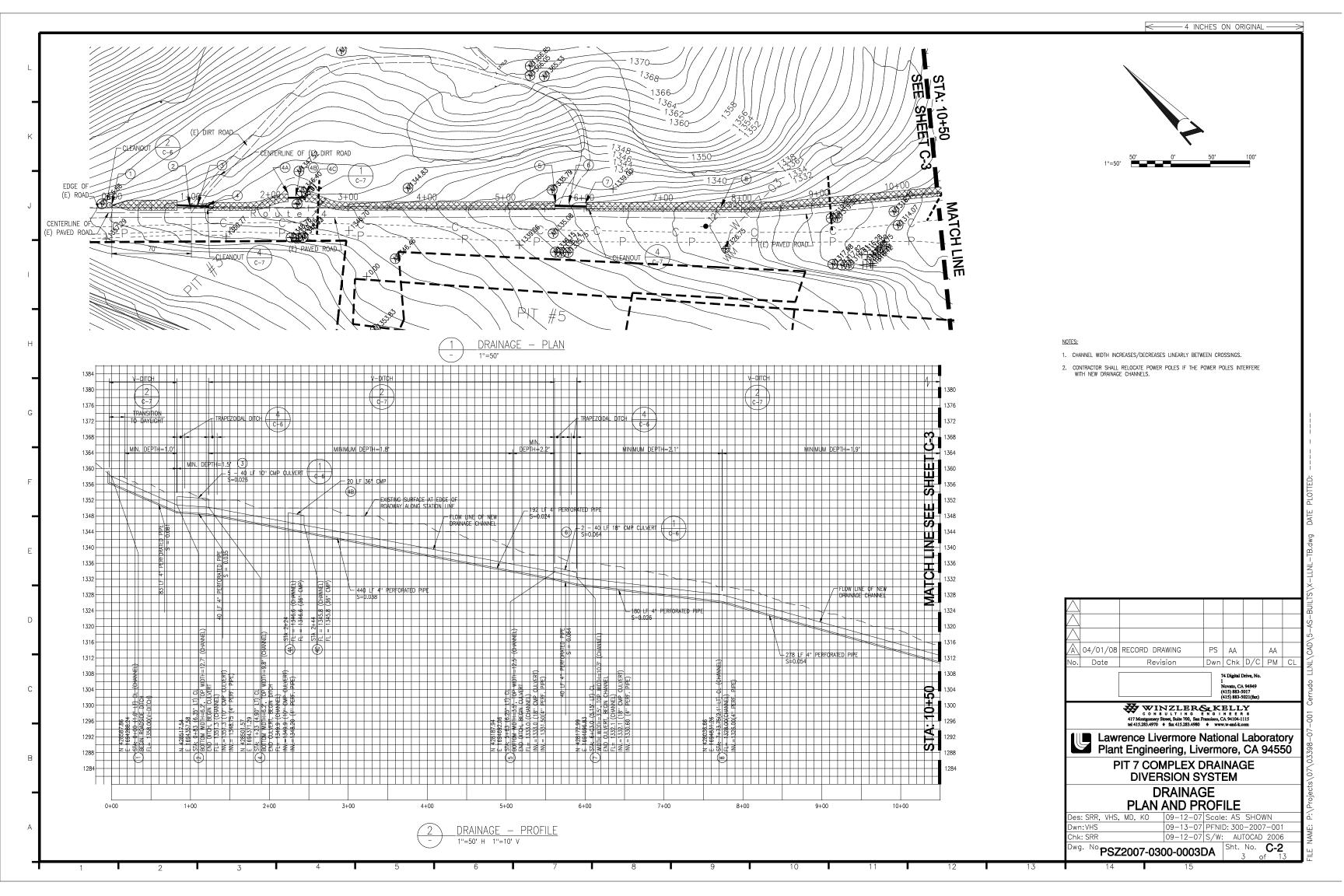
PIT 7 COMPLEX DRAINAGE **DIVERSION SYSTEM**

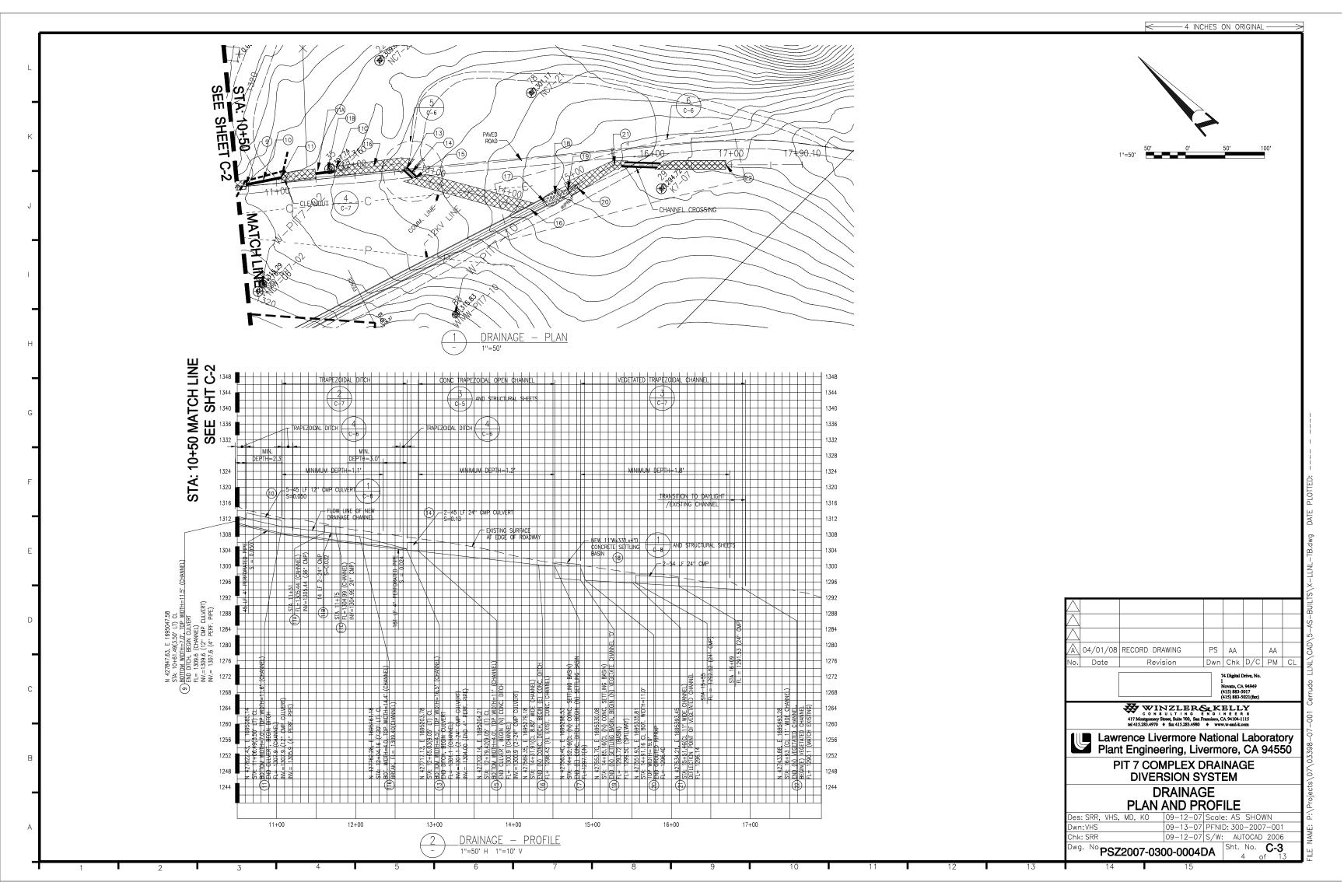
VICINITY MAP, LOCATION MAP, AND DRAWING INDEX

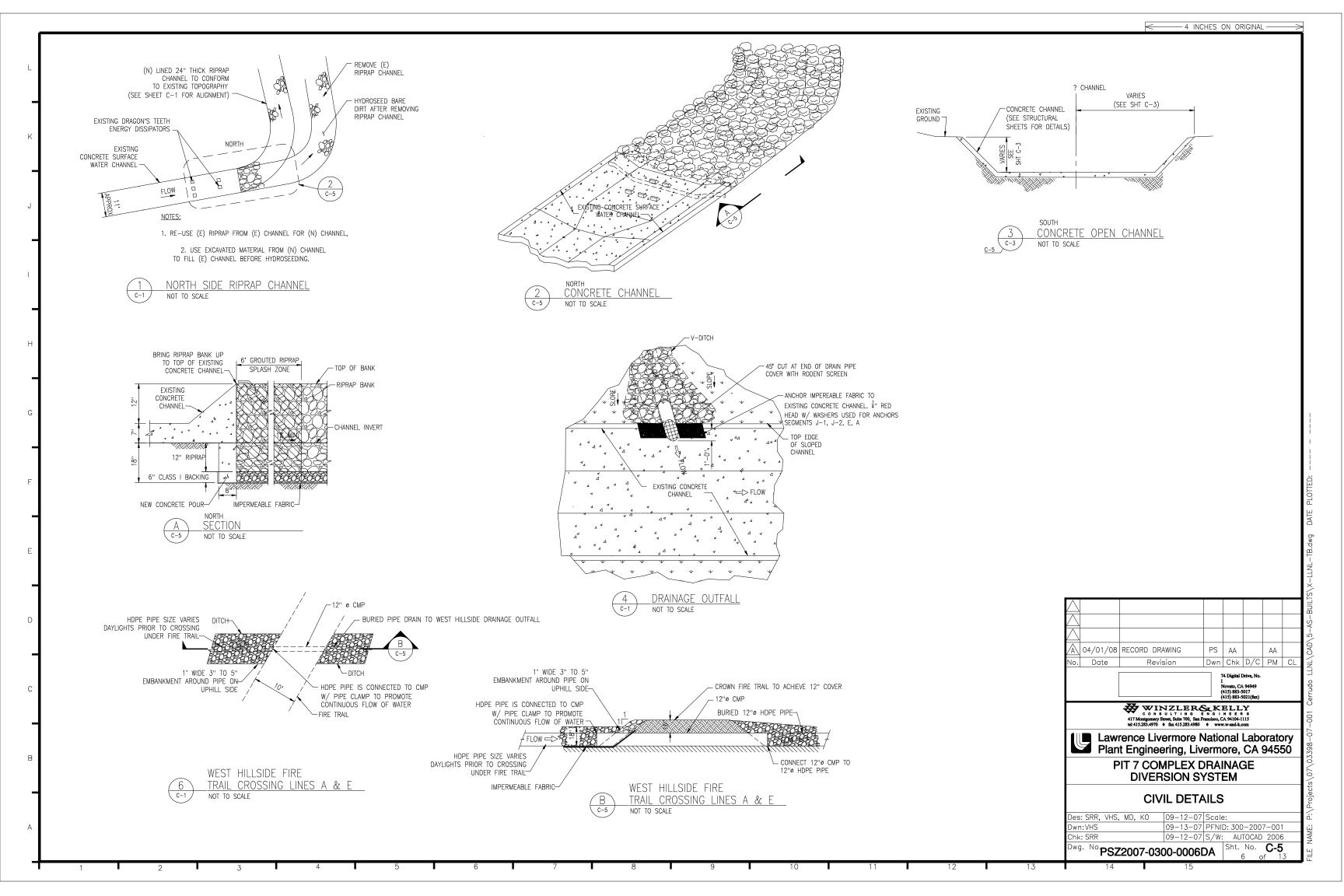
D 11		
Chk: SRR	09-12-07	S/W: AUTOCAD 2006
Dwn:VHS	09-13-07	PFNID: 300-2007-001
Des: SRR, VHS, MD, KO	09-12-07	Scale:

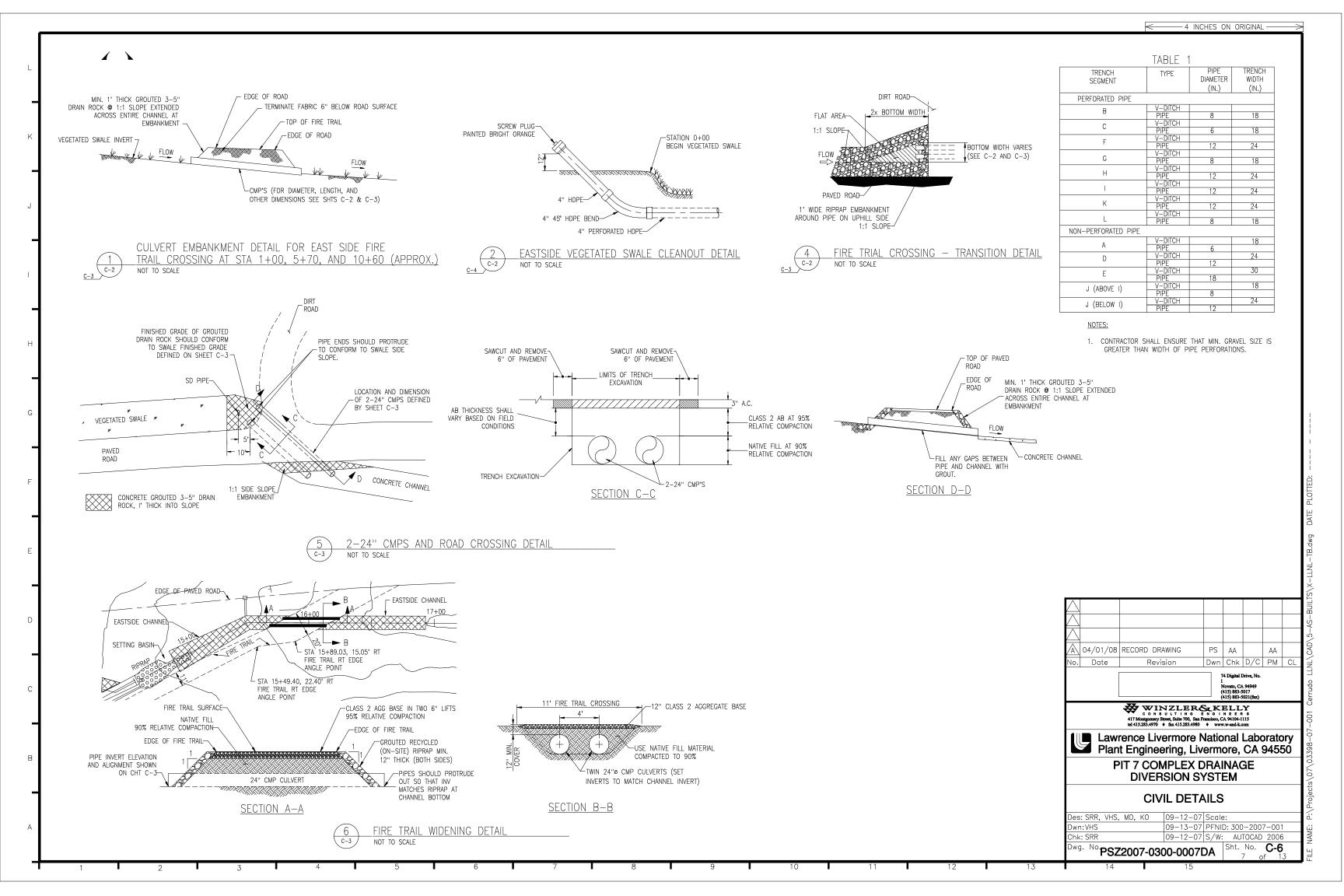
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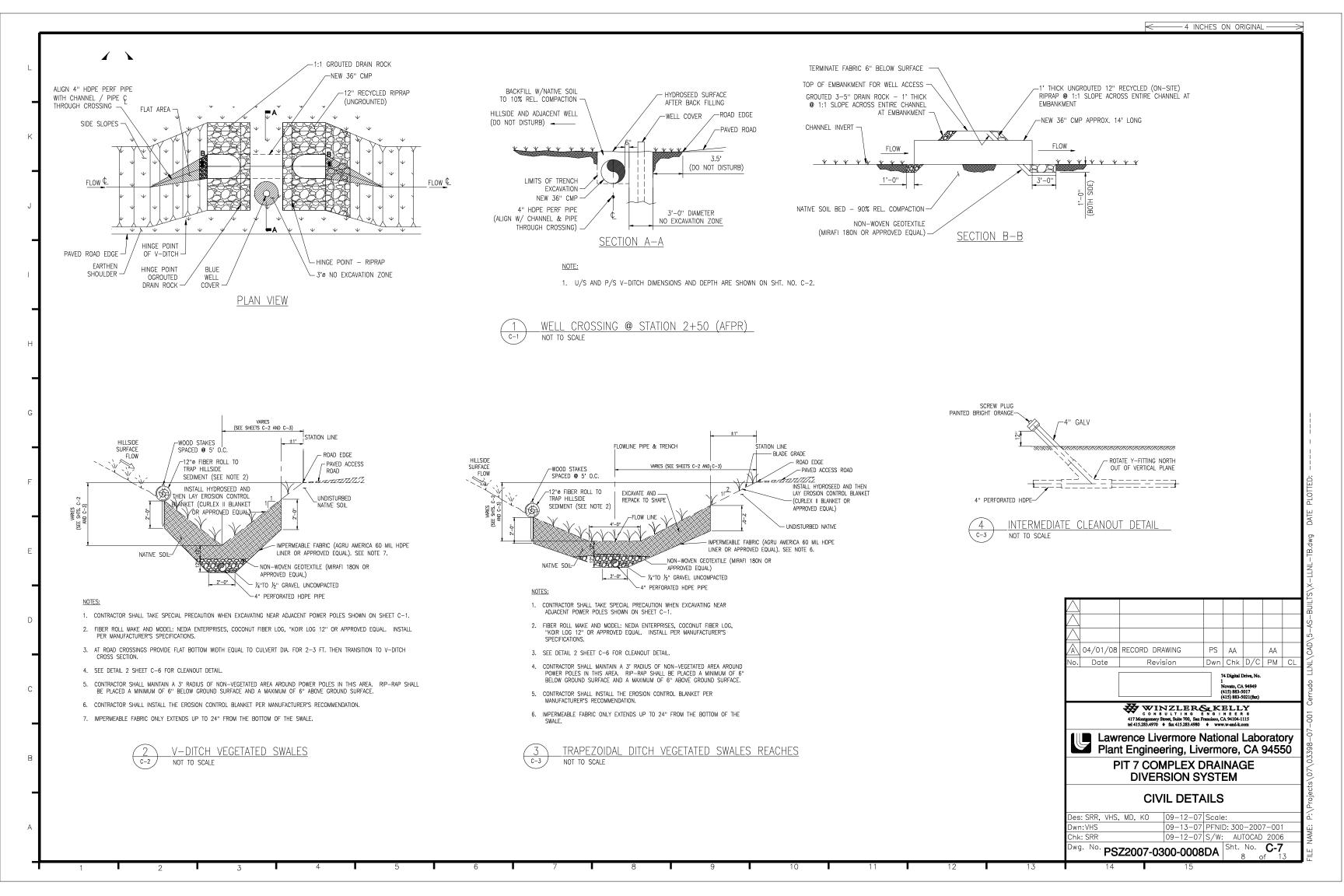


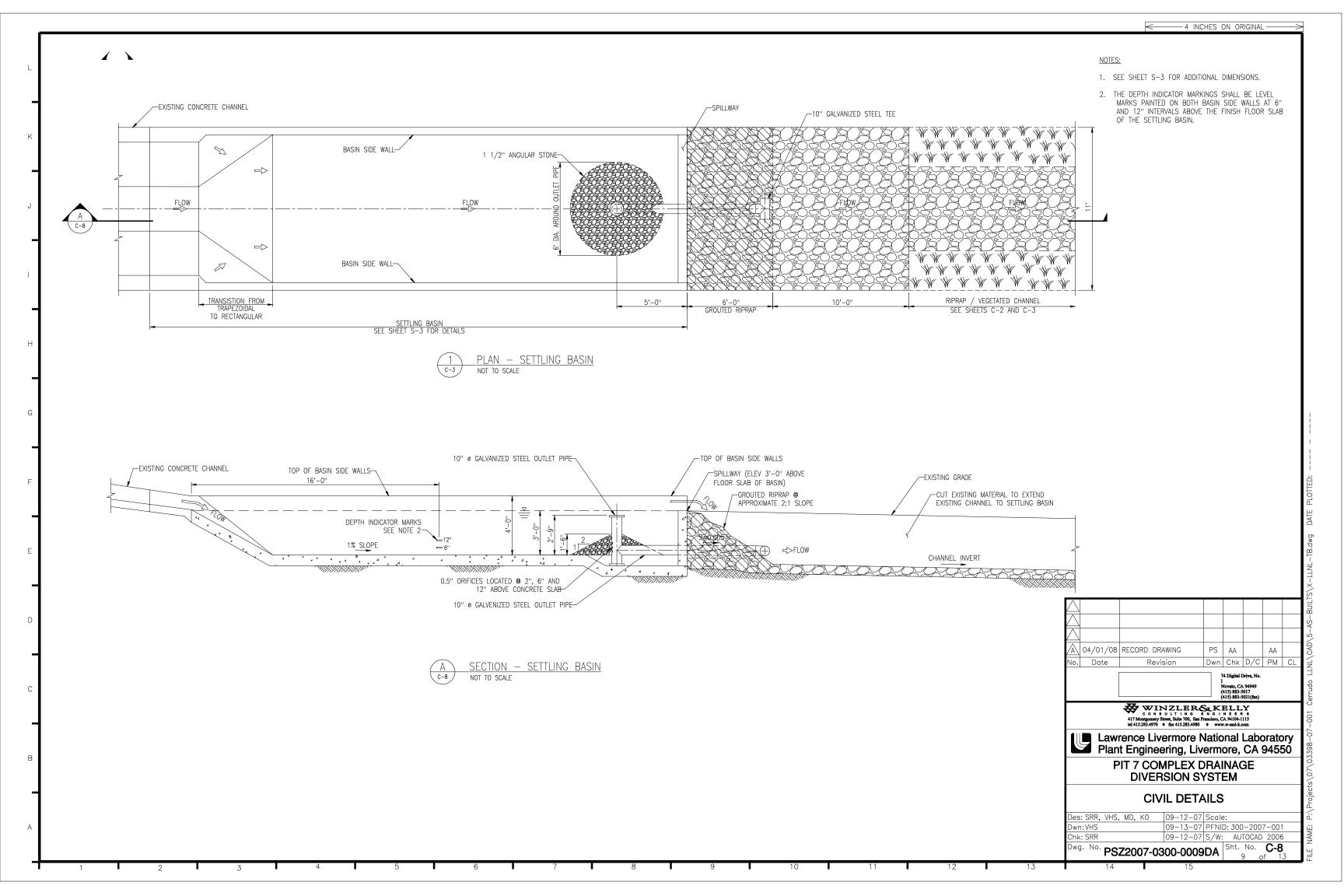


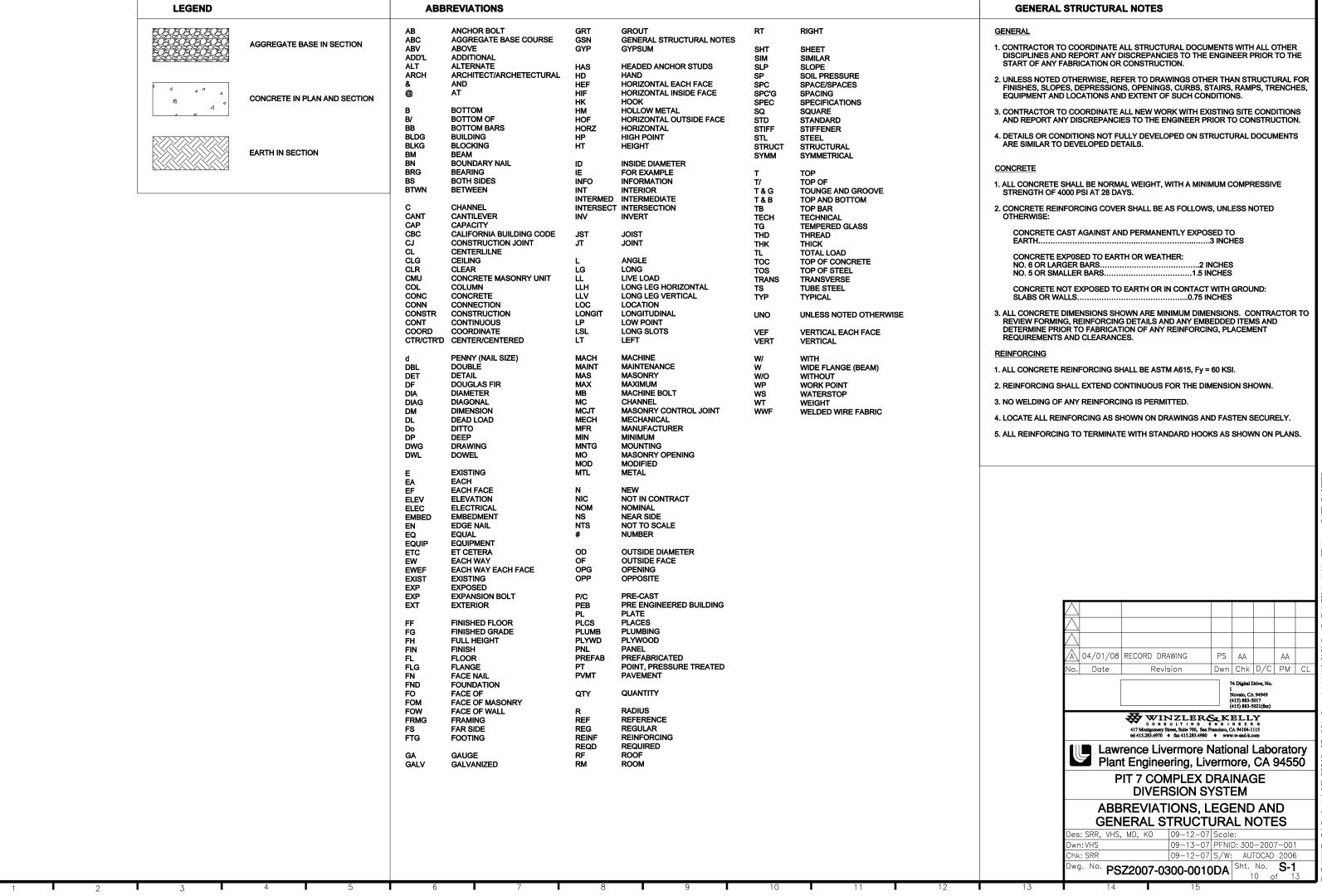


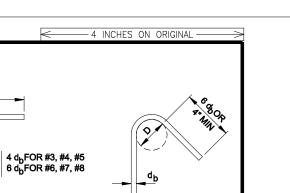










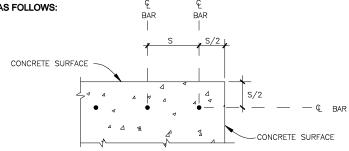


NOTES:

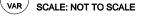
s≥6" s<6"

- 1. LENGTHS SHOWN ARE FOR GRADE 60 UNCOATED BARS
- 2. LENGTHS SHOWN ARE IN INCHES
- 3. INCREASE LENGTHS 30% FOR LIGHT WEIGHT CONCRETE
- 4. TOP BARS: HORIZONTAL BARS WITH MORE THAN 12" OF FRESH CONCRETE CAST BELOW THEM

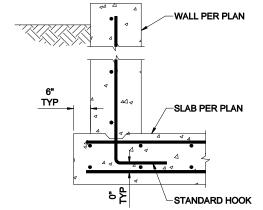




J13 STIRRUP AND TIE HOOKS



12 dhFOR #6, #7, #8 6 d_bFOR #3, #4, #5



G13 WALL BASE CONSTRUCTION JOINT

VAR SCALE: NOT TO SCALE

G1 BAR DEVELOPMENT LENGTHS AND LAP SPLICE LENGTHS

s≥6" s<6"

3000 PSI CONC (fc)
P OTHER

DEVELOPMENT LENGTH (\(\lambda \)d)

4000 PSI CONC (fc)

TENSION LAP SPLICE LENGTH (CLASS 'B' SPLICE

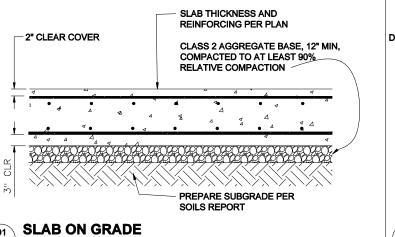
4000 PSI CONC (fc)

54

s≥6" s<6"

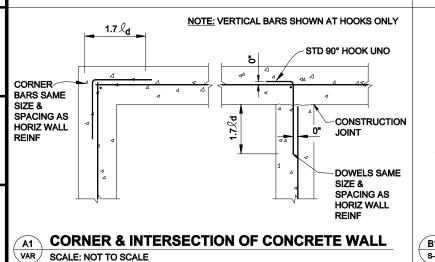
VAR SCALE: NOT TO SCALE

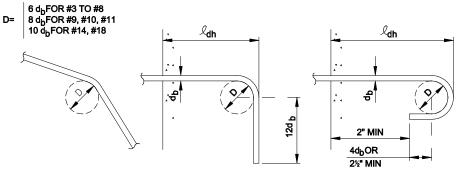
BAR SIZE





D1 SLAB ON GRADE VAR SCALE: NOT TO SCALE





TYP 90° END HOOK

BAR	NORMAL WEIGHT CONCRETE, fc , PSI			
SIZE	3000	4000	5000	6000
#3	6	6	6	6
#4	8	7	6	6
#5	10	9	8	7
#6	12	10	9	9
#7	14	12	11	10
#8	16	14	12	11
#9	18	15	14	13
#10	20	17	16	14
#11	22	19	17	16
#14	38	33	29	27
#18	50	43	39	35

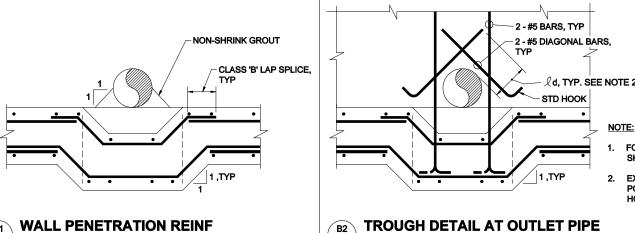
MINIMUM TENSION EMBEDMENT LENGTHS $\mathcal L$ dh (IN.) FOR

PREINF BAR BENDS & END HOOKS

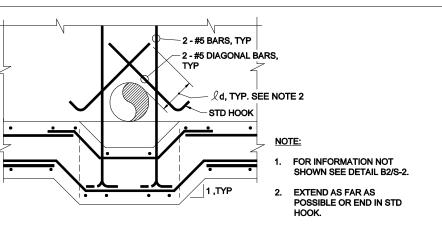
VAR SCALE: NOT TO SCALE

SCALE: NOT TO SCALE

TYP BAR BEND DIAMETER



TYP 180° END HOOK



B2 TROUGH DETAIL AT OUTLET PIPE SCALE: NOT TO SCALE

04/01/08 RECORD DRAWING AA Dwn Chk D/C PM Novato, CA 94949 (415) 883-5017 (415) 883-5021(fax)

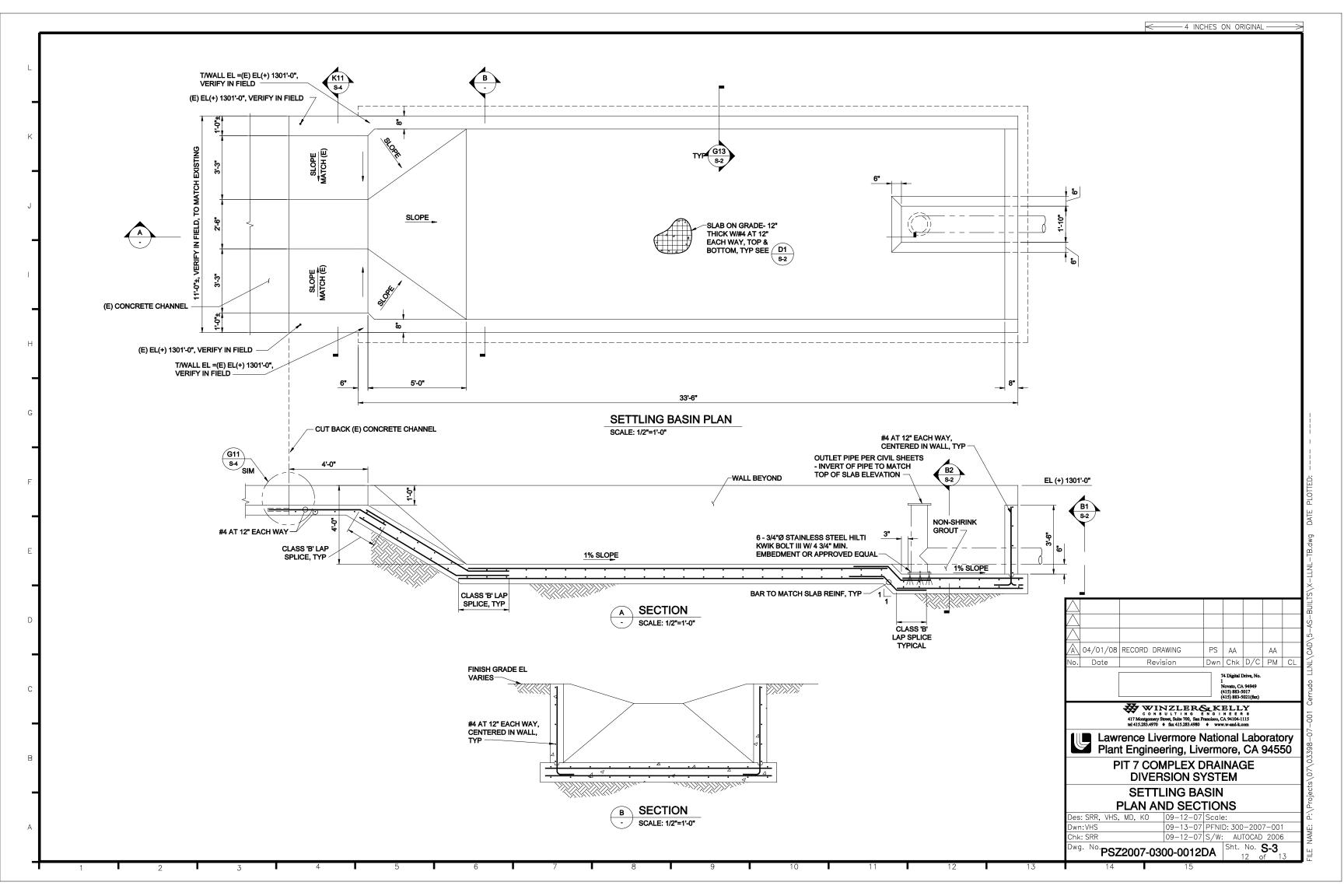
₩ IN ZLER S KELLY
consulting Engine Reliable
417 Montgomey Street, Suite 700, San Prancisco, CA 9410-41115
tel 415.283.4970 ♦ fax 415.283.4980 ♦ www.w-and-k.com

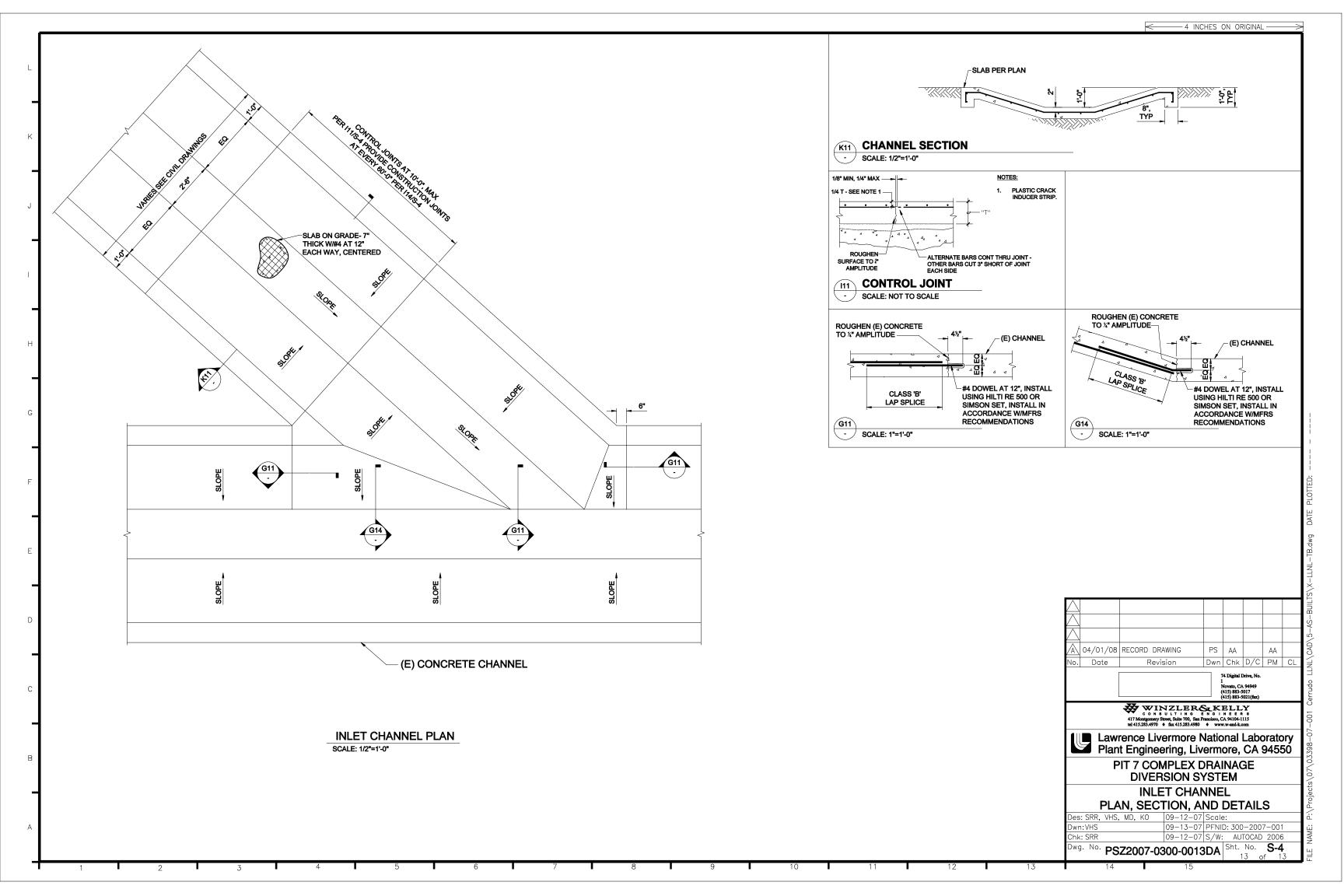
Lawrence Livermore National Laboratory Plant Engineering, Livermore, CA 94550

PIT 7 COMPLEX DRAINAGE **DIVERSION SYSTEM**

TYPICAL STRUCTURAL DETAILS Des: SRR, VHS, MD, KO 09-12-07 Scale:

09-13-07 PFNID: 300-2007-001 Chk: SRR 09-12-07 S/W: AUTOCAD 2006 Dwg. No. **PSZ2007-0300-0011DA** Sht. No. **S-2**





Appendix I

Pit 7 Complex Drainage Diversion System As-Built Variations from Design Specifications

Table I-1. Pit 7 Complex Drainage Diversion System As-Built Variations from Design Specifications.

Description of Change	Justification
Work Element #1 – Western Hillside: Added drain section J-2 in parallel to drain section J-1 (shown in as-built Sheet C-1, Appendix H.)	Drain section J-2 was included in the design to take advantage of a local change in topography. This section allows the horizontal sections of drains H and I to drain faster. This modification improved the functionality of the system.
Work Element #1 – Western Hillside: Modified drain sections A and C and eliminated drain section B (as-built Sheet C-1, Appendix H.)	Drain sections A and C were modified and drain section B was eliminated due to shallow bedrock encountered in the field. Drain section C was modified to follow the base of the bedrock. Drain section A was extended. This allowed elimination of drain section B. This modification improved the functionality of the system.
Work Element #2 – Eastern Drainage Channel: Two additional road crossings were added with culverts.	To allow vehicle access to the eastern hill slope, two additional road crossings were added to the drainage channel (as-built Sheet C-6, Appendix H.) These modifications did not alter the functionality or the capacity of the system.
Work Element #2 – Eastern Drainage Channel: Power poles were relocated to the western side of the main road and a culvert was added to protect extraction wells NC7-63 and NC7-64.	To allow for the maximum design width of the channel, power poles on the eastern side of the road were relocated to the western side. To protect extraction wells NC7-63 and NC7-64 from potential erosion damage, a culvert was installed in the section of the channel that lies in between the two wells (as-built Sheet C-7, Appendix H.) These modifications did not alter the functionality or the capacity of the system.
Work Element #4 – Northern Rip-Rap: The alignment of the riprap was adjusted (as-built Sheet C-5, Appendix H.)	The alignment of the riprap was adjusted to better fit the local topography and to prevent erosion down stream of the riprap. This modification did not alter the functionality or the capacity of the system.

Appendix J

Photographic evidence of OU 5 Remedial/Removal Action Implementation

Appendix J

Table of Contents

- Building 850 Soil Removal Action Corrective Action Management Unit Photographs.
- Pit-7-Source Ground Water /Extraction and Treatment System Photographs.
- Pit 7 Complex Drainage Diversion System Photographs.

Building 850 Soil Removal Action Corrective Action Management Unit Photographs

Building 850 Corrective Action Management Unit (CAMU)



Building 850 CAMU and monitor well/maintenance access road



Pit 7-Source Ground Water Extraction and Treatment System Photographs

Pit 7-Source extraction wellhead manifold and solar panel



Infiltration trench used for the discharge of treated effluent from the Pit 7-Source ground water treatment system and piezometers

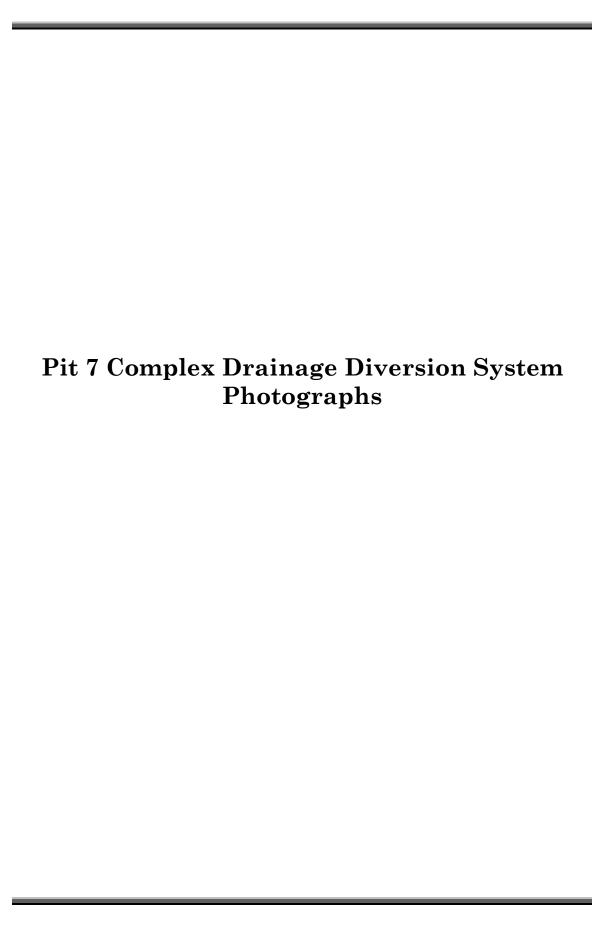


Exterior of Pit 7-Source ground water treatment system enclosure



Interior of Pit 7-Source ground water treatment system showing treatment media and batch tank





Pit 7 Complex Landfill Caps and Drainage Diversion System



Pit 7 Complex Drainage Diversion System – Southern Settling Basin



Pit 7 Complex Drainage Diversion System – Northern Riprap



Pit 7 Complex Drainage Diversion System – Eastern Hillside Drainage Swale



Pit 7 Complex Drainage Diversion System – Western Hillslope Trenches





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