PIEDMONT UNIFIED SCHOOL DISTRICT
ADMINISTRATION BUILDING
760 Magnolia Avenue • Piedmont, California 94611-4088 • (510) 594-2600

March 25, 2011

Alameda County
Health Care Services Agency
Environmental Health Department
Environmental Protection
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Dear Environmental Health Department,

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.

Sincerely,

Michael Brady
Asst. Superintendent

Preliminary Environmental Assessment
Site Characterization Sampling and Analysis Work Plan (PEA-SAP)
Havens Elementary School Modernization
1800 Oakland Avenue
Piedmont, CA

Prepared For:

Piedmont Unified School District
760 Magnolia Avenue
Piedmont, CA 94611

Prepared by:

MECA Consulting Associates.
620 Contra Costa Blvd. Suite 102
Pleasant Hill, CA 94523

Project Number: 16033.2013

Date: February 19, 2010

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REVIEWED AND APPROVED BY:

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1.0 INTRODUCTION

1.1 OBJECTIVES

This report presents a Sampling and Analysis Work Plan (SAP) for the Preliminary Environmental Assessment (PEA) to be conducted for the Frank C. Havens Elementary School (Havens ES) modernization project. The school is owned and operated by the Piedmont Unified School District (PUSD). The PEA will be performed by Millennium Consulting Associates (Millennium).

1.2 PEA DETERMINATION SUMMARY

Millennium previously performed a Phase I Environmental Site Assessment (ESA) for the Havens ES site, and presented the results in a report dated August 13, 2009. The Havens ES site is currently being modernized. Because the proposed facility renovations at Havens ES have been financed using state bond money, PUSD submitted the Phase I ESA for review and approval by California Department of Toxic Substances Control (DTSC) School Property Evaluation and Cleanup Division (SPECD).

A Phase I ESA Addendum was prepared to provide additional information requested by DTSC-SPECD based on review of the Phase I ESA and a site inspection conducted on September 23, 2009. The Phase I ESA Addendum was submitted to DTSC on September 25, 2009. Based on review of the Phase I ESA and Phase I ESA Addendum, DTSC-SPECD made a determination that a PEA of the site was necessary. The PEA determination was presented in correspondence dated October 5, 2009. DTSC has assigned the site the following Site Code: 204235-11 as part of the PEA process. This PEA SAP was prepared in response to the PEA determination made by DTSC- SPECD

1.3 PEA SCOPING DOCUMENTS

The following documents were utilized to develop the scope of the Sampling and Analysis Plan (SAP):

- Phase I Environmental Site Assessment, Frank C Havens Elementary School, prepared by Millennium Consulting Associates, dated August 13, 2009
- Phase I Environmental Site Assessment Addendum, Frank C Havens Elementary School, prepared by Millennium Consulting Associates, dated September 25, 2009
- Memorandum – Evaluation of Data Presented in Phase I Addendum for Frank C. Havens Elementary School, prepared by Valerie Mitchell, PhD, Associate Toxicologist, DTSC Human and Ecological Risk Office (HERO) dated October 28, 2009
- Interim Guidance – Evaluating Human Health Risks from Total Petroleum Hydrocarbons, Department of Toxic Substances Control, Human and Ecological Risk Division, dated June 16, 2009
- Interim Guidance – Evaluation of School Sites with Potential Soil Contamination as a Result of Lead from Lead-based Paint, Organochlorine Pesticides from Termiticides, and Polychlorinated Biphenyls from Electrical Transformers, Department of Toxic Substances Control, dated June 9, 2006
- Grading Plan Cut/Fill Map – Havens Elementary School Permit Set, prepared by EarthCalc, Inc., dated November 30, 2009, scale 1" = 40 ft.

1.4 REPORT ORGANIZATION

The PEA SAP Work Plan is organized into five (5) sections. Section 1 presents and introduction and includes project background and a summary of documents used in scoping the PEA. Section 2 presents site information while Section 3 summarizes previous investigations. Section 4 presents the Conceptual Site Model (CSM). The detailed PEA SAP Work Plan is included in Section 5. Figures and tables referenced in the work plan are included in the tabbed figures and table section of the report.

Additional project information is included in selected Appendices. Appendix A includes a project specific Health and Safety Plan. Appendix B includes the Passive Soil Gas Standard Operating Procedure provided by Beacon Environmental Services, Inc.

2.0 SITE INFORMATION

2.1 Site Location, Description and Use

The Havens ES is located at 1800 Oakland Avenue in Piedmont, California. The site is located within the city limits of Piedmont. The Havens ES is an elementary school for Kindergarten through 5th grade that is operated by the Piedmont Unified School District (PUSD). The Havens ES is shown in relation to city of Piedmont and local vicinity on the Vicinity Map, Figure 1.

The Havens ES site is an approximate rectangular parcel that occupies approximately three acres. The immediate vicinity around the school site is zoned as residential and commercial. Prior to implementing the current modernization program, the subject site was developed with numerous single-story structures. The building layout and building designations are shown on the Site Plan, Figure 2. Additional information regarding each building is summarized below:

Building Designation	Function	Year of Construction (original)	Type of Construction
Building A – West	Classrooms	1954	Concrete Slab on Grade
Building A – East	Administration/Classrooms	1954	Concrete Slab on Grade
Building B	Classrooms	1936	Concrete Slab on Grade
Building C	Auditorium/Theater	1940	Perimeter Concrete Spread Footing, Interior Slab on Grade Floor
Building D	Classrooms	1961	Concrete Slab on Grade
Building E	Multipurpose Room/Gym	1998	Concrete Slab on Grade
Building F	After School Program	1998	Portable
Building G	Portable Classrooms	2005	Portables

Building A was located on the northern part of the site, and faced Oakland Avenue. Building B was located in the approximate center of the site, and was located between Building A and Buildings C and D. Buildings C and D occupied the central eastern portion of the site, and faced Highland Avenue. Buildings E and F were located on the south eastern portion of the site, while Building G was located on the south western portion of the site.

2.2 Utility Service Providers

Domestic drinking water, waste water (sewer), electricity and natural gas are provided by following companies:

Domestic Drinking Water – East Bay Municipal Utility District (EBMUD)
Irrigation Water - EBMUD
Sewer and Waste Water – EBMUD
Electricity – Pacific Gas and Electricity (PG&E)
Natural Gas – PG&E

Domestic and irrigation water are provide through metered service by EBMUD. Natural gas and electricity are provided through metered service by PG&E.

2.3 Site Topography, Geology and Hydrogeology Summary

Regional and Site Topography - The Havens ES site is somewhat level with elevations across the site ranging from about 100 feet (MSL) to the east to about 90 feet (MSL) to the west[1]. The regional topographic gradient trends to the west at the site and in the immediate vicinity of the property. The Haven ES site and vicinity have been modified by grading and construction for the existing site improvements and the adjacent street improvements.

Regional and Site Geology - Based on review of the geotechnical report[2] for the project, the site and local vicinity are located in the lower foothills of the East Bay Hills. Available geologic maps show the site and surrounding area are underlain by bedded Franciscan Complex (late Cretaceous) consisting of sandstone and shale bedrock at shallow depth. Geologic mapping of exposed cut slopes near the Haven ES site indicate that bedrock generally strikes to the northwest with a moderate northeast dip.

Surficial deposits have not been mapped the site, but are considered to consist of native weathered bedrock and imported fill. The subject property is not located within a mapped Alquist-Priollo Zone (potential fault rupture zone), mapped seismic hazard zone (landsliding) or mapped flood hazard zone.

Soil borings conducted as part of previous geotechnical investigations generally encountered fill and native colluvial soils consisting of clayey/silty sands, clayey gravel and sandy clay/silt to varying depths ranging from 1 foot bgs up to about 7 feet bgs. The fill and/or colluvial soils are underlain by bedrock consisting clayed sandstone with shale and siltstone interbeds to the depths explored (about 21.5 feet bgs).

Site Hydrogeology - Free groundwater was reportedly not encountered in the borings conducted by Geomatrix Consultants or by Harza[3]. Geomatrix reported encountering wet soil in Boring B-2 at a depth of about 4½ feet bgs during drilling. Perched shallow groundwater was also encountered during site grading conducted as part of the modernization program at or near this boring location.

Geoprobe borings conducted as part of the Phase I Addendum Third Increment Investigation encountered groundwater in all four borings. Measured depths to groundwater were relatively consistent at borings GP-1, GP-2 and GP-6 with the groundwater measured at between 21.2 to 22.3 feet bgs. However, at geoprobe boring GP-7, the depth to groundwater was measured at 3.5 feet bgs.

None of the soil borings or geoprobe borings were surveyed. Consequently, no potetiometric surface data is available to determine groundwater hydraulic gradient or groundwater flow direction. However, groundwater flow is believed to follow the topographic gradient which would be west to southwest.
Groundwater Quality – No groundwater samples were collected from the previous soil borings performed by Harza and Geomatrix. However, grab groundwater samples were collected from the four geoprobe borings completed as part of the Phase I ESA Addendum Third Increment Investigation. The grab groundwater sample collected from geoprobe boring GP-2 was found not be impacted with petroleum hydrocarbons. However, the grab groundwater samples collected from geoprobe borings, GP-1, GP-6 and GP-7 were found to be impacted with various petroleum hydrocarbons.

2.4 Current Modernization Scope

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1 Site Plan and Boring Location, Figure 2, Geotechnical Study Report, Havens Elementary School Replacement, prepared by AMEC Geomatrix, Inc, Oakland, CA, dated October 24, 2008.

2 Geotechnical Study Report, Havens Elementary School Replacement, prepared by AMEC Geomatrix, Inc, Oakland, CA, dated October 24, 2008

3 Geologic Hazards and Geotechnical Investigation, Multi-Use Building , Haven Elementary School, prepared by Harza, dated March 16, 1995.

The Havens Elementary School Renovation Project will involve the complete demolition and/or removal of Building A – East, Building A – West, Building B, and Building D. The Ellen Driscoll Auditorium/Theater, Building C, will be renovated as part of the overall Havens Elementary School Modernization. Abatement to remove hazardous materials will be performed at Building A (East and West), Building B, Building C and Building D prior to demolition or modernization of these structures.

Building E will also be demolished and Building F will be removed from the site as part of the scope of the site renovation. Select portable buildings (Building G) will also be temporarily relocated while construction is being conducted.

The proposed modernization program at the Havens ES site will be include two new classroom buildings, a new administration building and new multi-purpose/use building. The new buildings will occupy the east and central portion of the site. As discussed above, the Ellen Driscoll Auditorium/Theater will be renovated. Site improvements will also include a new artificial turf playfield located on the northwest corner of the site and asphalt/rubberized surface playground area on the southwest corner of site. Concrete surface treatments including flatwork, stairs and landscape planters will comprise the remaining site work. No onsite parking is planned.

The previous building footprints and new modernization building footprints are shown superimposed on Figure 3. Figure 4 shows the new building and site improvement footprints. Figure 4 does not show the extent of concrete site work.

3.0 PREVIOUS SITE INVESTIGATION SUMMARY

Various site investigations were conducted prior to the development of the PEA SAP. The investigations were conducted by Millennium Consulting Associates (Millennium) or by Cook Environmental Services. The investigations included the following:

- Phase I Environmental Site Assessment (ESA), and
- Phase I Addendum

The various investigations are summarized below.

3.1 PHASE I ENVIRONMENTAL SITE ASSESSMENT

Millennium previously performed a Phase I Environmental Site Assessment (ESA) for the Havens ES site. The Phase I ESA findings, conclusions and recommendations were presented in a report dated August 13, 2009. PUSD submitted the Phase I ESA to California Department of Toxic Substances Control (DTSC) School Property Evaluation and Cleanup Division (SPECD).

3.2 PHASE I ADDENDUM

A Phase I ESA Addendum was prepared to provide additional information requested by DTSC-SPECD based on review of the Phase I ESA and a site inspection conducted on September 23, 2009. The Phase I ESA Addendum incorporated site investigations that were conducted by Millennium Consulting Associates (Millennium) or by Cook Environmental Services (CES) to address various environmental findings identified during the Phase I ESA or during modernization activities. The Phase I ESA Addendum was submitted to DTSC on September 25, 2009.

The site investigations that were incorporated into the Phase I Addendum were conducted in four increments. Each site investigation increment was conducted for different objectives. The objectives for each investigation increment are summarized below:

3.2.1 First Increment Investigation

Investigation Summary - The first investigation was performed to evaluate if near surface soils had been impacted from suspected lead containing paint that was used on Building A, Building B, Building C and Building D, since these buildings were constructed prior to 1993. Buildings E and F were not investigated for lead containing paint based on their age of construction (Post 1993).

In addition, selected soil samples were analyzed for naturally occurring asbestos since the site is located within ten miles of mapped ultramafic rock units. The soil samples were also analyzed for arsenic.

Findings Summary - the following findings were made:

- No visible discoloration of the soil was observed in the hand auger borings and no gross surface contamination with paint chips/debris was visually observed at the hand auger boring locations or in the immediate vicinity.

- All soil samples collected analyzed for lead were below the lead screening threshold concentration of 255 mg/kg established by the Department of Toxic Substances Control (DTSC)[4] and the 200 mg/Kg environmental screening level established by the Regional Water Quality Control Board[5], except at HA-10 where lead was detected at a concentration of 430 mg/kg. This sample was located in a small landscape planter area near the south end of Building B. The remaining area immediately adjacent to the sample location is paved with asphalt concrete or concrete pavements. The surface soil in this area is scheduled for removal as part of grading for site modernization.

- Arsenic was not detected in the soil samples analyzed above the method detection limit (mdl).

- Asbestos was not detected in the soil samples analyzed for naturally occurring asbestos.

This investigation was performed by Millennium.

3.2.2 Second Increment Investigation

Investigation Summary - The second investigation was conducted to investigate if there was an undocumented onsite source for petroleum hydrocarbons, since low levels of petroleum hydrocarbons were detected in excavated soil scheduled for offsite disposal. No documented onsite source was identified as part of the Phase I ESA. This investigation included subsurface investigation performed by Millennium and grab soil and grab water sampling by CES.

Findings – the following findings were made:

- No visible discoloration of the soil was observed in the test pits completed during this investigation by Millennium.

- The measured petroleum hydrocarbon concentrations in the soil samples collected from the test pits were below the applicable ESL for diesel (83 mg/Kg) and for motor oil (370 mg/Kg) established by the RWQCB.

- The soil samples collected by CES at the transformer pit (SS-1) and at various interior locations at the site (SS-2, SS-3 and SS-4) were below the applicable ESL for diesel (83 mg/Kg) and for motor oil (370 mg/Kg) established by the RWQCB except at two locations. At the transformer pit (SS-1) location, the measured motor oil concentration of 490 mg/Kg and at the sample location east of Building P4 where the measured motor concentration of 680 mg/kg exceeded the 370 mg/Kg ESL.

- The TPHd and TPHmo concentrations in the grab groundwater samples collected at the interior locations (GW-1) where perched groundwater was encountered were all above the applicable ESLs for diesel (100 µg/L) and motor oil (100 µg/L).

- Laboratory analyses indicate that the detected hydrocarbons appear to be significantly aged indicating that petroleum hydrocarbons may have resulted from old spills associated with historical activities.

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4 Interim Guidance Evaluation of School Sites with Potential Soil Contamination as a Result of Lead-based Paint, Department of Toxic Substances Control, Revised 6/9/06

5 Table A, Screening for Environmental Concerns at Sites Contaminated Soil and Groundwater, California Regional Water Quality Control Board, San Francisco Bay Region, Interim Final – November 2007

- Visual observations made during grading did not indicate a potential onsite source.

3.2.3 Third Increment Investigation

Investigation Summary – The third investigation was conducted to determine if there was an offsite source for the low level petroleum hydrocarbons that were being detected in the shallow groundwater at the site. As part of the Phase I ESA, a review of regulatory databases identified three sites where reported releases from underground storage tanks had occurred. The sites included the Heller Seasonings (2000 Oakland Avenue), Valero Station (formerly Chevron – 340 Highland Avenue) and Piedmont City Hall (120 Vista Avenue). In addition, the Phase I ESA identified two historical automobile service stations nearby to the site. The first historical service station located across Highland Avenue from the school site is still in operation (Valero Station). However, the second service station that was located adjacent to the south east corner of the school property (349 Highland Avenue) is believed to have ceased operation prior to 1993.

This investigation included additional record review that was performed by Millennium and groundwater sampling that was conducted by CES.

Findings – the following findings were made:

- The Heller Seasoning and Piedmont City Hall site cases appear to have been closed. No regulatory files were located.

- No regulatory records and or files were available for the former service station located at 349 Highland.

- Records for the former Chevron site were able to be accessed electronically. The most recent groundwater monitoring reports were included in the Phase I ESA Addendum (Appendix C). Groundwater gradient maps show groundwater flow direction and gradient are to the south at the site.

- TPHg was not detected in the grab groundwater samples collected at the four geoprobe boring locations. In addition, TPHd and TPHmo were not detected in the grab groundwater samples collected at the geoprobe boring locations GP-1, GP-2 and GP-7.

- TPHd and TPHmo were detected in the grab groundwater sample collected at geoprobe boring GP-6. TPHd and TPHmo concentrations (350 µg/L and 460 µg/L, respectively) in the grab groundwater sample collected at Geoprobe Boring GP-6 were above the applicable ESLs for diesel (100 µg/L) and motor oil (100 µg/L).

- Benzene and toluene were detected in the grab groundwater samples collected at Geoprobe Borings GP-1 and GP-7. The measured benzene concentration at Geoprobe Boring GP-7 (1.4 µg/L) slightly exceeded the 1.0 µg/L ESL established by the RWQCB, but the measured toluene concentration (1.1 µg/L) was below the 40 µg/L ESL established by the RWQCB. The measured benzene concentration (0.62 µg/L) and toluene concentration (0.87 µg/L) at Geoprobe Boring GP-7 were below the applicable ESLs established by the RWQCB.

3.2.4 Fourth Increment Investigation

Investigation Summary - During site grading and trenching, an underground storage tank (UST) was encountered along the northwest west property line adjacent to the side walk along Bonita Ave. The

approximate location of UST is shown on Figure 2. The UST removal was performed by Golden Gate Tank Removal, a licensed UST Removal Contractor. UST removal operations were conducted from July 28 through July 30, 2009. The investigation included observation of the tank removal and collection of soil samples for analysis. A UST closure report will be prepared by Golden Gate Tank Removal and submitted to the Alameda County Department of Environmental Health, Hazardous Material Division.

Findings – Based on the results of the Increment Four Site Investigation, the following findings were made:

- The UST was observed to be in fair to good condition. A small hole was observed in the bottom of the UST once the UST was removed from the excavation.

- Minor soil discoloration was observed in excavation base in the vicinity at this location. No visual discoloration of the excavation sidewalls was observed.

- The excavation was dry.

- The measured petroleum hydrocarbon concentrations were below applicable Environmental Screening Levels (ESLs) established by the San Francisco Regional Water Quality Control Board.

- No fuel hydrocarbons (BTEX, MTBE) or fuel oxygenates were detected above the specific analyte detection limits in the soil samples analyzed from the UST removal.

4.0 CONCEPTUAL SITE MODEL

Based on the data collected from the Phase I ESA and the Phase I Addendum, a Conceptual Site Model (CSM) was developed. The CSM development included identifying potential onsite sources that could have impacted site soils and offsite sources that could impact the site via subsurface transport mechanisms. The CSM also discusses potential exposure pathways and potential receptors. Each CSM element is discussed below. A preliminary evaluation of risks that the site poses to human health and the environment is also presented as part of the CSM.

4.1 POTENTIAL SOURCES

Potential sources identified from previous investigations include potential onsite sources related to historical operation and maintenance activities of the site as a school and potential offsite sources related to operation of underground storage tanks (USTs) containing various petroleum products. Potential onsite and offsite sources are discussed separately below.

4.1.1 Potential Onsite Sources

Potential onsite sources related to historical school site operations included the following activities:

- Operation of an underground storage tank (UST) used to store heating oil.
- Application of exterior paint and/or coating systems containing lead based paint for building maintenance purposes
- Operation of an onsite electrical transformer to provide onsite electrical power
- Possible application of Termiticides around historical building foundations

Additional investigation to be performed under the PEA and data review performed as part preparing the PEA SAP Work Plan will further evaluate these potential onsite sources

4.1.2 Potential Offsite Sources

The potential offsite sources that were identified included the following:

- Operation of historical underground storage tanks (UST) used to store heating oil at residences located immediately adjacent to or hydraulically upgradient to the Havens Site.

- Operation of historical underground storage tanks (UST) used to store motor fuels (gasoline, diesel and motor oil) at current or historical automobile gas stations located adjacent to or hydraulically upgradient to the Havens Site

Additional investigation to be performed under the PEA and data review performed as part preparing the PEA SAP Work Plan will further evaluate these potential offsite sources

4.2 POTENTIAL EXPOSURE PATHWAYS

Review of the previous investigations and data have identified the following potential exposure pathways at the site:

- Exposure to impacted surficial soils through inhalation, ingestion or direct contact
- Exposure to impacted surficial soil by leaching to groundwater, where it is ingested
- Exposure to impacted groundwater through ingestion or exposure through use
- Migration of impacted groundwater or impacted surficial soils to surface waters or sediments creating an ecological exposure
- Exposure to soil vapor from potentially impacted groundwater through unsaturated site soil or volatilization from shallow groundwater, and
- Exposure to impacted soil and groundwater by onsite construction workers during site modernization activities.

Each of the above potential exposure pathways will be discussed separately below. The last exposure pathway is limited to modernization activities that require trenching, excavation or will result in soil disturbance.

4.2.1 Direct Contact, Inhalation or Ingestion

Previous investigations have indicated that potentially impacted surface soils were limited to the areas associated with the previous Buildings A, B, C and D. The remaining buildings E, F and G were constructed or installed after 1993.

Potentially impacted surface soils from the previous building footprints for Buildings A, B, D were generally removed as part of site demolition and grading operations being conducted as part of the current modernization activities for the Havens site. Potentially impacted soils were also removed as part of seismic improvements at the Building C (Driscoll Playhouse) site. This exposure pathway is not considered to present a high risk for direct contact, inhalation or ingestion following completion of modernization activities.

Additional investigation and evaluation will be conducted as part of the PEA to identify if residual soil impact remains and if this exposure pathway will continue to pose a risk.

4.2.2 Soil Leaching to Groundwater

As discussed in Section 4.2.1, previous investigations have indicated that potentially impacted surface soils were limited to the areas associated with the previous Buildings A, B, C and D. Because potentially impacted surface soils from the previous building footprints were removed as part of site demolition and grading operations or seismic renovation being conducted as part of the current modernization activities, this exposure pathway is not considered to present a high risk for soil leaching to impact groundwater.

Additional investigation will be conducted as part of the PEA to identify if residual soil impact remains and if this exposure pathway will continue to pose a risk.

4.2.3 Groundwater Use

This pathway consists of pumping groundwater to the surface where it may be used for domestic purposes

(e.g., consumption, washing, showering). Based on the Phase I ESA, there are no onsite well at the site, nor are there known domestic wells within a one-mile radius to the site. Domestic water is provided by the East Bay Municipal Utility District. Consequently, this pathway will not be further evaluated under the PEA.

4.2.4 Migration to Surface Water

As discussed in Section 4.2.1, previous investigations have indicated that potentially impacted surface soils were limited to the areas associated with the previous Buildings A, B, C and D. Because potentially impacted surface soils from the previous building footprints were removed as part of site demolition and grading operations or seismic renovation being conducted as part of the current modernization activities, this exposure pathway is not considered to present a high risk of exposure since a construction storm water pollution prevention plan (SWPPP) has been prepared for the site and is being implemented during the Havens modernization. In addition, modernization improvements will include collection and treatment of surface and shallow groundwater.

Consequently, this pathway is not considered to present a high risk for migration, and will not be further evaluated under the PEA. However, the PEA will document the location of the collection system and treatment method being implemented at the site as a Post Construction Best Management Practice (BMP).

4.2.5 Soil Vapor Migration

Previous investigations have indicated that shallow groundwater underlying the site may have been impacted from releases of petroleum hydrocarbons. The petroleum impacted groundwater is believed to have migrated from an unidentified up gradient source. While the petroleum hydrocarbon groundwater concentrations are considered low, there is the potential for volatilization of the petroleum hydrocarbons to occur with subsequent lateral and up-ward migration of soil vapor containing petroleum hydrocarbons to the ground surface. The upward migration could result in vapor intrusion into the new buildings being constructed as part of the Havens Modernization.

This soil vapor intrusion pathway is not considered to present a high risk for exposure since shallow groundwater collection system has been constructed around the new building footrprint perimeter to intercept groundwater, and the individual building slab on grade foundations have been constructed with a vapor barrier.

The PEA will document the location of the collection system and treatment method being implemented at the site as a Post Construction Best Management Practice (BMP) and will further evaluate this pathway through a passive soil gas survey.

4.2.6 Construction Worker Contact

Potentially impacted surface soils from the previous building footprints for Buildings A, B, D were generally removed as part of site demolition and grading operations being conducted as part of the current modernization activities for the Havens site. In addition, potentially impacted soils were also removed as part of seismic improvements at the Building C (Driscoll Playhouse) site.

This exposure pathway is not considered to present an ongoing risk for direct contact, inhalation or ingestion by onsite workers since implementation of the construction SWPPP required strict dust control BMPs to be implemented. Consequently, this pathway will not be further evaluated under the PEA.

4.3 POTENTIAL RECEPTORS

Potential receptors to potentially impacted soils and groundwater include both human and ecological receptors.

Human Receptors – The current modernization activities will potentially impact onsite construction workers. However, potential impact to students and school staff in temporary portable classrooms, as well as the occupants of residential and commercial buildings in the immediate vicinity of the site is considered unlikely due to construction measures being implemented at the site (hard barrier separation, SWPPP BMPs and site safety and security protocols.

Following completion of the modernization, receptors will include students, school staff, school site visitors and local residents and commercial tenants in immediate proximity to the site.

Ecological Receptors – Because the site and vicinity are fully developed and there are not ecologically sensitive areas or habitats in proximity to the site, the current modernization activities and future use of the site are not anticipated to impact ecological receptors.

5.0 PRELIMINARY ENVIRONMENTAL ASSESSEMENT

5.1 OBJECTIVE

The objective of the PEA investigation will be to determine if the site soils after post grading exhibit heavy metals (lead and arsenic), organochlorine pesticides (OCPs), and soil gas (TPH) that could require special handling or require post-construction monitoring.

5.2 SUBSURFACE INVESTIGATION SUMMARY

Additional subsurface investigation will be performed to complete the project objectives. The subsurface investigation will include the following tasks.

Permitting - Soil borings will be advanced using hand auger drilling methods. The shallow sampling depths do not require obtaining a drilling permit.

Public Notice - PUSD has incorporated the PEA into the public notification program for modernization work being performed at the Havens. The general contractor has been notified of the subsurface investigation to be performed and Millennium is coordinating this work through the general contractor's Site Safety Officer.

Boring and Passive Soil Gas Survey Reconnaissance – Millennium will conduct a pre-site characterization reconnaissance to field locate the soil boring and passive soil gas survey sample locations. The field locations will be marked by stakes and flagging. The locations will be coordinated with the general contractor's SSO.

Site Health and Safety Plan - Millennium has prepared a project health and safety plan (HASP). The HASP addresses the potential physical and chemical hazards and identifies specific work practices and personal protective equipment for the associated hazards. The drilling will be performed in Level D personal protective equipment (PPE). The HASP is presented as Appendix A in this Work Plan.

Site Characterization Investigation – The PEA will include additional site characterization work including collection of soil samples for chemical analysis and performing a passive soil gas survey. The site characterization will include twenty-four (24) soil borings and up to twenty four (24) passive soil gas sample locations. Each boring will be advanced to a maximum depth of 2.5 feet below ground surface (bgs). The borings will be advanced using hand auger drilling equipment. This method minimizes investigation derived wastes (IDW) such as drill cuttings and decontamination fluids. Millennium will be assisted by Vironex, a licensed drilling subcontractor. Soil boring locations are shown on Figures 5 and 6.

Soil samples will be collected in a split core sampling auger. An open face auger will be used to advance the boring to deeper sampling depths. The spilt core auger is equipped with sample barrel that is capable of collecting a six inch soil sample. The slit core sample barrel contains a 6-inch-long stainless steel liner.

Two soil samples will be collected from each boring. One sample will be collected at the finish soil subgrade (0.5 to 1 feet bgs); the second sample will be collected from a lower zone (2 to 3 feet bgs).

Each soil sample will be collected in a new, clean stainless steel sample tube. The ends of the sample tube will covered with Teflon tape and covered with new end-caps. The ends of the samples will be sealed using adhesive less tape. The samples will be labeled, and stored in a cooler at approximately 4°C, using

water ice. The samples will be logged onto a chain-of-custody form, and will be transported by Millennium to a state-certified analytical laboratory (chemical analysis) for testing.

Based on the previous geotechnical investigation and site investigations conducted as part of the Phase I Addendum, free groundwater was encountered at depths generally deeper than 6 feet bgs, which is below the anticipated finish depth of the soil borings. Hence, grab groundwater samples will not be collected. Following completion of the sampling, the borings will be backfilled with the auger cuttings. Where necessary,

Analytical Testing (Chemical) - Millennium will transport the soil samples for chemical analysis to McCampbell Analytical Inc. (MAI), a state-certified analytical laboratory, for chemical analysis. All analyses for heavy metals will be performed as discreet analyses. Composite analyses will be performed on soil samples to be analyzed for organochlorine pesticides (OCPs). The specific chemical analyses to be performed are identified in Table 1. All analyses will be performed on a 5-day turnaround basis. Samples to be analyzed for heavy metals will be performed on individual discreet soil samples.

Passive Soil Gas Survey – A passive soil gas (PSG) survey will be performed at up to 24 soil gas sample locations. Primary and secondary PSG sample locations are shown on Figure 7. The PSG sampling will be performed in conformance with a PSG Standard Operating Procedures (SOP) provided by Beacon Environmental. The PSG SOP is included in Appendix B. The PSG samples will remain in the ground for up to seven days, and will then be withdrawn, handled and shipped to Beacon for testing.

Air Monitoring - The soil borings and passive soil gas survey will also utilize hand held instruments to monitor for the presence of petroleum hydrocarbons. The specific monitoring program is detailed in the project health and safety plan. The hand-held instruments will include an organic vapor analyzer equipped with a photo ionization detector (OVA-PID)

QA/QC and Data Evaluation – All soil analyses will be performed by a State-certified analytical laboratory. QA/QC samples will include duplicates (10% - discreet analyses for heavy metals only) and a trip blank. The specific analyses for the trip blank are shown on Table 1.

The PSG samples include duplicates in the sample probe. QA/QC samples will include 10% duplicates.

Millennium will review the analytical results upon receipt from the laboratory to verify that the data meet the data quality objectives.

Depending on the results of the PSG samples, a determination will be made regarding installation of the secondary PSG samples and field deployment location.

5.3 DETAILED PEA SAMPLING AND ANALYSIS WORK PLAN

5.3.1 LEAD-BASED PAINT

Investigation Findings - Based on the findings from the First Increment Investigation, impact to onsite soils from lead based paint appeared limited to an area around hand auger boring HA-10 using the 255 mg/kg lead screening threshold. At this location, the lead was detected in the at grade soil sample (0 – 6 inches bgs) at a concentration of 490 mg/Kg. The October 28, 2009 HERO Memorandum recommended that step out sampling be performed to ensure that the entirety of the lead-impacted soil is removed prior to any demolition.

Based on the cut/fill map, step out sampling does appear to be feasible based on the current site conditions within a limited area. However, the former HA-10 hand auger boring is located within the new two story classroom footprint which is currently being constructed. The area within a radius of at 10 feet around boring HA-10 is also located in a shallow cut/fill area. The proposed limits and approximate sample locations for lead sampling are shown on Figures 5 and 6. This information has been incorporated into Table 2. Figures 5 and 6 show the previous building footprints and new modernization site plan on the cut/fill map. The excavated soil from the new two story classroom building area appears to have been disposed offsite at a landfill.

Based on discussion with DTSC during development of the SAP Work Plan, the lead screening threshold has been lowered to 80 mg/kg. Using this screening threshold, four additional locations exhibited lead concentrations that exceeded the 80 mg/kg screening threshold. The four locations included HA-1 (190 mg/kg), HA-3 (130 mg/kg), HA-4 (100 mg/kg), and HA-9 (130 mg/kg). Based on review of the cut/fill map, the following supplemental findings were made:

- Borings HA-3 and HA-4 are located in areas where substantial cuts were made during grading. The cuts removed the upper five (5) to six (6) inches of soil in this area.

- At Boring HA-1 and along the north and south sides of Building C (Driscoll Playhouse), the soil immediately adjacent to the building was removed to a depth of about four feet to enable new foundation work for the seismic retrofit of the building.

- Boring HA-9 is located in an area where substantial fill was placed during grading. The fill was placed to backfill a ramp area associated with the former Building A-East Building. On-site soil was used as fill in this area.

- Grading at the proposed two story classroom building required placement of fill in the southwest corner of the building pad. The fill thickness ranged from 2 feet up to about 3.5 feet.

Based on the above supplemental findings, Millennium concludes that the lead impacted soils at the HA-1, HA-3 and HA-4 boring locations were removed by cuts performed during site grading.

Consequently, Millennium is not proposing to perform further sampling for lead in the vicinity of HA-1, HA-3, and HA-4. However, Millennium is proposing to perform additional soil sampling for lead at the following locations:

- Limited step-out sampling in the area of Boring HA-10 at proposed Borings HA-10A and HA-10B.

- Supplemental sampling in the fill area in the area of Boring HA-9 at proposed Borings HA-9A and HA-9B.

- Supplemental sampling in the fill area located in the south west corner of the proposed two story classroom building at proposed Borings HA-17 and HA-18

The supplemental sample locations are shown on Figure 5 and Figure 6. Two samples will be collected from each boring location (total of eight). One sample will be collected at the existing soil subgrade (0.5 to 1.0 below ground surface (bgs)). The second sample will be collected at 2.0 feet bgs.

The soil samples will be collected using hand auger drilling equipment. For quality assurance and quality

control purposes, one duplicate sample will be collected (Total 9 soil samples). The soil samples collected will be analyzed for lead by EPA Method 6010. All soil samples will be collected and handled in conformance with Millennium Standard Operating Procedures and transported under chain of custody to a state certified analytical laboratory (McCampbell Analytical).

In addition, Millennium will summarize the waste characterization data for lead for the excavated soils that were disposed offsite.

5.3.2 ONSITE FILL

Based on review of the cut/fill map, the following supplemental findings were made regarding onsite fill:

- Boring HA-9 is located in an area where substantial fill was placed during grading. The fill was placed to backfill a ramp area associated with the former Building A-East Building. On-site soil was used as fill in this area.

- Grading at the proposed two story classroom building required placement of fill in the southwest corner of the building pad. The fill thickness ranged from 2 feet up to about 3.5 feet.

Based on discussion with DTSC, Millennium will perform additional soil sampling for arsenic at the select locations where onsite soils were reused for onsite fill:

- Supplemental sampling in the fill area in the area of Boring HA-9 at proposed Borings HA-9A and HA-9B.

- Supplemental sampling in the fill area located in the south west corner of the proposed two story classroom building at proposed Borings HA-17 and HA-18

The supplemental sample locations are shown on Figure 5 and Figure 6. Two samples will be collected from each boring location (total of four). One sample will be collected at the existing soil subgrade (0.5 to 1.0 below ground surface (bgs)). The second sample will be collected at 2.0 feet bgs.

The soil samples will be collected using hand auger drilling equipment. For quality assurance and quality control purposes, one duplicate sample will be collected (Total 5 soil samples). The soil samples collected from the two fill areas identified above will be analyzed for arsenic using EPA Method 6010. All soil samples will be collected and handled in conformance with Millennium Standard Operating Procedures, and will transported under chain of custody to a state certified analytical laboratory (McCampbell Analytical).

5.3.3 POLYCHLORINATED BIPHENYLS

At the time that the Phase I ESA site reconnaissance was performed, site demolition had been initiated. No aboveground electrical transformers were observed at the time of the site reconnaissance. Millennium was informed after submittal of the Phase I ESA report that there was an electrical transformer at the site, and Millennium was informed that the transformer had been removed. Based on discussion with site personnel, the transformer did not contain PCBs. A soil sample (Sample SS-1) was collected by Cook Environmental Services (CES) from within the former transformer vault after the vault structure had been removed. The soil sample was submitted for PCB analyses by EPA Method 8082. PCBs were not detected above the method detection limit (12 µg/Kg).

Based on the above, no additional sampling for PCBs is considered necessary. The sample location and analytical data are included in the Phase I ESA Addendum. As part of the SAP, Millennium will obtain documentation that the transformer did not contain PCBs.

5.3.4 ORGANOCHLORINE PESTICIDES

As part of the Phase I ESA Addendum, Millennium contacted PUSD maintenance personnel regarding the use of pesticides. Discussion with PUSD maintenance personnel indicated that there were no records that Chlordane or other organochlorine pesticides (OCPs) had been used at the Havens site. Based on the building age data presented above, Building B and Building C were constructed prior to development and/or commercial use of OCPs for termite control. However, Building A (East and West) and Building D were built during the period when OCPs were commonly used. However, there was no documentation to confirm that OCPs had been used or applied at the time of construction.

No sampling for OCPs was conducted as part of the Phase I ESA since there was no documented use of OCPs on the site.

Based on the cut/fill map, the following findings were made:

- Building A West – the Building A West area was graded for a new artificial turf field. This area was subject to cuts up to 0.5 feet and fills up to about 0.7 feet. The area between borings HA-6 and HA-7 is a cut/fill transition zone.
- Building A-East – The Building A East area was graded for a new one story classroom building. This area was subject to deep cuts and fills. Cuts extended to depths of 0.9 feet and fills over 1 foot in thickness.
- Building B – The Building B area was graded for a new one story classroom building and new administrations building. A portion also underlies the new two story classroom building. This area was subject to substantial cuts up to 0.9 feet.
- Building C – The Building C area was not graded. However, as discussed above, the north and south sides of the building were excavated to enable seismic retrofit of the building foundation. The excavations extended to depths of 4 feet. The excavated soils were not reused. The excavated soil was characterized by analysis of four discreet soil samples. OCPs were not detected in the discrete soil sample analyses. A copy of the analytical report is included in Appendix A (Phase I Addendum).
- Building D – The Building D area was graded for a new administration building. The former Building D is located in cut areas. Cut depths ranged from 0.25 feet up to 0.5 feet.

As part of this SAP, Millennium proposes the following sampling and analysis:

- Perform supplementary soil sampling in the vicinity of former Building D building footprint at Boring Locations HA-11 through HA-16.
- Perform supplementary soil sampling in the vicinity of former Building B footprint at Boring Locations HA-9A, HA-9B, HA-10A and HA-10B
- Perform supplementary soil sampling in the cut/fill transition zone in the former Building A-West footprint at Boring Locations HA-19 to HA-24, and
- Perform supplementary soil sampling in the former Building A-East footprint at Boring Locations HA-25 to HA-30

Two samples will be collected from each boring location (total of forty four). One sample will be collected

at the existing soil subgrade (0.5 to 1.0 below ground surface (bgs)). The second sample will be collected at 2.0 feet bgs.

The soil samples will be collected using hand auger drilling equipment. For quality assurance and quality control purposes, up to four duplicate samples will be collected (Total 48 soil samples).

All soil samples will be collected and handled in conformance with Millennium Standard Operating Procedures, and will transported under chain of custody to a state certified analytical laboratory (McCampbell Analytical). The near surface soil samples collected from the 0.5 to 1.0 bgs will be analyzed for OCPs by EPA Method 8081. The soil samples will be composited by the analytical laboratory (2:1 to 3:1 composite). The soil samples collected from 2 to 2.5 bgs will be archived at the analytical laboratory.

5.3.5 TPH IMPACTED GROUNDWATER

Offsite Source - The October 28, 2009 Memorandum indicated that HERO was not convinced that the TPH contamination in groundwater is from an offsite source. The memo references that the highest TPH concentration in groundwater was detected at sample location GW-1. While this is correct, Millennium disagrees that GW-1 is in close proximity to the abandoned heating oil tank that was removed. GW-1 is located topographically upgradient from the abandoned heating oil tank. In addition, the hydraulic gradient is believed to follow the topographic gradient. Consequently, GW-1 would also be hydraulically up gradient to the former UST location. Consequently, the former UST could not be the source of TPH-impacted water at location GW-1.

It should also be noted that the water at the GW-1, WS-1 and WS-3 grab groundwater locations appear to be perched groundwater. The perched groundwater was removed by pumping and treated using liquid phase GAC. No additional perched water was encountered after initial pumping was complete. The excavations were backfilled, and the areas were then graded.

Risk Assessment - HERO has also recommended that TPH impacts to the site be evaluated using DTSC recently released guidance document. This document is cited in the SAP Scoping Documents used in preparing this SAP. Selected soil and groundwater analyses performed as part of the Phase I ESA Addendum included chromatograms since the analytical reports indicated that the petroleum products appeared to be aged. Millennium will work with the analytical laboratory (Curtis and Tompkins) to speciate the TPH results into the six groups of hydrocarbons identified in the guidance document. These data will be used to perform the risk assessment in conformance with the previously cited guidance document.

As part of this SAP implementation, Millennium will compile the specific chromatograms and hydrocarbon group breakdowns as a technical submittal prior to performing the risk assessment. Following concurrence form HERO, Millennium will perform the risk assessment.

Soil Vapor Migration – DTSC expressed a concern that the TPH-impacted groundwater may result in soil vapor migration. In order to perform an initial assessment of soil vapor migration, Millennium will conduct a limited passive soil gas (PSG) survey. The proposed sample grid and PSG sample locations are shown on Figure 7.

The PSG survey will include 24 sample locations. PSG sample locations within a specific grid will be determined based on existing building foundations. The PSG survey will include thirteen (13) primary sample points. The primary PSG sample locations are identified as PSG1-1 through PSG1-13 on Figure 7. The secondary PSG sample locations are identified as PSG2-1 through PSG2-11. The secondary PSG

sample points will be used to estimate the horizontal limits of areas where the initial PSG sample data identifies an area with elevated concentrations of chemicals of concern (COC). The primary and secondary PSG sample locations are shown on Figure 7.

Millennium will utilize PSG sample devices developed by Beacon Environmental. The PSG samplers will be installed in conformance with Beacon Environmental Inc.'s PSG Survey SOP. A copy of the SOP is included in Appendix B.

The PSG samples will be analyzed by Beacon for the following COCs: Total Petroleum Hydrocarbons (gasoline, diesel, motor oil), Volatile Organic Compounds (VOCs) and Semi Volatile Organic Compounds (SVOCs). TPH and VOCs will be analyzed by EP Method 8260. SVOS will be analyzed by EPA Method 8270. The specific EPA 8260 and EPA 8270 compound lists are included in the SOP. Benzo(a)pyrene and other heavy SVOCs cannot be analyzed by the current PSG technology.

It should be noted that all proposed building foundations will be constructed with below slab vapor barrier and perimeter shallow groundwater collection system. The specific details and specifications for the vapor barrier system and shallow groundwater collection system will be included as a technical submittal under this SAP.

5.4 PEA REPORT PREPARATION AND SUBMITTAL

Following receipt of the analytical results, Millennium will review the data for completeness. Findings, conclusions and recommendations will be developed. Millennium will submit the analytical results, findings, conclusions and recommendations to DTSC for initial review. Comments will be incorporated into the draft PEA report.

The draft PEA report will include the following information:

- Description of any deviation from preparation and analysis procedures described in the PEA Work Plan,
- Description of data validation results and conformance with QA/QC objectives identified in the PEA Work Plan,
- Tabulated listing chemical analytical results
- Tabulated list of passive soil gas survey results, and
- Summary of findings, conclusions and recommendations

The report will also include necessary figures and backup information (e.g., QA/QC analytical documentation). Upon review and approval by PUSD, Millennium will submit the draft report to DTSC for review and approval. Millennium will incorporate DTSC review comments into the final draft PEA report.

PUSD will develop and conduct necessary public notification as part of the 30-day comment period. If comments are received, Millennium will assist PUSD in developing responses to the comments.

FIGURES

MILLENNIUM CONSULTING ASSOCIATES PLEASANT HILL, CALIFORNIA	
SCALE: N.T.S.	FOR HAVENS ELEMENTARY SCHOOL PEA OAKLAND, CA
DATE: 11/10/09	
DRWN: S.S.L.	
CHECKED: M.M.M.	TITLE VICINITY MAP
APPROVED: M.M.M.	
JOB: 16033.2013	DWG. NO. FIGURE 1

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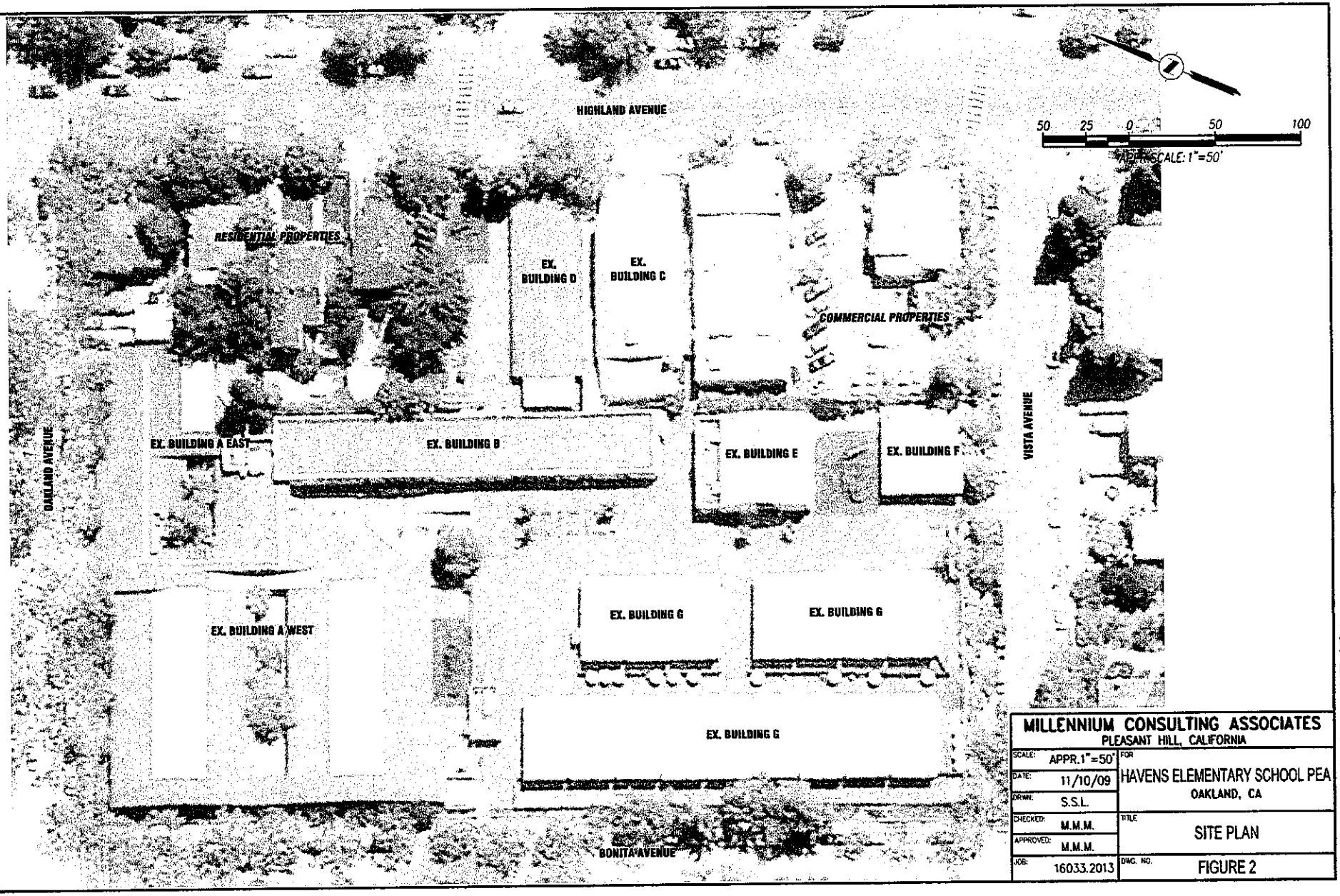

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APPROVED: M.M.M.	
JOB: 16033.2013	DWG. NO. FIGURE 2

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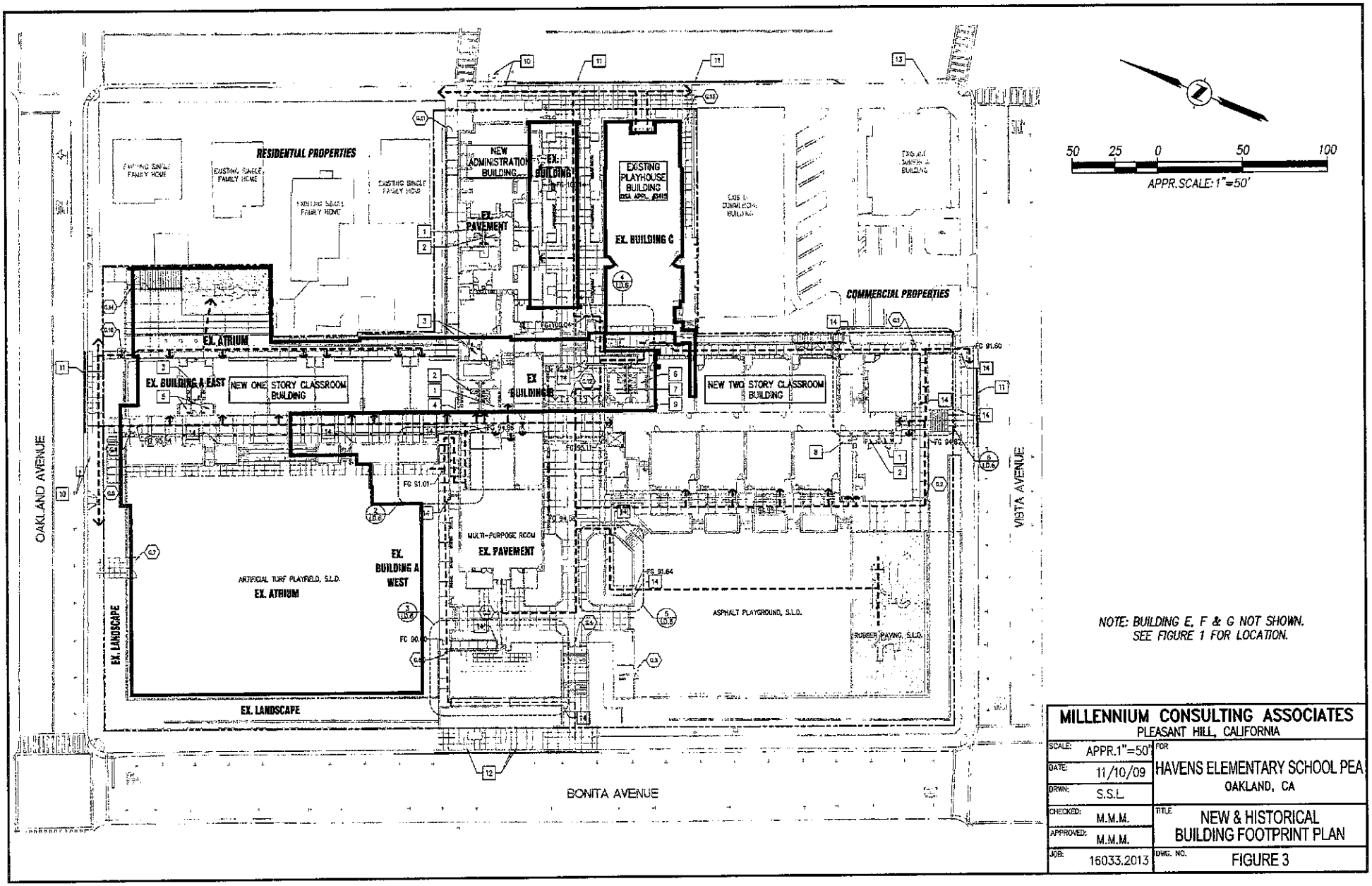

NOTE: BUILDING E, F & G NOT SHOWN.
SEE FIGURE 1 FOR LOCATION.

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APPROVED: M.M.M.	
JOB: 16033.2013	DWG. NO. FIGURE 3

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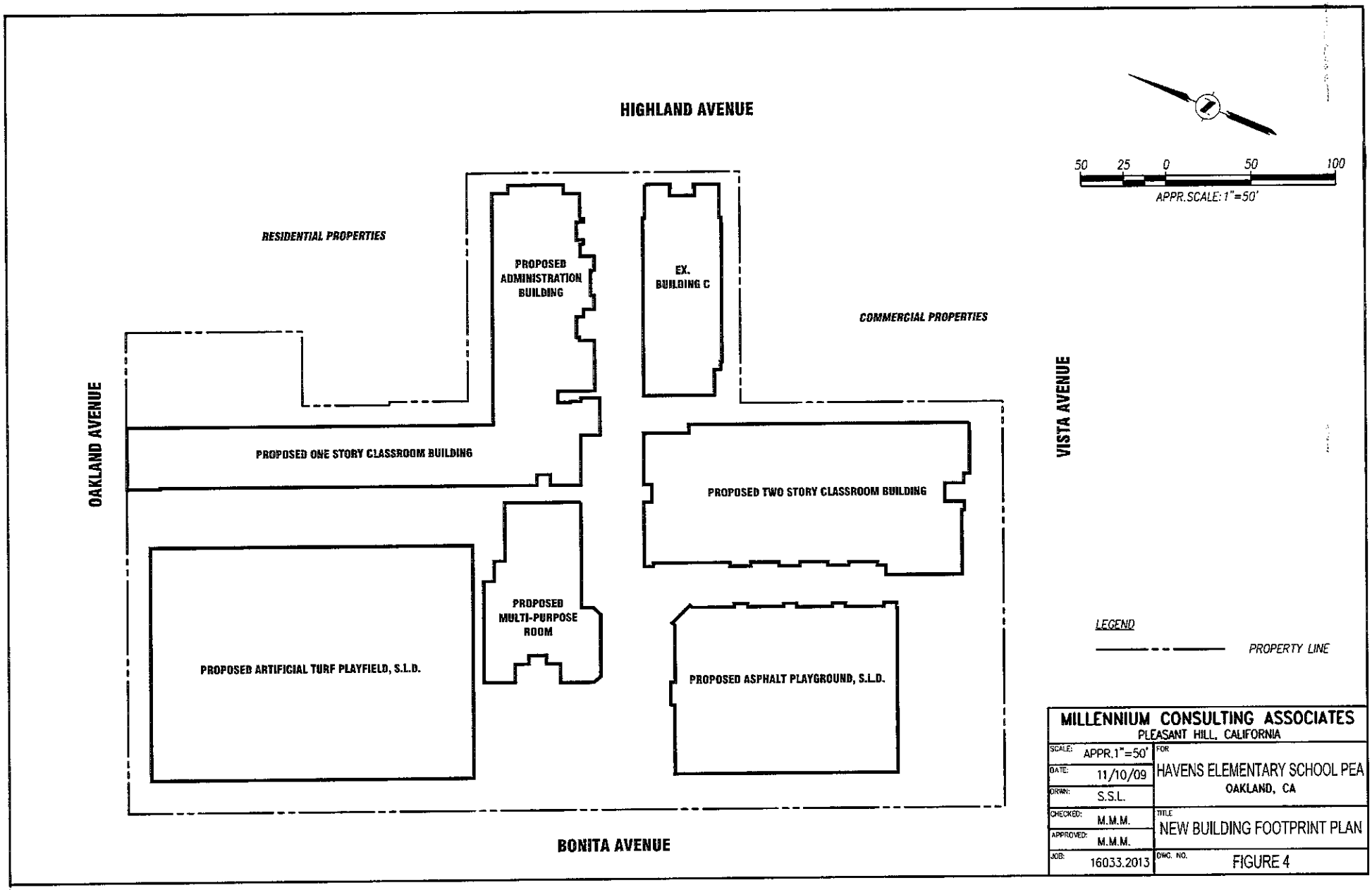

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DATE: 11/10/09	
DRAWN: S.S.L.	
CHECKED: M.M.M.	TITLE: NEW BUILDING FOOTPRINT PLAN
APPROVED: M.M.M.	
JOB: 16033.2013	DWG. NO. FIGURE 4

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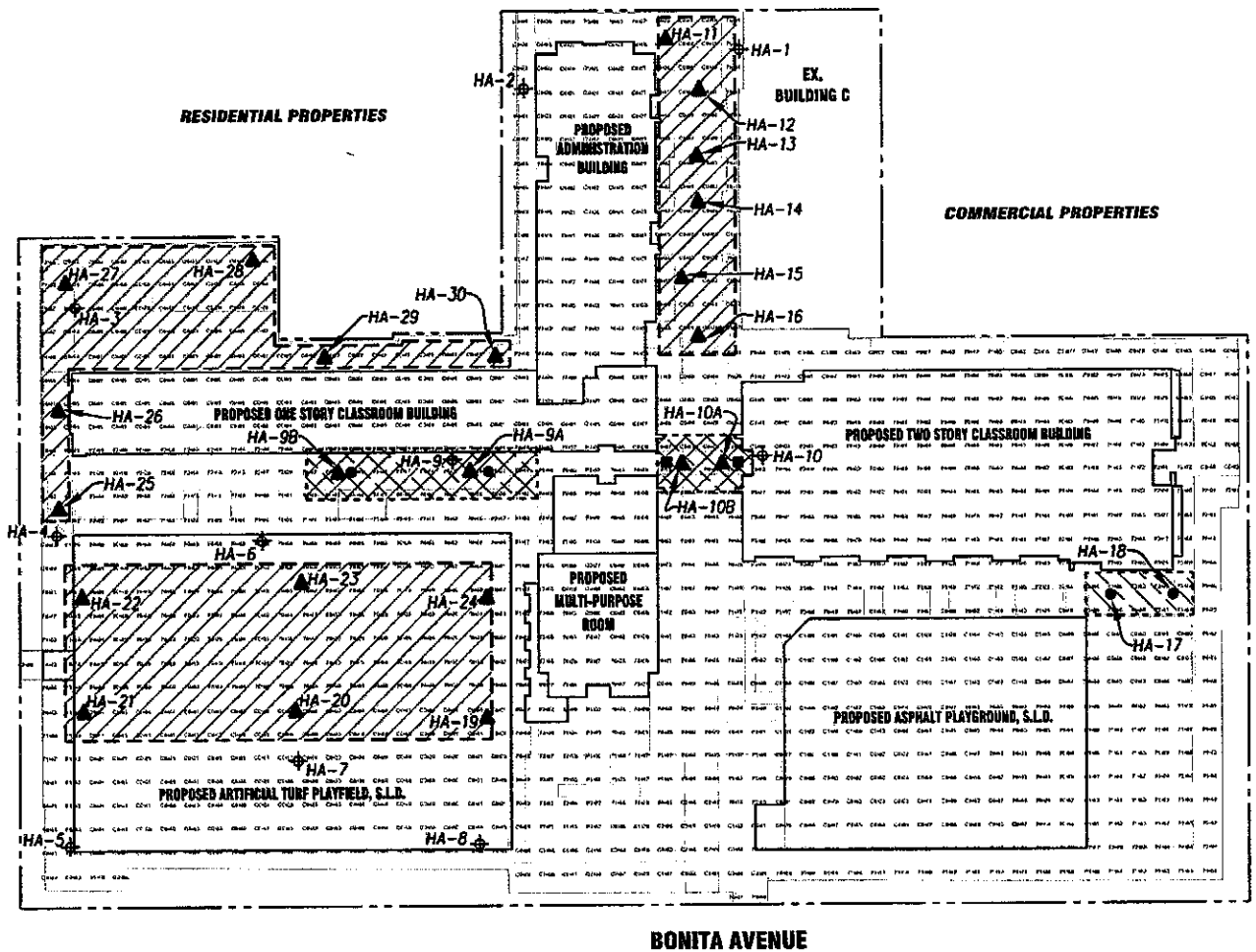

LEGEND

- APPROXIMATE PROPERTY LINE
- APPROXIMATE NEW BUILDING FOOTPRINT
- HA-1 HAND AUGER BORING LOCATION
- HA-11 PROPOSED OCP SAMPLE LOCATION
- PROPOSED LEAD SAMPLE LOCATION
- PROPOSED LEAD/ARSENIC SAMPLE LOCATION
- PROPOSED OCP SAMPLE AREAS
- PROPOSED LEAD/ARSENIC SAMPLE AREAS

F = FILL
C = CUT

C1 + 40

FEET

HUNDREDS OF A FOOT (OR METERS)

E.G. C1 +40 MEANS (A CUT OF 1.40 FEET (OR METERS))

NOTE: SAMPLE LOCATIONS ARE APPROXIMATE AND WILL BE DETERMINED IN THE FIELD BASED ON OBSERVE FIELD CONDITIONS.

50 25 0 50 100

APPR.SCALE: 1"=50'

MILLENNIUM CONSULTING ASSOCIATES PLEASANT HILL, CALIFORNIA	
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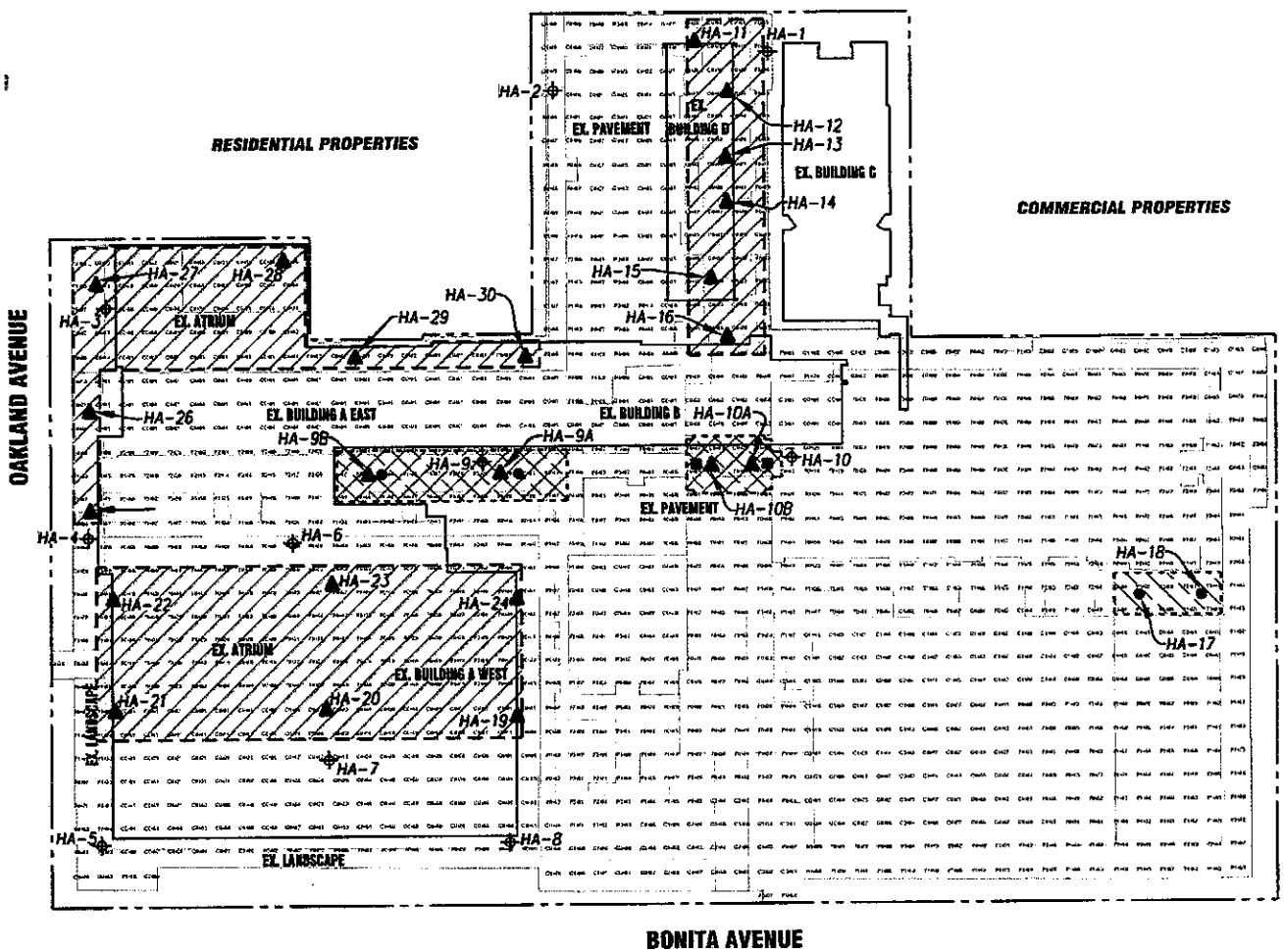
DATE: 02/12/10	
DRWN: S.S.L.	
CHECKED: M.M.M.	TITLE: LEAD / ARSENIC / OCP SAMPLE LOCATIONS WITH NEW BUILDING FOOTPRINTS
APPROVED: M.M.M.	
JOB: 16033.2013	DWG. NO. FIGURE - 5



LEGEND

- APPROXIMATE PROPERTY LINE
- APPROXIMATE NEW BUILDING FOOTPRINT
- HA-1 HAND AUGER BORING LOCATION
- HA-11 PROPOSED OCP SAMPLE LOCATION
- PROPOSED LEAD SAMPLE LOCATION
- PROPOSED LEAD/ARSENIC SAMPLE LOCATION
- PROPOSED OCP SAMPLE AREAS
- PROPOSED LEAD/ARSENIC SAMPLE AREAS

F = FILL
C = CUT

C1 + 40

FEET

HUNDREDS OF A FOOT (OR METERS)

E.G. C1 +40 MEANS (A CUT OF 1.40 FEET (OR METERS))

NOTE: SAMPLE LOCATIONS ARE APPROXIMATE AND WILL BE DETERMINED IN THE FIELD BASED ON OBSERVE FIELD CONDITIONS.

50 25 0 50 100

APPR. SCALE: 1" = 50'

MILLENNIUM CONSULTING ASSOCIATES PLEASANT HILL, CALIFORNIA	
SCALE: APPR.1"=50'	FOR: HAVENS ELEMENTARY SCHOOL PEA
DATE: 02/12/10	OAKLAND, CA
DRWN: S.S.L.	
CHECKED: M.M.M.	TITLE: LEAD / ARSENIC / OCP SAMPLE LOCATIONS WITH HISTORICAL BUILDING FOOTPRINTS
APPROVED: M.M.M.	
JOB: 16033.2013	DWG. NO. FIGURE - 6

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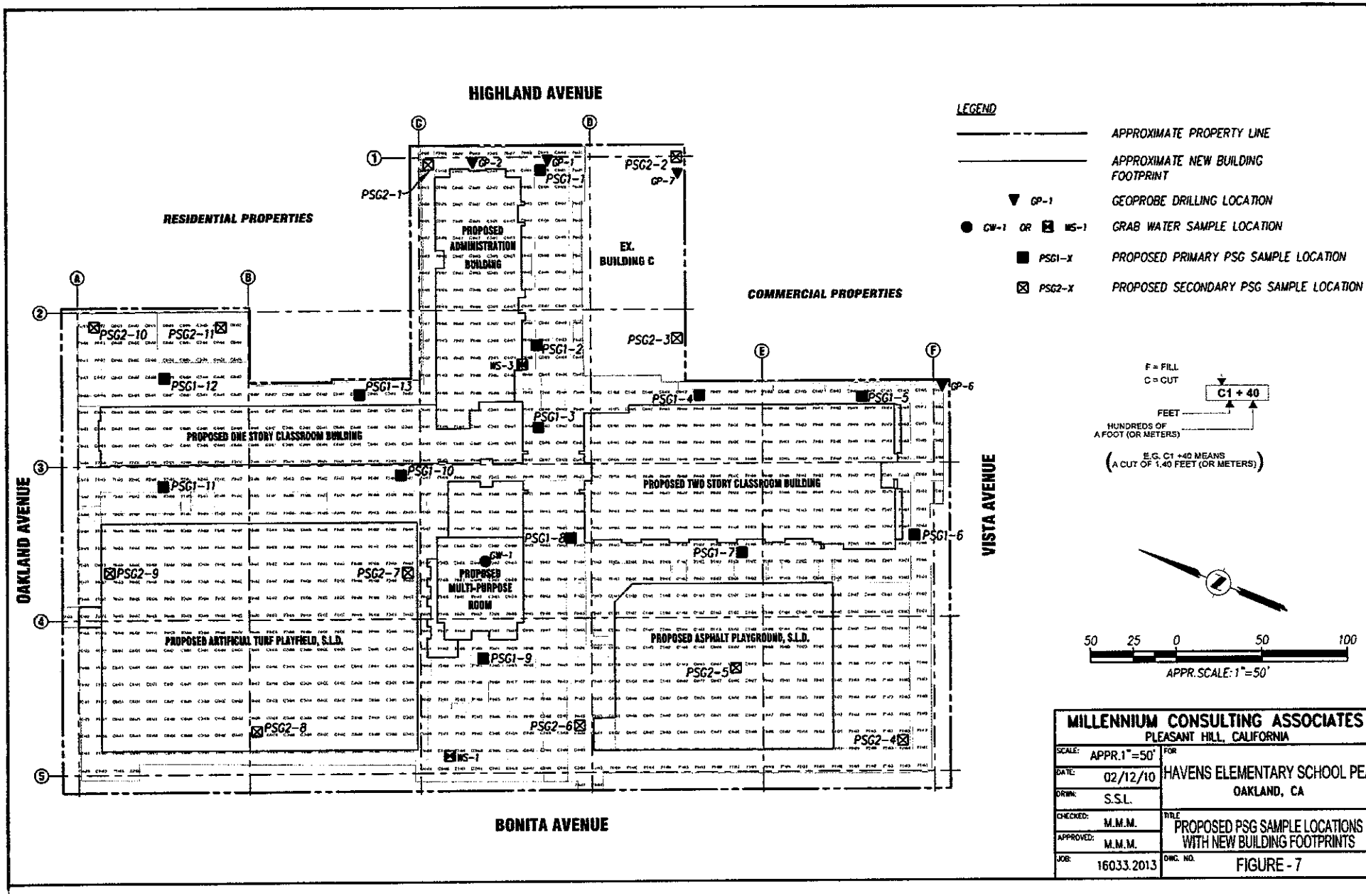

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CHECKED: M.M.M.	TITLE: PROPOSED PSG SAMPLE LOCATIONS WITH NEW BUILDING FOOTPRINTS
APPROVED: M.M.M.	
JOB: 16033.2013	DWG. NO. FIGURE - 7

TABLES

Table 1A
Havens Elementary School - PEA SAP
Boring/Test Pit/Soil Sample Data Summary Table

Boring/Test Pit Identification	Status	Boring/Soil Sample Data		
		Sample Intervals (below ground surface)	Total Depth (ft)	Analytical Summary
Previous Phase I Addendum Investigations (Increments 1, 2, 3 and 4)				
HA-1 to HA-10	Phase I Addendum 1st Increment Investigation	0 - 0.5 feet	0.5	Lead, Arsenic
HA-2, HA-5, HA-7	Phase I Addendum 1st Increment Investigation	2.0 - 3.0 feet	3	Naturally Occurring Asbestos
TP-1 to TP-12	Phase I Addendum 2nd Increment Investigation	3.0 to 6 feet	6	TPH (diesel, motor oil)
SS-1	Phase I Addendum 2nd Increment Investigation	4 feet	4	PCBs
SS-2 to SS-4	Phase I Addendum 2nd Increment Investigation	0 - 0.5	0.5	TPH (diesel, motor oil), BTEX
UST Excavation Base	Phase I Addendum 4th Increment Investigation	8 feet	8 feet	TPH (diesel, motor oil), BTEX, MTBE, Oxygenates
PEA SAP Work Plan				
HA-9A, HA-9B	PEA	0.5 - 1.0 feet 2 - 2.5 feet	2.5	0.5 - 1.0 OCP (2:1Composite) 0.5 - 1.0 Lead (Discreet) 2 - 2.5 feet Archive
HA-10A, HA-10B	PEA	0.5 - 1.0 feet 2 - 2.5 feet	2.5	0.5 - 1.0 OCP (2:1Composite) 0.5 - 1.0 Lead (Discreet) 2 - 2.5 feet Archive
HA-11, HA-12, HA-13	PEA	0.5 - 1.0 feet 2 - 2.5 feet	2.5	0.5 - 1.0 OCP (3:1Composite) 2 - 2.5 feet Archive
HA-14, HA-15, HA-16	PEA	0.5 - 1.0 feet 2 - 2.5 feet	2.5	0.5 - 1.0 OCP (3:1Composite) 2 - 2.5 feet Archive
HA-17	PEA	0.5 - 1.0 feet 2 - 2.5 feet	2.5	0.5 - 1.0 Lead (Discreet) 2 - 2.5 feet Archive
HA-18	PEA	0.5 - 1.0 feet 2 - 2.5 feet	2.5	0.5 - 1.0 Lead (Discreet) 2 - 2.5 feet Archive
HA-19, HA-20, HA-21	PEA	0.5 - 1.0 feet 2 - 2.5 feet	2.5	0.5 - 1.0 OCP (3:1Composite) 2 - 2.5 feet Archive
HA-22, HA-23, HA-24	PEA	0.5 - 1.0 feet 2 - 2.5 feet	2.5	0.5 - 1.0 OCP (3:1Composite) 2 - 2.5 feet Archive
HA-25, HA-26, HA-27	PEA	0.5 - 1.0 feet 2 - 2.5 feet	2.5	0.5 - 1.0 OCP (3:1Composite) 2 - 2.5 feet Archive
HA-28, HA-29, HA-30	PEA	0.5 - 1.0 feet 2 - 2.5 feet	2.5	0.5 - 1.0 OCP (3:1Composite) 2 - 2.5 feet Archive
PSG1-1 to PSG1-13	PEA	2 - 2.5 feet	2.5	TPH (gasoline, diesel, motor oil), VOCs (8260), SVOCs (8270)
PSG2-1 to PSG21-11	PEA	2 - 2.5 feet	2.5	TPH (gasoline, diesel, motor oil), VOCs (8260), SVOCs (8270)

Notes:
1. HA-1 to HA-30 advanced using hand auger drilling equipment
2. Test pits excavated using rubber-tired backhoe
3. PSG samples installed per Beacon Environmental PSG SOP

Table 1B
Havens Elementary School - PEA SAP
Sample Analysis/QA/QC Summary Table

Work Plan - Soil Analysis												
	Hand Auger Borings					Passive Soil Gas						
Analytical Method	HA-8a to HA-9b	HA-10a to HA-10b	HA-11 to HA-16	HA-17 to HA-18	HA-19 to HA-30	Primary	Secondary	Sample Container	QA/QC Samples	Detection Limit	Total	Rationale/Comments
Arsenic (EPA Method 6010/7000)	X			X				SS liner	10% Duplicates	0.5 mg/kg	9	Discreet Analysis. Sample Depths 0.5 - 1 and 2 - 2.5 bgs
Lead (EPA Method 6010/7000)	X	X		X				SS liner	10% Duplicates	0.5 mg/kg	13	Discreet Analysis. Sample Depths 0.5 - 1 and 2 - 2.5 bgs
Organochlorine Pesticides (EPA Method 8081)	X	X	X		X			SS liner	Trip blank +10% Duplicates	0.001 mg/kg	44	2:1 Composite (HA-9a/b, HA10a/b) to 3:1 Composite (HA-11 to HA-16, HA-19 to HA-30)
Passive Soil Gas - TPH/ VOCs (EPA 8260)						X	O	Beacon PSG Sampler	Trip Blank +10% Duplicates	See SOP	13/11	Discreet Analyses for Primary PSG Samples
Passive Soil Gas - SVOCs (EPA 8270)						X	O	Beacon PSG Sampler	Trip Blank +10% Duplicates	See SOP	13/11	Discreet Analyses for Primary PSG Samples

Notes:

1. Hand Auger Samples collected from 0.5 to 1 ft bgs analyzed; soil sample from 2 -2.5 ft archived at lab
2. O = Secondary PSG samples to be deployed based on review of Primary PSG Sample Results
3. PSG Analysis per Beacon Environmental QA/QC Protocols.

Table 2
Havens Elementary School PEA SAP
Analytical Summary Table for Lead and Arsenic

Sample Location	Sample Intervals	Analyte Concentration (mg/Kg) - Heavy Metals		Post Demo Grading Elevation Change		Comment
		Arsenic	Lead	Sample Location	10" Radius	
HA-1	0 - 0.5	ND (20)	190	----	Cut (0.24' to 4')	Soil removed to enable seismic foundation work. New backfill provided
HA-2	0 - 0.5	ND (20)	56	Cut (0.06')	Cut (0.04' to 0.26')	Boring located in drainage 45 feet from building
HA-3	0 - 0.5	ND (20)	130	Cut (0.48')	Cut (0.31' to 0.69')	Cut removed lead impacted soil.
HA-4	0 - 0.5	ND (20)	100	Cut (0.41')	Fill (1.2') to Cut (0.41')	Cut removed lead impacted soil.
HA-5	0 - 0.5	ND (20)	ND (40)	Fill (.0.04')	Fill (0.4') to Cut (0.01')	Area paved and partially covered with temporary portables
HA-6	0 - 0.5	ND (20)	48	Fill (0.47')	Fill (0.37' to 1.2')	Sample located in interior atrium area near building face at Building A West
HA-7	0 - 0.5	ND (20)	ND (40)	Cut (0.17')	Cut (0.17' to 0.24')	Sample located in interior atrium area near building face at Building A West
HA-8	0 - 0.5	ND (20)	40	Cut (0.45')	Cut (0.45' to 0.63')	Area paved and partially covered with temporary portables
HA-9	0 - 0.5	ND (20)	130	Fill (0.79')	F(0.79' to 5.23')	Location under or immediately adjacent to new building foundation. Onsite soil used for deep fill in this area
HA-10	0 - 0.5	ND (20)	490	Cut (0.01')	Fill (0.2') to Cut (0.03')	Location under new building foundation. Step out sampling feasible outside new building footprint
Stockpile - Building A West - West Stair	N/A	9.7	37			
Stockpile - Building A West - Under Slab	N/A	7.9	16			
DTSC Lead Paint Screening		N/A	80			
Cal EPA CHHSLS		0.07	150			
RWQCB ESL		0.39	200			
California TTLC		500	1000			
California STLC (mg/L)		5.0	5.0			

Notes
1. N/A = Not Analyzed
2. ND() = Not Detected (detection limit in (_))
3. TTLC = Total Threshold Limit Concentration: STLC = Soluble Threshold Limit Concentration
4. ESL = Environmental Screening Level (RWQCB 2008); CHHSLS = California Human Health Screening Levels for Soil (Cal EPA 2005 DTSC Lead Paint Screening - Guidance 2006)
5. Cells Shaded where analyte concentration exceeds an allowable regulatory limit
6. Post Demolition Grading Elevation Change taken from EarthCalc Grading Cut/Fill Map. Cut depth or fill thickness measured in feet).

Table 3
Analytical Summary Table for Naturally Occuring Asbestos
Havens Elementary School PEA SAP

Sample Location	Sample Intervals	Asbestos Concentration (%) -
HA-2	2.0 - 2.5	NAD
HA-5	2.5 -3.0	NAD
HA-7	2.0 - 2.5	NAD
California Air Resource Board		0.25

Notes
1. NAD = No Asbestos Detected

Table 4
Frank C Havens Elementary School PEA SAP
Field OVA-FID Screening Summary Table

Sample Location	FID (PPM)	
	4 ft bgs	6 ft bgs
TP-1	4.18	5.20
TP-2	4.20	8.60
TP-3	26.20	9.80
TP-4	10.88	5.50
TP-5	2.65	2.04
TP-6	1.38	2.26
TP-7	4.71	4.76
TP-8	2.50	4.00
TP-9	--	--
TP-10	10.00	5.00
TP-11	4.20	4.60
TP-12	1.20	1.00

Notes:
1. Background air concentration = 1 to 2 ppm

Table 5
Analytical Summary Table for TPH/BTEX/PCBs Soil
Havens Elementary School PEA SAP

Sample Location	Sample Intervals	Analyte Concentration Soil							
		TPHg (mg/Kg)	TPHd (mg/Kg)	TPHmo (mg/Kg)	Benzene (mg/kg)	Toluene (mg/kg)	Benzene (mg/kg)	Xylenes (mg/kg)	PCBs (mg/kg)
TP-1	6.0	N/A	ND(1.0)	ND(5.0)	NA	N/A	N/A	N/A	NA
TP-2	6.0	N/A	1.2	ND(5.0)	NA	NA	NA	NA	NA
TP-3	4.0	N/A	1.8	5.4	NA	NA	NA	NA	NA
TP-3	6.0	N/A	1.1	ND(5.0)	NA	NA	NA	NA	NA
TP-4	4.0	N/A	ND(1.0)	ND(5.0)	NA	NA	NA	NA	NA
TP-4	6.0	N/A	2.7	11.0	NA	NA	NA	NA	NA
TP-5	4.0	N/A	ND(1.0)	ND(5.0)	NA	NA	NA	NA	NA
TP-5	6.0	N/A	2.3	1.3	NA	NA	NA	NA	NA
TP-6	4.0	N/A	2.6	10.0	NA	NA	NA	NA	NA
TP-6	6.0	N/A	ND(1.0)	ND(5.0)	NA	NA	NA	NA	NA
TP-7	4.0	N/A	1.5	5.1	NA	NA	NA	NA	NA
TP-7	6.0	N/A	9.5	20.0	NA	NA	NA	NA	NA
TP-8	4.0	N/A	1.4	5.8	NA	NA	NA	NA	NA
TP-8	6.0	N/A	N/A	N/A	NA	NA	NA	NA	NA
TP-10	4.0	N/A	6.4	21.0	NA	NA	NA	NA	NA
TP-10	6.0	N/A	12	32.0	NA	NA	NA	NA	NA
Stockpile - Building A West - West Stair	NA	ND (1.0)	5.4	56	---	---			---
Stockpile - Building A West - Under Slab	NA	ND (1.0)	1.8	12	---	---			---
SS-1 Former Transformer Pit	4.0	N/A[1]	82	490	NA	NA	NA	NA	ND(12)
SS-2 South End of Site	0 - 0.5	ND(50)	ND(50)	ND(50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	N/A
SS-3 NW Corner Building D	0 - 0.5	ND(50)	ND(50)	67.0	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	N/A
SS-4 East of Building P-4	0 - 0.5	ND(50)	76.0	680.0	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	N/A
RWQCB ESL		83	83	370					
California TTLC		---	---	---	---	---			---
California STLC		---	---	---	---	---			---

Notes
1. N/A = Not Analyzed
2. ND() = Not Detected (detection limit in (_)). Where DL is not listed, DL varies by specific analyte
3. ESL = Environmental Screening Level (Regional Water Quality Control Board)
4. TTLC = Total Threshold Limit Concentration
5. STLC = Soluble Threshold Limit Concentration
6. Cells Shaded where analyte concentration exceeds an allowable regulatory limit
7. (----) = No applicable toxicity-based criteria limit established. Hazardous waste if sample exhibits reactivie, corrosive or ignitable characteristic.
8. TPH = Total Petroleum Hydrocarbons (TPHg = gasoline, TPHd - diesel, TPHmo - motor oil)
9. NA = Not Applicable

Table 6
Analytical Summary Table for TPH/BTEX Grab Groundwater
Havens Elementary School PEA SAP

	Boring/Water Data			Analyte Concentration Water								
Sample Location	Total Depth (ft)	Depth to Water (ft)	Sample Type	TPHg (ug/L)	TPHd (ug/L)	TPHmo (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	VOCs (ug/L)	SVOCs (ug/L)
GP-1	24	21.2	Bailer/Geoprobe	ND (50)	ND (50)	ND (250)	0.62	0.87	ND(0.50)	ND(0.50)	N/A	N/A
GP-2	24	22.3	Bailer/Geoprobe	ND (50)	ND (50)	ND (250)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	N/A	N/A
GP-6	24	21.7	Bailer/Geoprobe	ND (50)	350	460	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	N/A	N/A
GP-7	24	3.5	Bailer/Geoprobe	ND (50)	ND (50)	ND (250)	1.4	1.1	ND(0.50)	ND(0.50)	N/A	N/A
GW-1 (initial CES)			Grab	ND (50)	4900	640	N/A	N/A	N/A	N/A	N/A	N/A
GW-1 (resample Millennium)			Grab	N/A	850	450	N/A	N/A	N/A	N/A	N/A	N/A
WS-1			Grab	ND (50)	1400	740	ND(0.50)	0.69	ND(0.50)	ND(0.50)	N/A	N/A
WS-3			Grab	ND (50)	500	ND (250)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	N/A	N/A
Bonita (8/27/09)			Grab	ND (50)	ND (50)	N/A	ND(0.50)	0.88	ND(0.50)	8.4	N/A	N/A
Bonita (9/1/09)			Grab	ND (50)	330	ND (250)	ND(0.50)	1.90	ND(0.50)	3.9	N/A	N/A
Bonita (9/14/09)			Grab	ND (50)	ND (50)	ND (250)	ND(0.50)	ND(0.50)	ND(0.50)	1.7	N/A	N/A
Bonita (12/18/09)			Grab	ND (50)	76	ND (250)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(varies)	ND(varies)
Bonita French Drain			Grab	ND (50)	ND (50)	ND (250)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	N/A	N/A
RWQCB ESL				100	100	100	1	40	30	20	Varies	Varies

Notes
1. N/A = Not Analyzed
2. ND() = Not Detected (detection limit in (_)). Where DL is not listed, DL varies by specific analyte
3. ESL = Environmental Screening Level (Regional Water Quality Control Board)
4. Cells Shaded where analyte concentration exceeds an allowable regulatory limit
5. TPH = Total Petroleum Hydrocarbons (TPHg = gasoline, TPHd - diesel, TPHmo - motor oil)
6. NA = Not Applicable

Table 7
Analytical Summary Table for UST Removal
Havens Elementary School PEA SAP

Sample Location	Sample Intervals	TPH Analyte Concentration Soil (mg/Kg)			Fuel VOC Analyte Concentration Soil (mg/Kg)					
		TPHg	TPHd	TPHmo	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Oxgenates
UST - South Excavation Base	8.0	ND (1.0)	5.1	23	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.05)	ND (varies)
UST - North Excavation Base	8.0	1.8	28	62	ND (0.005)	ND (0.005)	ND (0.005)	N/A[2]	ND (0.05)	ND (varies)
Excavation Stockpile (4:1 composite)	8.0	ND (1.0)	7.0	35	ND (0.005)	ND (0.005)	ND (0.005)	N/A[2]	ND (0.05)	ND (varies)
RWQCB ESL		83	83	370	0.044	2.9	2.3	2.3	0.023	Varies

Notes

1. ND() = Not Detected (detection limit in (_)). Where DL is not listed, DL varies by specific analyte
2. ESL = Environmental Screening Level (Regional Water Quality Control Board)
3. Cells Shaded where analyte concentration exceeds an allowable regulatory limit
4. TPH = Total Petroleum Hydrocarbons (TPHg = gasoline, TPHd - diesel, TPHmo - motor oil)

APPENDIX A

HEALTH AND SAFETY PLAN

APPENDIX B

BEACON ENVIRONMENTAL

PASSIVE SOIL GAS STANDARD OPERATING PROCEDURE

Health and Safety Plan

Preliminary Environmental Assessment
Site Characterization
Havens Elementary School Modernization
1800 Oakland Avenue
Piedmont, CA

Prepared For:

Piedmont Unified School District
760 Magnolia Avenue
Piedmont, CA 94611

Prepared by:

MECA Consulting Associates
620 Contra Costa Blvd. Suite 102
Pleasant Hill, CA 94523

Date: February 19, 2010
Project No. 16033.2013

Health and Safety Plan
Site Characterization Activities

Preliminary Environmental Assessment
Havens Elementary School Modernization
1800 Oakland Avenue
Piedmont, CA

Millennium Project No. 16033.2013

REVIEWED AND APPROVED BY:

Mark Milani, P.E.
Project Health and Safety Manager

2/22/10
Date

Mike Noel, C.I.H.
Corporate Health and Safety Director
CIH 3941 exp 6/1/2011

2/22/10
Date

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APPENDICES

1.0 INTRODUCTION

1.1 GENERAL

This Health and Safety Plan (HASP) is intended to address safety and health hazards/procedures to be observed during the subsurface investigation activities to be performed at the Havens Elementary School (Havens).

This HASP will govern field operations involving the following activities:

- Initial site reconnaissance activities for hand auger sample location, passive soil gas sample location and utility clearance,
- Subsurface drilling using hand auger drilling equipment,
- Soil sampling and passive soil gas sampling, and
- Site restoration

The Havens site is located at 1800 Oakland Avenue in Piedmont, CA. The site is shown in relation to the city of Piedmont on the Vicinity Map, Figure 1 in Preliminary Environmental Assessment Sampling and Analysis (PEA-SAP) Work Plan.

1.2 POLICY STATEMENT

It is the policy of Millennium Consulting Associates (MILLENNIUM) to provide a safe and healthful work environment for all its employees. MILLENNIUM considers no phase of operations or administration to be of greater importance than injury and illness prevention. Safety takes precedence over expediency or shortcuts. At MILLENNIUM, we believe every accident and every injury is avoidable. We will take every reasonable step to reduce the possibility of injury, illness, or accident.

This HASP is a project-specific document, and is intended to augment and not replace existing health and safety programs, injury and illness protection plans, hazard communication programs, respiratory protection programs, hearing conservation programs, fall safety programs, training programs, standard operating procedures and other safety related programs, methods or procedures developed by MILLENNIUM, contractors and subcontractors for their own employees. These include both voluntary and regulatory required programs.

1.3 HEALTH AND SAFETY PROVISIONS AND OBJECTIVES

The provisions of this Health and Safety Plan are mandatory for all MILLENNIUM, contractor and subcontractor onsite personnel while engaged in any operations at the Project Site. MILLENNIUM requires that visitors to the work site during all activities, also abide by these procedures (see Section 10.4).

Site activities covered under this HASP include, but are not limited to:

- Initial work location reconnaissance, including utility clearance,
- Site preparation and layout,
- Drilling using hand auger drilling equipment,
- Passive soil gas sampling
- Soil sampling,
- Soil and/or passive soil gas sample recovery and handling, and

- Backfilling soil borings and passive soil gas sample locations

Some activities identified above may not be required or performed as part of the subsurface activities to be performed.

On-site hazard controls and monitoring include, but are not limited to:

- Visual observation for slip, trip and/or fall hazards associated with working around mechanized equipment
- Air monitoring during site investigation activities
- Use of hearing protection around heavy equipment
- Handling and storage of hazardous and non-hazardous materials

Potential physical and chemical hazards associated with the above tasks are described in Section 5.

Operational changes to this HASP that could affect the health or safety of personnel, the community, or the environment will not be made without prior approval of the MILLENNIUM Health and Safety Project Manager (H&S PM). In the event of a conflict between this HASP and federal, state, or local regulations, the more stringent will apply.

This HASP excludes performing field activities that require training to perform hazardous waste operations or emergency response actions as described in Title 8 of the California Code of Regulations, Chapter 4, Subchapter 7 and Title 29 of the Code of Federal Regulations, Part 1910.

1.4 REFERENCES

This Health and Safety Plan complies with requirements specified in applicable U.S. Department of Labor Occupational Safety and Health Administration (OSHA), California Occupational Safety and Health Administration (CAL/OSHA), and U.S. Environmental Protection Agency (EPA) regulations. This HASP follows the guidelines established by the regulatory agencies in the following documents.

Standard Operating Safety Guides, U.S. EPA, November 1984

Title 8 of the California Code of Regulations, Chapter 4, Subchapter 4 (commencing with Section 1500), Construction Safety Orders (CAL/OSHA)

Title 29 of the Code of Federal Regulations, Part 1926 (29 CFR 1926), Safety and Health Regulations for Construction (OSHA)

1.5 ORGANIZATION

The HASP is organized into twelve (12) sections. Section 1 gives an introduction and identifies specific health and safety objectives. Section 2 gives a brief description of the project, and summarizes historical uses of the site. Sections 3 through 12 address specific health and safety plan requirements.

This HASP has been incorporated into the PEA-SAP Work Plan as Appendix A. Figures and tables not included in this HASP but are referenced in the HASP are included in the tabbed figure or table section of the PEA –SAP Work Plan.

2.0 SCOPE OF WORK

2.1 SITE DESCRIPTION AND PROJECT AREAS

The Havens ES is located at 1800 Oakland Avenue in Piedmont, California. The site is located within the city limits of Piedmont. The Havens ES is an elementary school for Kindergarten through 5th grade that is operated by the Piedmont Unified School District (PUSD). The Havens ES is shown in relation to city of Piedmont and local vicinity on the Vicinity Map, Figure 1 in the PEA-SAP Work Plan.

The Havens ES site is an approximate rectangular parcel that occupies approximately three acres. The immediate vicinity around the school site is zoned as residential and commercial. Prior to implementing the current modernization program, the subject site was developed with numerous single-story structures. The building layout and building designations are shown on the Site Plan, Figure 2 in the PEA-SAP Work Plan. Additional information regarding each building is summarized below:

Building Designation	Function	Year of Construction (original)	Type of Construction
Building A – West	Classrooms	1954	Concrete Slab on Grade
Building A – East	Administration/Classrooms	1954	Concrete Slab on Grade
Building B	Classrooms	1936	Concrete Slab on Grade
Building C	Auditorium/Theater	1940	Perimeter Concrete Spread Footing, Interior Slab on Grade Floor
Building D	Classrooms	1961	Concrete Slab on Grade
Building E	Multipurpose Room/Gym	1998	Concrete Slab on Grade
Building F	After School Program	1998	Portable
Building G	Portable Classrooms	2005	Portables

Building A was located on the northern part of the site, and faced Oakland Avenue. Building B was located in the approximate center of the site, and was located between Building A and Buildings C and D. Buildings C and D occupied the central eastern portion of the site, and faced Highland Avenue. Buildings E and F were located on the south eastern portion of the site, while Building G was located on the south western portion of the site.

2.2 SITE HISTORY

Historical aerial photographs, historical topographic maps, Sanborn Fire Insurance Maps, historical directories, building construction information provided by the project architect, and historical information available through the city of Piedmont were utilized to document the historical use of the site and nearby vicinity.

The city of Piedmont area was part of the Rancho Antonio owned by Don Luis Peralta during the early 1800's. Development of the Piedmont area reportedly began in 1852 when Walter Blair purchased 600 acres of land from the Peraltas. Initial development included a dairy that was located on what is now Highland Avenue. In addition, a quarry operation was started in the area where Dracena Park is currently

located, and a hotel was constructed in the area that is now Piedmont Park. Residential development in the Piedmont area began in about 1877. Significant development of the area began after the 1906 San Francisco Earthquake.

The cited sources do not indicate any prior agricultural use or development of the property before it was developed for use as a school site in 1908. The land was donated by Frank C Havens. The first school was named Piedmont Public School. The school was operated by the Piedmont School District. No building plans were found for the school. However, an archive photograph maintained by the City of Piedmont and available Sanborn Fire Insurance Maps and historical aerial photographs indicate the building was located in about the center of site with the school entrance located on Bonita Avenue. The building was approximately "I"-shaped in plan view and appeared to be a two-story building with at least a partial basement. The building reportedly was heated by steam heat generated by boiler located in the basement. The boiler was believed to be fueled by heating oil, which was typical for the area at the time. The Piedmont Public School was later renamed the Frank C Havens School.

The school was expanded in the 1920's to include additional classrooms. The expansion included acquiring additional land to the eastern portion of the site to construct additional classrooms or to convert existing structures on the acquired land for classroom usage. Additional expansion occurred into the early 1950s. This included construction of Building B in 1936 and construction of Building C (Driscoll Auditorium) in 1940. In 1954, the original school building was demolished and a new school (Building A) was constructed along the northern portion of the site The existing Buildings B and C were incorporated into the new school.

Additional expansion occurred in 1961 when Building D was constructed and in 1998 when Building E was constructed. The portables (Building G) were added after 2005.

The site is currently undergoing modernization. Modernization included demolition of Buildings A, B, D, and E.

2.3. PREVIOUS INVESTIGATIONS

Millennium previously performed a Phase I Environmental Site Assessment (ESA) for the Havens ES site. The results were presented in a report dated September 2009. Because the proposed facility renovations at Havens ES have been financed using state bond money, Piedmont Unified School District (PUSD) submitted the Phase I ESA for review and approval by California Department of Toxic Substances Control (DTSC) School Property Evaluation and Cleanup Division (SPECD). A Phase I ESA Addendum was prepared to provide additional information requested by DTSC-SPECD based on review of the Phase I ESA and a site inspection conducted on September 23, 2009. The Phase I ESA Addendum was submitted to DTSC on September 25, 2009. Based on review of the Phase I ESA and Phase I ESA Addendum, DTSC made a determination that a Preliminary Environmental Assessment (PEA) of the site was necessary. The PEA determination was presented in correspondence dated October 5, 2009. DTSC has assigned the site the following Site Code: 204235-11 as part of the PEA process.

Various site investigations were conducted as part of the Phase I ESA Addendum . The investigations were conducted by Millennium Consulting Associates (Millennium) or by Cook Environmental Services (CES) to address various environmental findings identified during the Phase I ESA or during modernization activities. The various investigations are summarized in the PEA SAP Work Plan.

2.4 SCOPE OF FIELD WORK

The subsurface investigation will include field reconnaissance to locate the hand auger boring locations and passive soil gas (PSG) sample locations. The proposed hand auger borings and passive soil gas sample locations are shown on Figures 5 and 6 in the PEA SAP Work Plan.

2.4.1 Soil Sampling

The borings will be advanced using hand auger drilling equipment This method minimizes investigation derived wastes (IDW) and potential damage to underground utilities. Hand auger drilling will be performed by Millennium personnel. Millennium field personnel will be assisted by Vironex, a C-57 licensed drilling contractor.

The hand auger borings will be advanced using an AMS open face auger. At the target depth, the open face auger head will be replaced with a spilt-core sampling auger head. The split core sampling auger head is capable of collecting a soil sample in a 6-inch-long stainless steel liner located in the split core sample barrel behind the auger head.

Two soil samples will be collected from each hand auger boring locaiton. One sample will be collected at the existing soil subgrade (about 0.5 to 1 foot bgs); the second sample will be collected from 2 to 2.5 feet bgs. Actual sample depths will be determined in the field based on observed soil conditions and sample recovery. Much of the site has been covered with aggregate base that overlies the existing soil subgrade to varying thickness (0.5 to 1 foot thick).

Each soil sample will be collected in a new, clean stainless steel sample liner. The ends of the sample liner will covered with Teflon tape and covered with new end-caps. The ends of the samples will be sealed using adhesive less tape. The samples will be labeled, and stored in a cooler at approximately 4°C, using water ice. The samples will be logged onto a chain-of-custody form, and will be transported by Millennium to a state-certified analytical laboratory for chemical analysis.

Based on the previous investigations, free groundwater was encountered at a depth of about 6 feet bgs, which is below the anticipated finish depth of the hand auger soil borings. Hence, grab groundwater samples will not be collected. Following completion of the sampling, the borings will be backfilled with cuttings generated from the hand augering.

Analytical Testing (Chemical) - Millennium will transport the soil samples retained for chemical analysis to McCampbell Analytical Incorporated (MAI), a state-certified analytical laboratory. All analyses for lead and arsenic will be performed on discreet soil samples.

Composite analyses for organochlorine pesticides (OCPs) will be performed according to the following protocol. The soil samples from each zone (0.5 to 1 feet bgs) will be composited by the analytical laboratory (4:1 max). The soil samples collected from the 2 to 2.5 foot bgs zone will be archived at the analytical laboratory. Analyses on the soil samples collected from the 2 to 2.5 foot zone will be determined pending review of the analytical results of the soil samples collected from the 0.5 to 1 foot zone.

The specific chemical analyses to be performed are identified in Table 1 in the PEA SAP Work Plan. All analyses will be performed on a 5-day turnaround basis. Samples to be analyzed for heavy metals will be performed on individual discreet soil samples.

2.4.2 Passive Soil Gas Survey

A passive soil gas (PSG) survey will be performed at designated sample locations. PSG sample locations are shown on the Figure 7 in the PEA SAP Work Plan. The PSG sample probes will be installed in conformance with the PSG Sampling Standard Operating Procedure (SOP) developed by Beacon Environmental (Beacon). The Beacon PSG SOP is included as Appendix A.

The PSG samples will be installed in two interval. The primary PSG samples will be installed concurrently with the hand auger boring. The primary PSG sample probes will be left in place for seven (7) days. After the designated

sampling period, the PSG sample probes will be removed, logged onto a chain-of-custody form, handled and shipped to Beacon for analysis in conformance with the PSG SOP.

All PSG samples will be analyzed for TPH, VOCs and SVOCs using EPA Methods.

Additional Health and Safety issues encountered during the project will include:

Construction Safety and Work Zone Delineation:. The site is an active construction site with controlled site access that requires visitor sign-in to gain access the site. The site area is fenced. Site investigation activities will be coordinated with general contractor's site safety officer.

Groundwater Management: Groundwater is not anticipated to be encountered during the investigation.

The following fieldwork will be performed to support the scope items identified above:

Air Monitoring. The hand auger drilling method has a low potential to cause dust or allow the release of soil gas into the air. However, perimeter air monitoring will be performed during all drilling.

Waste Management. Vironex shall utilize DOT 17-H drums (5-gallon open head) or equivalent to contain decontamination fluids generated from cleaning hand auger equipment. All drums will be secured to prevent tampering when filled, will be properly labeled and stored at a designated location onsite.

Emergency Contingencies. Emergency procedures are described in Section 11

2.5 HASP SITE SPECIFIC PARAMETERS

2.5.1 Location, size and details of Control Areas

The existing site construction boundaries and fencing will serve as the perimeter of the control area. Work zones within the control area will be delineated in the field with caution tape as necessary. Because sampling will utilize hand auger drilling equipment, the work zone at a soil sample or PSG sample location is anticipated to limited to an area extending out to a radius of five (5) feet beyond the sample location.

2.5.2 Decontamination of Drilling Equipment

The contractor shall utilize pressure washing and/or hand washing to decontaminate the hand auger drilling equipment and PSG sample installation equipment that comes in contact with site soils.

Power Washer:

A 2500 to 5000 psi power washer shall be used. The power washer shall be inspected before use to determine that all hoses, fittings and components are within manufacturers specifications and without defects. No damaged equipment shall be permitted.

All persons operating power washers shall be properly trained and knowledgeable of the hazards of use. The power washer shall be operated in conformance with the contractor's Injury and Illness Prevention Plan.

2.5. 3 Waste Management

Waste water generated on the project will be placed into a separate DOT 17-H drums for waste profiling as necessary. The drums will be sealed and labeled when waste is in drums. The drums will be secured against tampering and stored in such a manner that the drums will not spill or tip over.

2.5.4 Means of notifying occupants of proposed work schedules

The general contractor will be notified of the onsite activities. Trades personnel will not be allowed in the work area for this project. Therefore, they will not be subjected to potential exposure.

2.5.5 Training requirements

No special training is required. Training commensurate with the contractor's IIPP requirements for operating drilling equipment will have been completed by the operator of the drilling equipment.

2.5.6 Unique problems associated with the project

Due to the ongoing modernization activities at the Havens site, the site is an active construction site. Heavy equipment is in use at times at various locations across the site and various construction trades are working in and around buildings currently under construction.

2.5.7 Eating, drinking, smoking and restroom procedures

There will be no eating, drinking or smoking while in the work zone. The general contractor has established areas where employees may eat, drink or smoke.

Onsite toilet facilities are available near the work zone. See Section 10.6.2 for OSHA requirements.

2.5.8 Personnel Protective Equipment; Respiratory Protection Program and Controls

Protective equipment for this project is described in Section 7.0 of this HASP. Worker assessment protocols may be found under Air Monitoring in Section 6.0.

2.5.9 Housekeeping

Housekeeping practices shall be adhered at all times. Debris generated from sampling activities shall be handled to prevent it from leaving the work area. Equipment that is not being used shall be stored to prevent a tripping hazard.

2.5.10 Hygiene facilities and practices

In accordance with Title 8 CCR § 1527, employees will be provided washing facilities (e.g., buckets with water and hand soap) at the work location. The use of water and hand soap (or similar substance) will be used by each employee following exit from a work area, prior to breaks and at the end of daily work activities.

2.5.11 Sampling, testing and analytical methods (air and soil)

a. Air Monitoring -Requirements and protocols may be found in Section 10 for monitoring. General area monitoring shall be performed while drilling activities are being performed.

b. Soil Sampling- MILLENNIUM will collect soil samples as part of the subsurface investigation at soil boring locations shown on PEA SAP Work Plan Figures 5 and 6.

c. Passive Soil Gas Sampling- MILLENNIUM will collect passive soil gas samples as part of the subsurface investigation at PSG sample locations shown on PEA SAP Work Plan Figure 7.

3.0 HEALTH AND SAFETY RESPONSIBILITIES

The following health and safety authorities and responsibilities are established for underground work activities covered under this HASP.

3.1 MILLENNIUM HEALTH AND SAFETY PROJECT MANAGER: (Mark Milani)

The MILLENNIUM Health and Safety Project Manager (H&S PM) has operational management authority for all health and safety monitoring operations during subsurface investigation as part of this project, and is responsible to the Corporate Health and Safety Director of MILLENNIUM for ensuring that all project health and safety activities are completed in accordance with requirements set forth in this guidance document. The H&S PM is responsible for ensuring that proper health and safety provisions are incorporated into the management and operation of the work activities. Specific duties include:

- Preparing the Health and Safety Plan and related project site documentation,
- Maintaining compliance with the Health and Safety Plan and other safety regulations,
- Submitting in writing each addendum to the Health and Safety Plan to the CIH for review and approval
- Documenting that site personnel assigned have received the proper training and medical clearance prior to entering the site,
- Discussing potential health and safety hazards with the MILLENNIUM Corporate Health and Safety Director.

3.2 MILLENNIUM CORPORATE HEALTH AND SAFETY DIRECTOR: (Michael Noel CIH)

The MILLENNIUM Corporate Health and Safety Director is designated with coordinating authority for health and safety activities related to activities where site personnel may come into contact with hazardous and construction materials. The CIH is responsible for providing all necessary health and safety-related technical support necessary for the safe completion of the program. Specific duties include:

- Approval of this HASP,
- Implementation of health and safety procedures by periodic site visits (as necessary)
- Conducting periodic safety reviews of the project site and project documentation
- Review of health and safety monitoring data, and
- Review of worker health and safety documentation

3.3 SITE SAFETY OFFICER: (Ramil Arcia/Mark Milani)

The Site Safety Officer (SSO) manages the safety aspects of on-site activities at the Site covered by this HASP. The SSO also serves as the coordinator for on-site safety in the field implementation of this HASP. The responsibilities of the SSO also include:

- Maintaining a copy of this HASP and any subsequent revisions at the work site,
- Coordinating with the Contractor to ensure that proper personal protective equipment is available, used properly, and cleaned/stored appropriately when not in use,

- Maintaining documentation of health and safety related activities such as air monitoring, safety briefings, etc. as required in this HASP,
- Performing site inspections to find hazards and observe employees at work,
- Stopping work when necessary to prevent injury or illness and ensure personal and environmental health and safety,
- Investigating all injuries and illnesses,
- Determining evacuation routes, establishing and posting local emergency telephone numbers, and arranging emergency transportation,
- Developing and implementing corrective action plans to eliminate or mitigate hazards,
- Presenting field safety meetings and maintaining attendance logs and records,
- Implementing the respiratory protection program (where applicable),
- Maintaining decontamination procedures which meet established criteria, and
- Ensuring that all subcontractor personnel assigned to this project have received appropriate training in the hazards associated with the job (as detailed in this HASP).

3.4 SUBCONTRACTORS

Subcontractors are responsible for assigning specific work tasks to their employees, and for ensuring that their personnel are properly trained and participate in health and safety programs, which fulfill the requirements, specified in this HASP (e.g., hearing conservation, respiratory protection, etc.). Each subcontractor's management will provide qualified employees and allocate sufficient time, materials and equipment to safely complete assigned tasks. In particular, each subcontractor is responsible for equipping its personnel assigned to this Project with all required personal protective equipment.

MILLENNIUM considers each subcontractor to be an expert in all aspects of the work operations for which they are tasked to provide, and each subcontractor is responsible for compliance with those regulatory requirements, which pertain to the services provided. Each subcontractor is expected to perform its operations in accordance with its own unique safety policies and procedures, to ensure that hazards associated with the performance of the work activities are properly controlled. Copies of safety documentation for the subcontractor's work activities will be provided to MILLENNIUM for review prior to the start of on-site activities. In the event that subcontractor procedures/requirements conflict with requirements specified in this HASP, the more stringent guidance will be adopted.

Hazards not listed in this HASP but known to any subcontractor, or known to be associated with a subcontractor's services, must be identified and addressed during the daily field safety briefing (see Section 10.2.2) prior to beginning work operations. The SSO or CIH has the authority to halt any subcontractor operations, and to remove any subcontractor or subcontractor employee from the work area for failure to comply with established health and safety procedures or for operating in an unsafe manner.

3.5 ON-SITE PERSONNEL AND VISITORS

All MILLENNIUM and subcontractor personnel performing duties related to the Project at the Site are required to read and acknowledge their understanding of this HASP. All visitors (including third-party observers) to contractor-controlled areas of the work site (see Section 9.2) must also read and acknowledge their understanding of this HASP, and must conform with all HASP requirements. MILLENNIUM reserves the right to suspend work activities as necessary to protect visitor safety or health if entry to controlled work areas (see Section 9.1) is required by individuals who do not meet HASP requirements.

All personnel will abide by the requirements of this HASP and cooperate with site authorities to ensure a safe and healthful work site. Site personnel are required to report immediately any of the following to the SSO:

- Accidents and injuries, no matter how minor,
- Unexpected or uncontrolled releases of any hazardous substances, and any symptoms of exposure to a hazardous substance,
- Any unsafe or malfunctioning equipment, and
- Any changes in site conditions which may affect the health or safety of project personnel.

4.0 HEALTH AND SAFETY PROGRAMS

Any person performing work on-site within an active work area, and any visitor requiring entry to active areas of the work site will meet the following requirements.

4.1 GENERAL HEALTH AND SAFETY TRAINING

Personnel involved with subsurface drilling and sampling activities will have completed health and safety training courses commensurate with their specific duties in compliance with the Contractor's IIPP. The training will include, but is not limited to:

- Hazard communication,
- Protective clothing,
- Respiratory protection,
- Hearing conservation,
- Heat stress,
- Decontamination,
- Prevention of slip, trip, and fall hazards, and
- Safe lifting techniques and safe work practices.

4.2 SITE-SPECIFIC TRAINING

All field personnel will be trained concerning the potential hazards at the site, and exposure prevention or control measures. Field personnel will be:

- Instructed on the contents of this HASP,
- Made aware of task-specific physical hazards and other hazards which may be encountered during site work (see Section 5.0).
- Informed about the potential routes of exposure, protective clothing, precautionary measures, and symptoms or signs of chemical exposure, and heat stress, and
- Made aware of fire prevention measures, fire extinguishment methods, and evacuation procedures.

Site-specific training will be performed prior to the start of any work task, and will be supplemented with daily site safety briefings for the duration of the work task. The training will be conducted by the SSO or his designated representative before daily work activities begin. The CIH shall be notified of all training and be in attendance at all briefings and on-site training.

5.0 HAZARD ASSESSMENT

5.1 POTENTIAL PHYSICAL AND CHEMICAL HAZARDS

Specific physical hazards related to this project are detailed below. Physical hazards include the following:

1. Mobilization activities,
2. Power washing equipment
3. Heat/cold stress, depending heavily on time of year, personal protective equipment in use, and specific work tasks/activities undertaken,
4. Cleaning and decontamination of equipment,
5. Vehicular traffic, including JGL or other lifting equipment, and
6. Physical hazards related to drilling operations and associated construction activities.

Physical hazards not listed here but known to any subcontractor or known to be associated with any subcontractor-provided services must be identified to the SSO and addressed prior to beginning work. Relevant information pertaining to such hazards will be presented to personnel during daily field safety briefings (see Section 10.2.2).

Specific chemical hazards related to this project are detailed below. Chemical hazards may include the following:

1. Exposure to various petroleum-based compounds (diesel, gasoline, motor oil), fuel hydrocarbon VOCs (BTEX compounds) and other petroleum-based chemicals,
2. Exposure to heavy metals (lead and arsenic),
3. Exposure to organochlorine pesticides (OCPs)
4. Exposure to hydraulic fluid used in construction equipment, and
5. Exposure to soil gas containing various petroleum-based compounds (diesel, gasoline, motor oil), fuel hydrocarbon VOCs (BTEX compounds) and other petroleum-based chemicals.

Relevant information pertaining to such hazards will be presented to personnel during daily field safety briefings (see Section 10.2.2).

5.2 TASK HAZARD ANALYSIS

5.2.1 Reconnaissance Activities

Reconnaissance activities include initial site walks, staking or other marking activities, utility location operations, and setup of site security and control measures. During these activities the work site will be walked and work locations identified.

Additional hazards which may be encountered, include heat stress and sunburn, potential for unprepared walking surfaces as well as open trenches and other contractor operations associated with ongoing construction activities. Level D personal protective equipment (PPE) will be worn at all times during site reconnaissance activities. Requirements for Level D PPE are described in Section 7.2.1.

Also, the following requirements should be observed:

- Watch carefully where you walk. Do not step in shadows until you are sure of your footing. Shadows may hide pits, holes, or other unstable footing.
- Carefully choose your footholds when crossing rocky, uneven, or loose ground surfaces.
- Where other onsite contractor operations are using mechanical lifts, always wear a high visibility vest. Be aware of traffic flow directions and patterns.

5.2.2 Mobilization Activities

Mobilization includes the establishment of controlled work zones, staging of drilling equipment, decontamination equipment and supplies. Equipment and supplies shall be verified prior to being brought on-site that each piece is in proper working condition. Such equipment shall have all manufacture-required warning and safety devices attached and operating. Equipment shall not have been modified or altered in violation of manufacturer requirements.

Supplies and staged equipment shall be placed in such a manner as to not impede traffic or cause obstructions in road visibility. Such supplies and equipment shall be staged in areas that will not present additional tripping or falling hazards and be organized.

5.2.3 Drilling Activities

Drilling equipment has the potential for cause serious injury either through defect or misuse. All drilling equipment shall be inspected initially before beginning drilling operations, especially hydraulic hoses and lifting cables on powered drilling equipment where used. All intended safety equipment shall be present and in proper working order at all times. Any significant damage or potential failure of a component requires the drilling equipment to be repaired or replaced immediately. All workers shall be trained in the proper use and field maintenance of the equipment.

5.2.4 Power Washing Equipment

Power washing equipment has the potential to cause serious injury either through defect or misuse. All pressure washing equipment shall be inspected initially before being brought on site. The equipment shall be re-inspected after not using for more than 30 minutes at any time. All intended safety equipment shall be present and in proper working order at all times. Any significant damage or potential failure of a component requires the pressure washer to be repaired or replaced immediately. All workers shall be trained in the proper use and field maintenance of the equipment.

5.2.5 Heat and Cold Stress

Heat/cold stress depends heavily on time of year, personal protective equipment in use, and specific work tasks/activities undertaken. See Section 5.4 below.

5.2.6 Cleaning and Decontamination of Equipment

Cleaning of equipment shall be performed inside the designated decontamination area before any potentially contaminated equipment is moved off site. The Contractor will clean this equipment with soap, brushes or whatever tools are necessary to remove contamination. All potentially-contaminated water or debris shall be captured on plastic and placed into 55 gallon, DOT 17-H drums for waste profiling and disposal as required by testing.

5.2.7 Vehicular traffic

All workers shall be briefed in traffic movement and safety. All backup alarms on mobile equipment shall function properly at all times. Workers near any moving vehicles or mechanical lifts shall wear daytime and/or nighttime visible reflective vests for safety.

5.2.8 Site Investigation Related Physical Hazards

All workers shall be briefed in back injury prevention and proper lifting techniques. Workers shall be briefed on the use of all tools and equipment and wear all safety equipment such as gloves, steel-toed boots, protective eyewear, hearing protection (as needed) and hardhats during all work activities.

5.3 HEAVY MACHINERY

The use of heavy machinery in areas where unprotected personnel are operating warrants special attention on the part of all personnel. Operators should ensure that equipment is working properly and is being run in a safe manner, and should be aware of the location of unprotected personnel at all times while operating this machinery to avoid serious accidents. Other personnel must be aware of heavy equipment, operations, and exercise proper caution to avoid placing themselves in an unsafe situation.

5.4 HEAT/COLD STRESS

Heat stress is a major hazard, especially for workers wearing protective clothing. The same protective materials that shield the body from chemical exposure also limit the dissipation of body heat and moisture. Personal protective clothing can therefore create a hazardous condition. Depending on the ambient conditions and the work being performed, heat stress can occur very rapidly, within as little as 15 minutes. Site personnel will be instructed in the identification of a heat stress victim, the first-aid treatment procedures for the victim and the prevention of heat stress casualties.

Cold stress is not an expected hazard on this project. Due to the time of year, heat stress is not an expected hazard on this project. However, work practices to prevent heat related conditions will be implemented as necessary depending on actual weather conditons.

5.4.1 Heat Exhaustion

Symptoms: Usually begins with muscular weakness, dizziness, nausea, and a staggering gait. Vomiting is frequent. The bowels may move involuntarily. The victim is very pale, with clammy skin, and he or she may perspire profusely. The pulse is weak and fast, breathing is shallow. He or she may faint unless they lie down.

First Aid: Immediately remove the victim from the work area to a shady or cool area with good air circulation (avoid drafts or sudden chilling). Remove all protective outerwear. Call a physician. Treat the victim for shock. (Make the victim lie down, raise his or her feet 6-12 inches and keep him or her warm but loosen all clothing.) If the victim is conscious, it may be helpful to give him or her sips of water. Transport victim to a medical facility as soon as possible.

5.4.2 Heat Stroke

Symptoms: This is the most serious of heat casualties due to the fact that the body excessively overheats, body temperatures often rise to between 105 °-110°. As the victim progresses toward heat stroke, symptoms such as headache, dizziness, nausea, oppression, can be noted, and the skin is observed to be dry, red, and hot. Sudden collapse and loss of consciousness follows quickly and death is imminent if exposure continues. The attack will usually occur suddenly.

First Aid: Immediately evacuate the victim to a cool and shady area. Remove all protective outerwear and all personal clothing. Lay the victim on his or her back with the head and shoulders slightly elevated. Apply cold wet towels, ice bags, etc. to the head, armpits, and thighs. Sponge off the bare skin with cool water or rubbing alcohol, if available, or even place the victim in a tub of cool water. The main objective is to cool without chilling the victim. Give no stimulants or hot drinks. Since heat stroke is a severe medical condition requiring professional medical attention emergency medical help should be summoned immediately to provide on-site treatment of the victim and proper transport to a medical facility.

5.4.3 Prevention of Heat Related Conditions

A. General

1. Maintain good physical conditioning and control your blood pressure (avoid weight gain, smoking, etc.).

2. Eat regularly and properly. Increase salt intake through food consumption during the hot season or hot spells and avoid the use of salt tablets. Consult a physician if you are on a salt restrictive diet.
3. Regulate alcohol intake if you are going to be working in hot environments, either from ambient conditions or through the wearing of Chemical Protective Clothing.
4. Obtain basic First Aid and CPR training.
5. Participate in a yearly medical monitoring program. If you are on medication or have a chronic medical history, consult a physician prior to working in a hot environment.

B. On Site/Scene

1. If you anticipate fieldwork, get acclimated and conditioned prior to working in high temperatures. This process usually takes from 4 - 7 days.
2. Plan site work for cooler periods in the day, early morning or evening.
3. Take frequent short breaks. Open or remove protective clothing while on break.
4. The Site Safety Plan shall include a telephone number for the local hospital, ambulance and rescue squad.
5. Drink cool water or an electrolyte solution while on the site/scene. Vary your intake of both fluids. While working on site/scene drink 1 cup of replacement fluid every 15 - 20 minutes. Remember that the sensation of thirst is not a good gauge for the need for replacement fluids.
6. Work using the buddy system. Watch out for your buddy and fellow workers. Look for the signs and symptoms of heat related emergencies. Workers with heat related emergencies may have physiological as well as physical problems. Workers may do unsafe things, make poor decisions, or act hastily due to the situation.
7. If you experience the symptoms of heat related emergencies, STOP WORK, notify your on-site supervisor, then go to a cool, shaded area and rest. If the condition persists or worsens, consider seeking advance medical care. If in doubt call for an ambulance.
8. Monitoring for Heat Stress shall be performed by the SSO. Workers shall be advised of precautions and symptoms of Heat Stress.

5.4.4 Heat Rash

Also known as prickly heat, this is a condition affecting the skin. This condition occurs in situations where the skin remains wet most of the time. The sweat ducts become plugged and a skin rash soon appears.

A. Signs and Symptoms

1. Skin rash over affected areas of the body.

2. Tingling or prickling sensation on the affected areas.

B. Emergency Care

1. Take shower after working in heat.

2. Dry the skin thoroughly.

3. Change underwear as needed.

4. Stay in cool place after work hours.

5. Avoid repeated exposure to heated environment until condition improves, when possible.

5.4.5 Heat Cramps

Heat Cramps are muscle pains, usually in the lower extremities, the abdomen, or both, which occur secondary to profuse sweating with accompanying salt depletion. Heat Cramps most often afflict people in good physical

condition, who overwork in conditions of high temperature and humidity. Untreated, Heat Cramps may progress to Heat Exhaustion.

Treatment of Heat Cramps is aimed at eliminating the exposure and restoring the loss of salts and water.

A. Signs and Symptoms

1. Cramps in the extremities and abdomen, which come on suddenly during vigorous activity. Heat Cramps can be mild with only slight abdominal cramping and tingling in the extremities, but more commonly present intense and incapacitating pain in the abdomen and extremities.

2. Respiration rate will increase, decreasing after the pain subsides.

3. Pulse rate will increase.

4. Skin will be pale and moist.

5. Body temperature will be normal.

6. Loss of consciousness, airway maintenance are seldom problems with this condition.

7. Generalized weakness will be noted as the pain subsides.

B. Emergency Care

Move the worker to a cool environment. Have him lie down if he feels faint.

If the worker is not nauseated he may be given 1 or 2 glasses of an electrolyte solution. Have the worker drink slowly. The use of salt tablets is not recommended, as they may precipitate nausea.

If the worker is nauseated avoid giving anything by mouth until the nausea subsides.

Avoid massaging the cramping muscles. This rarely helps and may actually aggravate the pain.

As the salt and water level is replenished, the worker's pain will subside. He may wish to return to work, however this is NOT recommended for a period of 12 hours. Further exertion may lead to heat exhaustion or heat stroke.

These are only guidelines for the care of Heat Related Emergencies. Actual training in emergency medical care or basic first aid is recommended.

Heat stress or related illnesses could arise at any time during the course of this project. Wearing protective clothing under confining conditions, increased energy expense and elevated surrounding temperatures could cause personnel to experience symptoms of a heat related disorder.

MILLENNIUM shall ensure the TLV established for Heat stress by the ACGIH is not exceeded for workers who wear permeable clothing (cloth coveralls). Work/rest schedules shall be based upon ambient temperature and direct sunlight intensity. Monitoring of workers who wear protective clothing (chemically resistant coveralls) shall be implemented where ambient temperatures reach or exceed 70 degrees F.

The following procedures shall be used to determine the work/rest periods:

- Measure heart rate (HR) by the radial pulse for 30 seconds as early as possible in the rest period. If the (HR) exceeds 110 beats per minute (BPM), the next work period shall be shortened by 1/3, while the rest period stays the same. If the HR is 110 BPM at the beginning of the next rest

period, the following work cycle shall be shortened by another 1/3, while the length of the rest period again remains the same.

- Measure body temperature using a fever strip or oral thermometer as early as possible in the resting period. Oral temperature (OT) at the beginning of the rest period should not exceed 99 degrees F. If it does, the next work period shall be shortened by 1/3, while the rest period remains the same. If the OT exceeds 99.7 degrees F at the beginning of the next work period, the work period shall be shortened by another 1/3. The OT shall be measured again at the end of the next rest period to make sure it has dropped below 99 degrees F.

- Workers shall not be allowed to wear semi-permeable or impermeable clothing when his/her OT exceeds 100.6 degrees F.

- Body water loss shall be measured if Heat stress has become a problem. Employees shall be measured on a scale accurate to +/- 0.25 lb. They shall be measured in the morning and evening, preferably nude. Body water loss should not exceed 1.5 percent of total body weight.

Suggested Frequency of Physiological Monitoring for Fit and Acclimatized Workers

Adjusted Temperatures	Normal Work Ensemble	Impermeable Ensemble
90 deg F or >	After each 45 min of work	After each 15 min of work
87.5-90 deg F	After each 60 min of work	After each 30 min of work
82.5 - 87.5 deg F	After each 90 min of work	After each 60 min of work
77.5 - 82.5 deg F	After each 120 min of work	After each 90 min of work
72.5 - 77.5 deg F	After each 150 min of work	After each 120 min of work

*Adjusted Temperature=taF + (13 x %Sunshine) where (ta) is the ambient temperature measured with a glass thermometer. %Sunshine is measured by estimation of total available sunshine (100% sunshine =0% cloud cover and 0% sunshine = 100% cloud cover).

5.4.6 Prevention Of Sunburn

When working in the sun, regardless of temperature, exposed skin is vulnerable to sunburn. Protect exposed skin with an appropriate sunscreen. A sun-screen with a sun protection factor (SPF) of 15 or greater is recommended for a full day in the sun.

5.5 SLIPS, TRIPS, FALLS, AND PROTRUDING OBJECTS

Hazards from protruding objects, careless movements, or placement of materials on paths or foot traffic areas present a problem with regard to slips, trips, falls, and puncture wounds. Personnel will use a reasonable amount of effort to ensure the prevention of such injuries.

5.6 HAZARDOUS NOISE ENVIRONMENTS

Working around large equipment often creates excessive noise. The effects of noise can include physical damage to the ear, pain, and temporary and/or permanent hearing loss. Workers can also be startled, annoyed, or distracted by noise during critical activities.

The SSO can monitor employee exposure to hazardous noise levels from time to time as part of the hearing conservation program (see Section 6.3). However, for all work on this project, hearing protection will be worn at all times when normal conversation becomes difficult at distances of 3 feet or less.

5.7 UNDERGROUND OR OVERHEAD UTILITIES

Various forms of underground or overhead utility lines or pipes may be encountered during site activities. Prior to the start of intrusive operations, contractors will obtain authorization from all concerned public utility department offices (i.e. contacting Underground Service Alert (USA). Where necessary, a private utility locating service will be used to identify potential buried objects and/or utility crossing. Should intrusive operations cause equipment to come into contact with utility lines; the SSO and the Corporate Health and Safety Officer will be notified immediately. Work will be suspended until the appropriate actions for the particular situations can be taken.

At the Havens site, utility location surveys have been performed previously. Underground utilities have been marked and there are no overhead hazards within the subject site.

6.0 MONITORING PLAN

This section of the HASP presents monitoring requirements and analytical methods, which will be used to assess employee exposure to chemical and physical hazards. Monitoring will consist primarily of on-site determination of various parameters (airborne contaminant concentrations, heat stress effects, etc.), but may be supplemented by more sophisticated monitoring techniques (i.e., exposure assessment) where necessary.

The SSO is responsible for designating individuals within the work crew who will perform monitoring activities and complete the documentation of results. The SSO is also responsible for the collection, review and maintenance of the completed documentation.

6.1 WORK AREA AIR MONITORING

To assess the concentrations of airborne organic vapors that may be released during drilling and soil gas sampling activities, monitoring will be accomplished both in worker breathing zones and at the boundaries of defined work areas. Table 3 details the requirements for monitoring instruments to be used. Table 4 provides information concerning the monitoring frequency and appropriate response actions.

6.2 PERIMETER AIR MONITORING

Monitoring will be conducted to assess release of contaminants to the surrounding "community" (the area, and anyone in it, not within the designated work area(s) related to this project - see Section 9.1). The perimeter of any defined work area presents the highest possible airborne contaminant concentration which might occur in any "community" area. Assessment and control of the airborne concentrations of contaminants present at the perimeter of a defined work area will be accomplished to ensure that concentrations in "community" areas are acceptable.

Evaluation of defined work area perimeter airborne contaminant concentrations will be performed using instrumentation as specified in Table 3, and evaluated against the appropriate action level criteria specified in Table 4. In the event that concentrations of contaminants released at the work area perimeter exceed established action levels, the SSO will implement appropriate mitigation measures.

6.3 NOISE EXPOSURE

Exposure to excessive noise can damage hearing ability and cause permanent hearing loss. It is the intent of MILLENNIUM to prevent permanent hearing loss from noise exposure.

When noise levels exceed 85 decibels on the A-weighted scale (85 dBA), workers are required to use appropriate hearing protection. The SSO is also empowered to designate work areas where hearing protection will be used by all personnel (MILLENNIUM employees, contractor, and subcontractor personnel and/or visitors).

Potential sources of hazardous noise related to site investigation activities are limited to the various types of equipment used in the performance of work activities and general construction equipment in use on active construction sites.

Noise exposure levels can be expected to vary during the performance of the various investigation activities, dependant upon the equipment selected and used by each individual subcontractor. All MILLENNIUM field personnel who are medically monitored participate in a hearing conservation program meeting the requirements specified below. It is expected that where operations may expose workers to hazardous noise that MILLENNIUM will provide personnel who also participate in a hearing conservation program, which should include the following elements:

- Baseline survey of noise exposures

- Baseline audiometric testing
- Annual or biannual audiometric testing
- Annual training on the use and need for hearing protection
- Distribution of hearing protectors to employees in the program
- Maintenance of records

Contractors and subcontractors are individually responsible for the adequacy of their own program.

6.4 HEAT STRESS MONITORING

Due to the use of protective clothing and other equipment, there is a potential for heat stress to pose a significant safety hazard to workers. To mitigate the effects of heat stress, it will be necessary to establish a work routine that incorporates appropriate rest periods to allow workers to remove protective clothing, drink fluids (vital when extreme sweating is occurring) and rest.

The frequency and length of such work breaks must be determined by the SSO or the individual work location supervisor based upon factors such as the ambient temperature and sunshine, the amount of physical labor being performed, the physical condition of the workers and protective clothing being used. In any case, breaks must be sufficient to prevent workers from manifesting symptoms of heat stress, which can include irritability, confusion, lethargy, and headache.

Workers are being encouraged to immediately report any difficulties or heat-related problems that they may experience or observe in fellow workers. Supervisors will use this information to alter the work-break schedule to accommodate such problems. During breaks, workers should be encouraged to drink plenty of water or other liquids to replace lost fluids and to help cool off. If any worker exhibits signs of severe heat distress, such as profuse sweating, extreme confusion and irritability, or pale, clammy skin, that worker shall be relieved of all duties at once and made to rest in a cool location and drink plenty of water. Anyone exhibiting symptoms of heat stroke (red, dry skin, or unconsciousness) will be taken immediately to the nearest medical facility while taking steps to cool the person during transportation (clothing removal, wet the skin, air conditioning, etc.). Heat stroke is a life threatening condition that must be treated by competent medical authority.

6.5 MAINTENANCE AND CALIBRATION OF EQUIPMENT

All monitoring equipment will be maintained and calibrated in accordance with manufacturer recommendations. All pertinent data will be logged on a the field daily and maintained on site for the duration of site activities. Calibration of all monitoring equipment will be performed daily.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 PERSONAL PROTECTIVE CLOTHING

The harmful effects that chemical substances may have on the human body often necessitate the use of protective clothing. Proper selection of personal protective equipment (PPE) depends upon a number of factors. Protection against different types of chemicals and differing concentrations of those substances can be quite varied. The tasks to be performed and the probability of exposure to the substance must also be considered when specifying protective clothing.

Once the specific hazard has been identified, appropriate clothing can be selected. The protection level assigned must match the hazard confronted. Protective clothing ensembles range from safety glasses, hard hats, and safety shoes to fully encapsulating suits with a supplied source of breathing air. Selection of appropriate PPE is specified in the task hazard analyses found in Section 5.2, and upgrade criteria based upon on-site monitoring results are presented in Table 4. In addition, Section 7.2 provides additional guidance concerning the appropriate levels of protection, which should be utilized during site activities.

7.1.1 Head Protection

Employees will wear hard hats during outdoor site investigation activities. Ear protection and face shields may be attached to hard hats.

7.1.2 Eye Protection

Eye protection will be worn at all times, meeting the following requirements:

- Provide adequate protection against the particular hazards for which they are designed,
- Be reasonably comfortable when under the designated conditions, fit snugly and not unduly interfere with the wearer's movements,
- Be durable, and
- Be easily cleaned and disinfected.

Contact lenses do not provide adequate eye protection. Contact lens wearers must use the same additional eye protection as for non-lens wearers. Contact lenses may be worn under full-face respirators (if required to be worn), but are generally not acceptable with half-face respirators.

Persons whose vision requires correction and are required to wear eye protection may wear goggles or spectacles of one of the following types:

- Spectacles whose protective lenses provide optical correction (Rx),
- Goggles that can be worn over corrective (Rx) spectacles without disturbing the adjustment of the spectacles, and
- Goggles that incorporate corrective (Rx) lenses mounted behind the protective lenses.

Due to the limited potential for high velocity impact hazards associated with the work activities, the use of sunglasses will be permitted at the work sites, however wire framed sunglasses will not be permitted. Subcontractor employees who do not have suitable eye protection will have an appropriate type of eye protection provided to them by their respective employers.

7.1.3 Ear Protection

Appropriate hearing protection, including ear plugs, canal caps, and ear muffs, will be provided when noise may be a problem, such as around heavy machinery, power support equipment, and impact tools, or whenever normal conversation becomes difficult at distances of 3 feet or less. Employees who may be exposed to hazardous noise must be participants in a hearing conservation program which meets the requirements of CCR §5096-5100 (29 CFR 1910.95).

7.1.4 Foot Protection

Employees will wear appropriate foot protection while working on site, which will consist of leather boots with safety toes. Footwear must meet the specifications of ANSI 241.1-1969, which is the standard for industrial footwear with safety toes.

7.1.5 Hand Protection

Employees will use appropriate hand protection when exposed to hazards that could cause injury to the hands. Gloves must resist puncturing and tearing as well as provide any necessary chemical resistance.

7.1.6 Respiratory Protection

The use of respiratory protection will not be required. Where respiratory protection is used for nuisance dust, the following requirements shall be followed:

- Only NIOSH-approved dust masks will be used, and
- Dust masks will not be reused and will be disposed of after use.

MILLENNIUM personnel participate in a Corporate Respiratory Protection Program meeting the requirements of 8 CCR §5144. It is expected that Contractors and subcontractors whose personnel may be required to utilize respiratory protection will have a similar program, however its specific elements will not be reviewed or approved by MILLENNIUM, who assumes no responsibility for inadequate employee respiratory measures. Each subcontractor is individually responsible for the adequacy of its own respiratory protection program.

7.1.7 Body Protection

Protective clothing and body protection is selected on the basis of the tasks to be performed and the hazards, both chemical and physical, to which the worker may be exposed. For all work areas, including the "clean" support and administrative areas, appropriate work clothing will be worn that at least covers from the knees to shoulders. Tank and halter tops are not appropriate. Bathing suits, shorts, and cut-off pants are not appropriate.

7.2 CHEMICAL PROTECTIVE ENSEMBLES

In order to aid in the selection of personal protective equipment (PPE), various ensembles have been developed which provide increasing levels of protection. These ensembles are designated, in increasing levels of complexity and protection, as Levels D, C, B, and A. The specific equipment comprising each level of protection will vary slightly, but. are defined primarily by the type of respiratory protective equipment used, and secondly by skin protection. The information presented below consists of a description of the equipment, applications and limitations for ensemble, which might be utilized during construction activities. Specific PPE requirements for each task associated with this project are presented in Table 5, while upgrade criteria linked to results of on-site monitoring activities are provided in Table 4.

The following requirements shall apply to the use of any PPE:

- Only medically certified individuals will be permitted to use PPE above Modified Level D,

- Personnel will utilize only equipment, which has been provided for use at the Project sites. Designation of appropriate PPE is the responsibility of the Site Supervisor,

- All PPE will be properly fitted to the individual user.

7.2.1 Level D

Level. D protection is the lowest level of personal protection allowed during any activity at the site. Level D provides for physical protection only (i.e., against workplace physical hazards only), and includes no use of respiratory protection. The use of Level D protective equipment is permissible only when work functions preclude splashes, immersion, significant skin contact or potential for unexpected inhalation of any chemical contaminants.

During site investigation activities, Level D protection will be the primary level of protection worn during all operations where contact with contaminated materials is unlikely. Upgrading to greater levels of protection will be executed as required in the monitoring guidelines outlined in Table 2

Typical Level D Equipment List

Hardhat

Work clothing (Long pants, long-sleeved, button-down shirt)

Safety glasses/face shield

Safety-toed work boots

Hearing protection (as required)

Safety vest with reflective elements

7.2.2 Modified Level D

If the potential exists for contact with chemical contaminants (e.g., splashes, "dirty operations," etc.), however the respiratory hazard is low, the use of a Modified Level D ensemble is appropriate. Modified Level D consists of protective clothing to preclude hazards due to contact with contaminated materials, but does not provide increased respiratory protection.

The use of protective clothing in the Modified Level D ensemble can also serve to aid in personal cleaning and maintenance efforts through the use of disposable outer protective garments.

The limitations specified above for Level D PPE apply equally to Modified Level D, except that in this ensemble some contact with contaminated material can be tolerated.

The use of Modified Level D PPE will not be required for on-site operations where power washing or other decontamination activity. Modified Level D may be utilized where required under this HASP or the contractor's and/or individual subcontractors' Safety Program for the specific work tasks, whichever is more strict.

Typical Modified Level D Equipment List

Chemical-resistant disposable outer coveralls (e.g., Tyvek™ or polyethylene-coated Tyvek™ coveralls)

Chemical-resistant (e.g., nitrile) outer gloves (taped to outer coveralls)

Chemical-resistant (e.g., nitrile) inner gloves

Butyl apron (Required where there is high potential for splashing with highly chlorinated water)

Hard hat

Safety glasses/face shield

Chemical-resistant safety boots (taped to outer coveralls)

Hearing protection (as required)

Safety vest with reflective elements

7.2.3 Level C

The use of Level C protective equipment during site activities is not permissible for this project. Should on-site monitoring indicate that Level D PPE is inadequate, the SSO will stop all work, and will contact the Corporate Health and Safety Officer for further guidance. Upgrade to Level C PPE will not be permitted without the concurrence of the Health and Safety Project Manager and the Corporate Health and Safety Officer and the preparation of supplemental Health and Safety requirements addressing the additional procedures, which will be observed.

7.2.4 Level B

The use of Level B protective equipment during site activities is not permissible at this site.

7.2.5 Level A

The use of Level A protective equipment is not permissible for this project.

8.0 DECONTAMINATION

Decontamination involves the physical removal and/or neutralization of harmful contaminants in order to prevent their migration to previously uncontaminated areas, and to minimize the potential for adverse health effects. The extent of decontamination depends on the hazard and the quantities of the contaminant.

Contamination can occur from:

- Contacting vapors, gases, mists, or air particulates,
- Splashes while sampling or opening containers,
- Handling contaminated instruments or equipment,
- Assisting contaminated personnel during routine operations, decontamination procedures, and emergencies, and
- Chemicals used for the decontamination of equipment or in construction operations (i.e. solvent based adhesive, glues, etc.).

Decontamination of equipment and personnel will be performed upon exit from the work area (see Section 9.1). Contractors and subcontractors will provide all necessary decontamination equipment. The SSO is responsible for ensuring that the setup and implementation of decontamination procedures that are adequate for the nature and level of contaminants encountered and consistent with the following requirements. Contractors and subcontractors will provide all necessary decontamination equipment and ensure that set-up and implementation of decontamination procedures is adequate for the nature and level of contaminants which are encountered, consistent with the tasks covered under this HASP or the individual contractor's or subcontractor's Safety Programs, whichever is more strict.

8.1 DECONTAMINATION PROCEDURES

Decontamination procedures appropriate for the existing work area and work tasks will be specified by this HASP or the contractor's Safety Program, whichever is more strict. Such procedures must be in place before site operations begin, and they must remain in place (modified as necessary) throughout the period of activity. Wherever possible, the need for decontamination should be reduced through work practices that minimize contact with contaminants.

Decontamination will be performed only in designated areas. Separate areas may be set up for equipment and personnel.

Workers shall wash their hands and face each and every time they leave the work area.

8.2. PERSONNEL DECONTAMINATION

Decontamination procedures are carried out on all personnel leaving any defined work area. Under no circumstances (except emergency evacuations) will personnel be allowed to leave the site without fully decontaminating.

Decontamination of personnel should consist primarily of soap and water washing and water rinse of exterior protective gear to remove contaminants, followed by doffing of the gear. Coveralls should be removed by turning the clothing inside out. Requirements appropriate to the degree of contamination expected for each protective equipment ensemble is established below, however modifications of these procedures may be necessary in response to specific conditions encountered at the work site(s).

Personnel exiting any work area who are utilizing Level D PPE will perform decontamination in accordance with the following guidelines:

- Place tools, instruments, samples and trash at an appropriate location. The equipment drop area should be clean and dry and at a minimum, plastic bags should be available for trash. Waste PPE will not be placed in the same containers as general trash.

- Inspect equipment, samples, and if applicable, tools for signs of residual amounts of contamination or excessive soil buildup. If present, soils and contamination must be completely cleaned off of equipment, samples, and tools prior to removal from the work area.

- Personnel will visually check themselves for signs of excessive soils and possible contamination, especially work boots. If observed, soils and contamination will be completely removed before further decontamination is performed.

- Prior to exiting the work area, personnel will wash their hands with soap and water in order to minimize the potential for contaminant exposure.

Where work activities are performed in Modified Level D PPE personnel will perform decontamination using the following guidelines:

- Place tools, instruments, samples and trash at an appropriate location. The equipment drop area should be clean and dry and at a minimum, plastic bags should be available for trash. Waste PPE will not be placed in the same containers as general trash.

- Inspect equipment, samples, and if applicable, tools for signs of residual amounts of contamination or excessive soil buildup. If present, soils and contamination must be completely cleaned off of equipment, samples, and tools prior to removal from the work area.

- Personnel will visually check themselves for signs of excessive soils and possible contamination. If observed, soils and contamination will be completely removed before further decontamination is performed.

- Wash and rinse outer work gloves and boots (boot covers) with soap and water.

- Wash/brush off outer protective coverall (Tyvek™).

- Untape wrists and ankles.

- Remove outer work gloves and place them in an appropriate container specified for waste PPE.

- Remove outer Tyvek™ coveralls and place them in an appropriate container specified for waste PPE.

- Wash, rinse, and remove inner protective gloves and place them in an appropriate container specified for waste PPE.

- Wash hands using soap and water (separate from other decontamination cleaners/solutions)

8.3 EQUIPMENT DECONTAMINATION

Decontamination of all equipment will be performed to prevent migration of earthen materials to previously uncontaminated areas, and to minimize the potential for adverse health effects. Where feasible, plastic tarps should be used as draping to minimize earthen material from coming into contact with heavy equipment. This should include draping tires. Accumulated material on exposed equipment surfaces, including tires and treads, should be removed prior to moving heavy equipment to minimize the potential of contaminant migration.

Decontamination of equipment and personnel will be performed upon exit from the work area in conformance with the Health and Safety Plan. The contractor is responsible for providing all decontamination equipment and ensuring that the set-up and implementation of decontamination procedures are adequate for the nature and level of contaminants which are encountered, consistent with the requirements in the Health and Safety Plan.

Decontamination procedures must be in place before site operations begin, and they must remain in place (modified as necessary) throughout the period ofactivity. Wherever possible, the need for decontamination should be reduced through work practices that minimize contact with contaminants.

Decontamination will be performed only in designated areas. Separate areas may be set up for equipment and personnel. Equipment to be decontaminated includes drilling equipment, tools, monitoring equipment, sampling equipment, and sample containers.

General equipment decontamination consists of a soap and water wash, and a water rinse. If soap and water alone cannot remove contamination, additional procedures may be used such as steam cleaning.

Tools: Tools will be dropped into a plastic pail, tub or other container. They will be brushed off, rinsed, and transferred into a second pail to be carried to the decontamination station. Generally, tools will be washed with a detergent solution only, followed by a clean-water rinse.

Avoid using wooden tools; they cannot be adequately decontaminated due to their absorptive properties. If used, wooden tools cannot be removed from the Exclusion Zone until the end of the project, and then only to be disposed of as appropriate.

Sampling Equipment: Sampling equipment will be decontaminated before and between sampling to prevent cross contamination, and when the equipment leaves the work area. Sampling equipment may include trowels, shovels, bailers, submersible pumps, geotechnical samplers, sleeves, and backhoe buckets.

All sampling equipment will be decontaminated using an Alconox wash, or equivalent, followed by two clean water rinses. The sampling tool will then be rinsed with deionized or distilled water and air dried.

Heavy Equipment: Drilling tools and other equipment which may contact contaminated soils/groundwater will be cleaned with high-pressure water or a portable high-pressure steam spray followed by a soap and water wash and rinse. Loose material shall be removed by brush.

All cleaning water should be collected and stored for disposal characterization.

Other reusable PPE: In addition to being decontaminated, all reusable PPE (i.e. safety glasses, hard hats, etc.), protective clothing, and other personal articles must be sanitized before they can be used again. The insides of reusable PPE and clothing become soiled from exhalation, body oils, and perspiration. The manufacturer's instructions should be followed in decontaminating and sanitizing reusable PPE. If practical, protective clothing should be machine washed after a thorough decontamination. Otherwise, it should be cleaned by hand.

Instruments: Monitoring equipment should be protected as much as possible from contamination. Drape, mask, or otherwise cover as much of the instruments as possible with plastic without hindering the operation ofthe unit. Contaminated instruments will be taken *from* the drop area, their protective coverings removed, and disposed of in appropriate containers. Any remaining dirt or obvious contamination will be brushed or wiped with a damp disposable paper wipe. The units can then be placed in a clean plastic tub, taken inside, wiped with damp disposable wipes and dried.

Be aware that many instrument manufacturers and rental companies will not accept contaminated equipment for repair, and that a heavily contaminated piece of equipment, if improperly handled, may have to be disposed of as hazardous waste.

8.4 DISPOSAL OF DECONTAMINATION WASTES

Wastes generated from decontamination activities collected during the project will be handled in conformance section 5.2.5 of the HASP. Waste PPE and equipment will also be placed into appropriate containers. Sampling of this waste is limited to use of the PID instrument to determine head space concentrations of organic vapors, and will present only minimal hazards to personnel. All activities involving these containers can be accomplished in Level D PPE.

8.5 DECONTAMINATION DURING EMERGENCIES

Often during emergencies the need to quickly respond to an accident or injury must be weighed against the risk to the injured party from chemical exposure. It may be that the time lost or the additional handling of an injured person during the decontamination process may cause greater harm to the individual than the exposure that would be received by undressing that person without proper decontamination.

Decisions concerning the appropriate decontamination process during an emergency must be made by the SSO, with consideration to the following:

Physical Injury: Physical injuries can range from minor to life threatening. In severe instances life-saving care should be instituted immediately without considering decontamination, however in most cases normal decontamination procedures can be followed.

Heat Stress: Heat-related illness ranges from heat fatigue to heat stroke, the latter being the most serious. Heat stroke requires prompt treatment to prevent irreversible damage to health or death, and protective clothing may have to be cut off to allow more rapid treatment. Less serious forms of heat stress may require prompt attention or they may lead to a heat stroke. As a guide, if the victim is able to adequately perform decontamination without unusual assistance, no special procedures should be attempted. If the victim is too incapacitated to perform a normal decontamination routine, then emergency decontamination and prompt medical care are warranted.

Chemical Exposure: When protective clothing is grossly contaminated, contaminants may be transferred to the wearer or to treatment personnel and cause injuries. Using the same criteria as for heat stress, if the victim is able to adequately perform decontamination without unusual assistance, no special procedures should be attempted. If the victim is too incapacitated to perform a normal decontamination routine, then emergency decontamination and prompt medical care are warranted, but unless severe medical problems could result, any significantly contaminated protective clothing should be washed off as rapidly as possible and carefully removed.

9.0 SITE CONTROL AND WORK ZONES

Contractors and subcontractors are responsible for the safety and protection of all personnel at work locations at the Site. Therefore, a control area will be established around each work location to protect untrained or unprotected workers from exposure to contaminants or other hazards. Access to the controlled areas will be limited to authorized work personnel and visitors who comply with the requirements of this HASP. Contractors and subcontractors will exercise control over their work areas whenever work operations are in progress, or when hazards related to the presence of chemical contaminants or physical hazards due to work activities may be encountered. At the conclusion of each work period, the SSO is responsible for ensuring that all work location hazards have been eliminated, in order to allow unrestricted access during non-working periods.

The SSO is responsible for delineating the boundaries of each controlled work area, based upon requirements set forth in Section 9.1, results of monitoring obtained during work operations, and site-specific conditions (e.g., proximity of roads or buildings and terrain peculiarities).

9.1 CONTROLLED WORK AREAS

Requirements

Where practical, a single entry/exit point shall be established at the edge of each work zone to facilitate control of personnel entering the area, and as the location for the set-up of decontamination stations. Initial requirements for work zone set-up are presented here as a guide, however location-specific factors must also be considered. Work zones will be determined by the contractor and or subcontractor based on the type of operation being performed and specific equipment being used.

Work Zone Delineation and Security

Work Zones should be delineated using traffic cones linked by yellow "CAUTION" tape, which provides a visible and physical barrier to prevent entry by unauthorized persons. Placement of vehicles and K rails can be used to provide additional security if required based on site conditions. The SSO/Task Leader will be responsible for maintaining the integrity of the perimeter during work activities, and will maintain a surveillance of the Work Zone to prevent unauthorized entry. If such an entry should occur, the trespasser will be immediately escorted outside the area, or all work at that location must cease. All personnel, equipment and supplies, which enter a work zone, must be decontaminated or containerized as waste prior to leaving.

At the conclusion of all work location tasks, controlled areas must be properly cleaned so as to be non-hazardous ("clean") prior to relaxation of entry control procedures and PPE requirements. Due to other requirements at the site, it may be necessary to "safe" each work location at the conclusion of each work period to allow for "other" unrestricted uses of the site.

9.2 THE SUPPORT ZONE

The areas, which lie outside any defined work zone location, are considered to be free of work-related hazards. In this area the requirements for protective equipment usage can be relaxed, and tasks, which need do not present significant hazards (including administrative/management activities), can be conducted. For convenience, the uncontrolled areas of the site will be referred to as the Support Zone, however it should be understood that within this area the contractor and subcontractor exercises no control and assumes no responsibilities for actions not directly related to its own work activities. Access to these areas is unrestricted, and Support Zone areas are available for other uses during all non-working hours.

The Support Zone can be used for set up and storage of all equipment, vehicles and supplies which are not required for immediate use in a defined work zone, and can serve as a work area for all non-hazardous tasks which might be undertaken (e.g., paperwork). A break area will also be designated in the Support Zone where personnel can eat, drink, and smoke. The break area is the only place where such activities are permitted by contractor and subcontractor personnel. There are no requirements for delineation or marking of Support Zone boundaries since it

encompasses all portions of the property where work activities or security considerations do not require access control.

9.3 WORK ZONE CONTROL RECORDS

Work Zone control records will be maintained on a daily basis by SSO. Other information to be recorded will include details concerning monitoring efforts undertaken and results (if available), and unusual events that may occur.

10.0 HEALTH AND SAFETY OPERATING PROCEDURES

10.1 GENERAL

10.1.1 Smoking, Eating, and Drinking

In order to minimize the potential for exposure to site contaminants, smoking, eating, drinking, gum chewing and application of cosmetics will not be permitted inside defined work zones at any time. Field workers, even those working in Level D conditions (see Section 7.2.1), will wash their hands and face prior to leaving and prior to eating or drinking. Consumption of alcoholic beverages is prohibited at the site.

10.1.2 Site Awareness

Field crew members shall be familiar with the physical characteristics and requirements of the work site, including:

- Accessibility to equipment and vehicles
- Communication
- Defined work zones (areas of suspected contamination or significant physical hazard)
- Site access
- Supplemental illumination by mobile lighting
- Emergency procedures and evacuation assembly points
- Location of protective and emergency equipment and relevant first-aid procedures.

The number of personnel and equipment permitted inside any Work Zone should be minimized, consistent with site operations.

10.2 SITE HEALTH AND SAFETY MEETINGS

10.2.1 Site Safety Orientation

The SSO will conduct a site safety orientation for every person assigned to the project on the following occasions:

- Before field personnel begin work at the site
- When there are significant revisions or modifications to the Health and Safety Plan
- When additional workers or subcontractors begin fieldwork and when authorized visitors are required to enter the Exclusion Zone Areas

A record of the site safety orientation will be documented by each personnel's signing of the signature page, which accompanies each site-specific addendum. Records of additional meetings, including attendees, will be maintained in the project health and safety file. The Health and Safety Professional will assist the SSO to develop the site safety orientation.

As a minimum, the orientation and training meeting agenda must include:

- Distribution of this HASP.
- A review of this HASP and the site-specific safety guidance document.

- Hazard awareness of contaminants, which may be encountered on site.
- Fire safety training, fire extinguishments, and evacuation procedures.
- Attendee signatures to acknowledge receipt and understanding of the HASP and an agreement to comply.

10.2.2 Field Safety Briefings

The SSO will conduct a field safety briefing at the start of each workday. When necessary (at a minimum weekly), the SSO will review and discuss the health and safety issues associated with the work, problems encountered, and modifications to existing procedures during the field safety briefing. Documentation of the field safety briefings will be accomplished by using the safety briefing sign-in log. The SSO maintains copies of all safety briefing sign-in logs in the project files. All field personnel associated with each day's project activities are required to attend these meetings.

10.3 ACCIDENT OR INCIDENT REPORTS

All accidents and incidents that occur on site during field activities associated with this project will be promptly reported to the SSO and the Site Supervisor. The Site Supervisor will provide timely notification to the MILLENNIUM H&S Project Manager. The supervisor of the injured employee or work crew will initiate the written report.

10.4 VISITOR CLEARANCES

Visitors will not be allowed within the Work Zones unless they comply with the health and safety requirements of this HASP, and can demonstrate a need for entry into the work area, which is acceptable to the SSO. All visitors (including the site owner or the owner's representative, or regulatory agency representatives) desiring to enter a defined work area must observe the following procedures:

Obtain a briefing from the SSO on the hazards associated with the site activities being performed, and acknowledge receipt of this briefing by signing the appropriate field safety briefing form and this HASP.

If the site visitor requires entry to any Work Zone, but does not comply with the above requirements, all work activities within the Work Zone must be suspended and monitoring must indicate that no airborne contaminant concentrations are present which exceed the established background levels and/or the physical hazard has been abated. Until these requirements have been met entry will not be permitted.

10.5 CONTRACTOR SAFETY

In addition to the requirements of this Health and Safety Plan, Contractors and subcontractors performing work under this HASP will observe the rules outlined in the "General Safety Rules for Contractors" which are located in Appendix D of this document. Compliance with these rules will be observed by contractors and subcontractors (during all phases of site activities).

10.6 WORKSITE SANITATION

During site activities, work areas will be continuously policed for identification of excess trash and unnecessary debris. Excess debris and trash will be collected and stored in an appropriate container (e.g., plastic trash bags, garbage can, roll-off bin) prior to disposal. At no time will debris or trash be intermingled with waste PPE or contaminated materials. Anyone observed throwing contaminated material or PPE away with municipal wastes will be removed from the site.

10.6.1 Water Supply

A water supply meeting the requirements of Title 8 CCR § 1524 will be utilized, consisting of the following:

Potable Water. An adequate supply of potable water will be available for field personnel consumption. Contractors and subcontractors will provide potable water for field personnel consumption for their individual employees. Potable water can be provided in the form of water bottles, canteens, water coolers, or drinking fountains. Where drinking fountains are not available, individual use cups will be provided as well as adequate disposal containers. Potable water containers will be properly identified in order to distinguish them from non-potable water sources.

Non-Potable Water. Non-potable water may be used for hand washing and cleaning activities. Non-potable water will not be used for drinking purposes. Any non-potable water sources will be clearly labeled as such.

10.6.2 Toilet Facilities

In accordance with Title 8 CCR § 1526 access to a toilet facility will be available for workers. A designated toilet facility located outside the facility will be available for use.

10.6.3 Washing Facilities

In accordance with Title 8 CCR § 1527, employees will be provided washing facilities (e.g., buckets with water and hand soap) at each work location. The use of water and hand soap (or similar substance) will be used by each employee following exit from a Work Zone, prior to breaks and at the end of daily work activities.

10.7 COMMUNICATIONS

Effective communication is essential to safe working conditions and the successful completion of the project. External communication is maintained by MILLENNIUM using cellular telephone links. Cellular phones will be required during all hazard abatement activities and to facilitate communications with MILLENNIUM management personnel, subcontractors and if necessary, to notify appropriate emergency response units (e.g., police, ambulance teams, fire department, etc.).

11.0 EMERGENCY CONTINGENCY PLAN

The following responsibilities and response actions are in accordance with the requirements for an Emergency Response and Contingency Plan.

There are four major categories of emergencies that could occur during site investigation activities:

1. Illnesses and physical injuries (including injury-causing chemical exposure).

2. Catastrophic event (fire, explosion, earthquake, or chemical release).

3. Safety equipment problems.

4. Minor spills or leaks of equipment fuel (e.g., gasoline) or decontamination fluids.

Although a catastrophic event or severe medical emergency is unlikely to occur during work activity at the site, this emergency contingency plan has been prepared for this project should such critical situations arise. The purpose of this procedure is to establish the appropriate response actions for emergency situations, the means of communication, and the responsibilities of key personnel at the site.

11.1 RESPONSIBILITIES

11.1.1 Site Safety Officer (SSO)

The SSO is the primary coordinator for all emergency activities. Responsibilities include:

- Evaluating the severity of the emergency,
- Implementing appropriate response action,
- Directing worker response activities,
- Summoning appropriate emergency services (fire department, ambulance, etc.), and
- Notifying all site personnel, the Health and Safety Professional, and concerned authorities of the emergency situation.

11.1.2 Other On- Site Personnel

It will be the obligation of the field personnel to inform the SSO of all emergency situations and to abide by their issued response actions. Special medical problems of field personnel such as allergies to insects, plants, prescription medication, etc. will be reported to the SSO.

11.2 EMERGENCY EQUIPMENT

Provisions will be made to have appropriate emergency equipment available and in proper working condition.

11.2.1 First Aid Kits

Each work site shall have a first-aid kit meeting the following requirements:

- First-aid kits in weather-proof containers, meeting all regulatory requirements, shall be present at all locations where contractor personnel and subcontractors will be working,

- First-aid kits shall be available at each work location at all times, and
- Only designated personnel will be permitted to use first-aid kits.

During all work operations, at least one individual will be present at all times who is a certified first aid provider.

11.2.2 Eyewash Units

Eyewash units meeting the requirements of ANSI Standard 2358.1-1981 will be available as necessary at each work location. These units will also comply with the provisions of 8 CCR §5162, and shall be capable of supplying hands-free irrigation for both eyes for at least 15 minutes at a flow rate of at least 0.4 gallons per minute.

11.2.3 Fire Extinguisher

A tire extinguisher capable of extinguishing Class A, B, and C fires will be available for use at the site at each work location at all times, and personnel will be readily aware of the location of the fire extinguisher for immediate use. At a minimum the fire extinguisher shall carry a rating of 10-A, 1O-B,C.

11.2.4 Spill Containment and Cleanup

Equipment for containment and clean-up of small spills will be available.

11.3 WORK STOPPAGE AND CORRECTIVE ACTIONS

The SSO and/or CIH will require temporary work stoppage and implementation of corrective actions if any of the following conditions are encountered:

- Air monitoring shows concentrations of airborne contaminants exceeding requirements as presented in Table 4
- Concentrations of airborne contaminants outside any controlled area (see Section 9.1) exceed 50 percent of the unprotected exposure limits required by OSHA (OSHA PEL's)
- Emergency conditions directly affect the health and safety of on-site workers or offsite residents or properties
- Detection of unexpected lead levels on adjacent grounds.

Corrective actions may include modification of personal protection levels, ventilation, evacuation, or other necessary measures as determined by the SSO using guidance found in this HASP (mitigation measures in Section 6.1.2). The SSO is empowered to unilaterally stop work if necessary to meet health and safety requirements.

11.4 NON-CATASTROPHIC EMERGENCY RESPONSE ACTIONS

The following procedures will be implemented in response to specific non-catastrophic emergency situations:

11.4.1 Medical Emergencies

Medical emergencies can be described as situations that present a significant threat to the health of personnel. These can result from chemical exposures, heat stress, cold stress, and poisonous insect or snake bites. Medical emergencies must be dealt with immediately and proper care should be administered. This may be in the form of first aid and emergency hospitalization. In the event of a medical emergency:

- All injured individuals may be given appropriate emergency first aid by a qualified individual trained in first aid, and

- Severely injured personnel shall be transported to the designated hospital listed in Table 6.

The route to hospital is shown on Figure 1.

11.4.2 Safety Equipment Problems

An emergency may develop due to malfunction or other problems associated with health and safety equipment being used by field personnel. These equipment problems must be corrected before proceeding with field activities. Health and safety problems that may occur include:

- Leaks or tears in protective clothing,
- Failure of respiratory protective devices (air-purifying respirators), and
- Encountering contaminants for which prescribed protective equipment may not be suitable.

Any person encountering a problem with protective equipment will evacuate the Work Zone and will immediately decontaminate and remove all protective clothing and other equipment. As necessary, the affected employee can be evaluated by a physician if overexposure is suspected.

11.4.3 Fuel/Solvent Spills

In the event of a small spill of fuel or cleaning solvents, actions should be taken to immediately contain the spill. This can include the use of spill containment devices (spill "pillows", etc.) or other barriers. The SSO will direct the clean-up of spilled material as quickly as possible. Clean-up will be performed using an absorbent material. Waste will be collected and containerized.

11.5 CATASTROPHIC EVENT PROCEDURES

In the event of a catastrophic incident:

Work activities will cease and all project personnel will be evacuated from the work location. The evacuation will proceed in a direction opposite of the critically affected area with all personnel assembling in a pre-designated location outside of the job site proper (determined and presented as part of the daily field briefing),

A headcount will be taken by the SSO or designated alternate of the assembled employees and any injured individuals shall be administered first aid, and

If not present at the affected work location, the SSO, the MILLENNIUM H&S Project Manager, and the MILLENNIUM Corporate Health and Safety Officer will be contacted immediately.

A universal signal for emergency evacuation (e.g., use of a horn), and designation of the evacuation assembly location, shall be established by the SSO and briefed to all workers during initial site-specific training. Any changes mandated by changing site conditions shall be determined by the SSO and communicated to workers during the daily field safety briefing.

11.6 WASTE HANDLING AND STORAGE PLAN

All waste will be properly stored in labeled DOT 17-H drums that are sealed. The storage area will be barricaded and/or labeled with barrier tape and signs to distinguish this as a storage area. The requirements followed with be in accordance with 40 CFR 262 & 265.

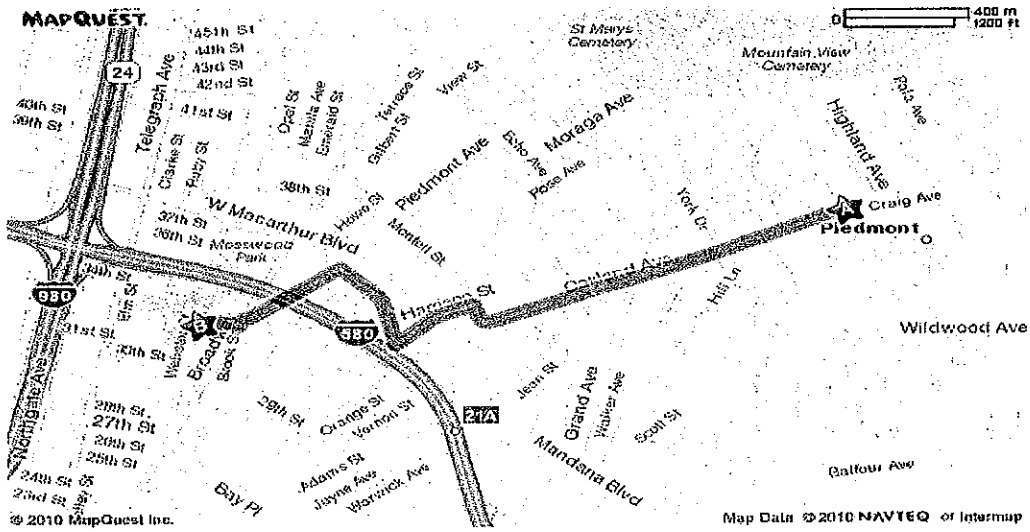
12.0 SIGNATURE PAGE

I have read and reviewed the Health and Safety Plan for this project (Millennium Project Number 16033.2013). I have been instructed in the contents of this document and understand the information presented. I will comply with the provisions contained therein.

PRINT NAME	SIGNATURE	ORGANIZATION	DATE

FIGURES

NORTH



1800 Oakland Ave, Piedmont, CA 94611-4022

START	1. Start out going **SOUTHWEST** on **OAKLAND AVE** toward **HILLSIDE AVE.**	go 0.9 mi
	2. Turn **SLIGHT RIGHT** onto **BAYO VISTA AVE.**	go 0.0 mi
	3. Turn **LEFT** onto **HARRISON ST.**	go 0.2 mi
	4. Turn **RIGHT** onto **W MACARTHUR BLVD.**	go 0.3 mi
	5. Turn **LEFT** onto **PIEDMONT AVE.**	go 0.3 mi
	6. Turn **SLIGHT LEFT** onto **BROADWAY / BROADWAY AUTO ROW.**	go 0.0 mi
	7. Turn **RIGHT** onto **HAWTHORNE AVE.**	go 0.0 mi
	8. Turn **LEFT** onto **WEBSTER ST.**	go 0.0 mi
	9. Turn **SLIGHT RIGHT** onto **HAWTHORNE AVE.**	go 0.0 mi
END	10. **350 HAWTHORNE AVE** is on the **RIGHT.**	go 0.0 mi

350 Hawthorne Ave, Oakland, CA 94609-3108
Total Travel Estimate : 1.92 miles - about 6 minutes

FIGURE 1
ROUTE TO HOSPITAL MAP
HAVENS ELEMENTARYSCHOOL
PIEDMONT UNIFIED SCHOOL DISTRICT
PIEDMONT, CA

TABLES

Table 1
Chemicals of Concern

Chemical Family	Compound Name	Maximum Concentration (mg/kg)
TPH	TPH as gasoline (TPHg)	<10
TPH	TPH as diesel (TPHd)	<100
VOCs	Benzene	<700
VOCs	Toluene	<0.5
VOCs	Ethylbenzene	<0.5
VOCs	Xylenes	<0.5
OCPs	Organochlorine Pesticides	<100
Inorganic Compounds	Arsenic	<10
Inorganic Compounds	Lead	< 500

Note:

1. Maximum Concentration based on previous investigation and/or stockpile sample data

Table 2
Summary of Environmental Contaminant Properties

CHEMICAL PRODUCT	OSHA PEL	ACGIH TLV	SIGNIFICANT HEALTH EFFECTS
Gasoline	300 ppm	300 ppm	Inhalation of vapors, skin contact with liquid may cause CNS depression and skin irritation
Diesel Fuel	Not Established	100 mg/m^3	Inhalation of mist, ingestion may cause CNS depression. Prolonged skin contact with liquid may cause irritation
Benzene	1 ppm	1 ppm	Known human carcinogen. Inhalation of vapors, prolonged skin contact may cause leukemia. Acute inhalation exposures may cause CNS depression. Skin contact with liquid may cause irritation. Chronic exposures may cause anemia and liver degeneration
Toluene, Xylene, Ethylbenzene	100 ppm	100 ppm	Acute inhalation exposures may cause CNS depression. Skin contact with liquid may cause irritation. Chronic exposures may cause liver degeneration
Lead	0.050 mg/m^3	0.050 mg/m^3	Lead is a poison by ingestion; but significant exposure can occur from inhalation. Lead is also a suspected carcinogen of the lungs and kidneys Exposure can result in loss of appetite, anemia, malaise, insomnia, headache, irritability, muscle and joint pain and intestinal irritation and swelling.
Arsenic	0.5 mg/ m^3	--	Arsenic is a poison by ingestion; but exposure can occur from inhalation of dust. Arsenic is also a suspected carcinogen
OCPs	Varies	Varies	OCPs are poisons by ingestion; but exposure can occur from inhalation
Motor Oil/Hydraulic Fluids	5 mg/m^3 (as mist)	5 mg/m^3 (as mist)	Inhalation of mist, ingestion may cause CNS depression, gastric distress. Prolonged skin contact with liquid may cause irritation

Table 3
Air Contaminant Monitoring Instrumentation

Instrument	Manufacturer/Model	Substance Detected
Flame Ionization Detector (FID) (Optional)	Foxboro OVA 108 Foxboro OVA 128	Combustible/organic vapors, gases, hydrocarbons, methane
Photo Ionization Detector (PID) (Required)	Millie Rae Microtip	Aromatic hydrocarbons
Detector tube kit	Draeger	Benzene 0.5 – 10 ppm
Multi-gas Detector (Optional)	RKI Eagle	Oxygen, %LEL, CO and H2S

Table 4
Monitoring Program Action Levels

PARAMETER	LOCATION AND INTERVAL	RESPONSE LEVEL	RESPONSE
Petroleum Hydrocarbons (total by PID/FID)	Breathing Zone, Every 15 minutes, Perimeter of work area	< 10 ppm > 10 ppm >15 ppm	Continue Level D Work Continue Level D Monitor for Benzene Stop Work and Monitor
OCPs	Visual Monitoring	Visible Dust in Breathing Zone	Provide dust suppression and/or perform work activities in modified Level D PPE with dust mask if dust suppression is not adequate.
Arsenic	Visual Monitoring	Visible Dust in Breathing Zone	Provide dust suppression and/or perform work activities in modified Level D PPE with dust mask if dust suppression is not adequate.
Lead	Visual Monitoring	Visible Dust in Breathing Zone	Provide dust suppression and/or perform work activities in modified Level D PPE with dust mask if dust suppression is not adequate.

Table 5
Task Specific PPE Guidance

Activities to be performed:			
◙ Site Reconnaissance	◙ Lead Abatement	◙ Monitoring	☐ Reconstruction Activities
◙ Utility Clearance	◙ Waste Management	☐ Night Work	◙ Soil Sampling
☐ Asbestos Abatement	☐ Demolition Activities	☐ Gas Testing	◙ Other: Other Monitoring
	Site Reconnaissance/Utility Clearance/: Level D		
◙ Typical Work Uniform	☐ Outer Protective Gloves	☐ Tyvek@ Coveralls	☐ Safety-Toe Boots
◙ Hard Hats	☐ Polycoated Tyvek@	◙ Safety-Toe Boots	◙ Safety Glasses/Face Shield
☐ Nomex© Coveralls	☐ Inner Protective Gloves	◙ Hearing Protection	
	Drilling Activities: Level D		
◙ Typical Work Uniform	☐ Outer Protective Gloves	☐ Tyvek@ Coveralls	◙ Safety-Toe Boots
◙ Hard Hats	☐ Polycoated Tyvek@	◙ Safety-Toe Boots	◙ Safety Glasses/Face Shield
☐ Nomex® Coveralls	☐ Inner Protective Gloves	◙ Hearing Protection	
	Debris Handling in Sealed Drums: Level D		
◙ Typical Work Uniform	☐ Outer Protective Gloves	☐ Tyvek@ Coveralls	◙ Safety-Toe Boots
◙ Hard Hats	☐ Polycoated Tyvek(g)	◙ Safety-Toe Boots	◙ Safety Glasses/Face Shield
☐ Nomex® Coveralls	◙ Inner Protective Gloves	☐ Hearing Protection	
Other H&S considerations:	◙ Apron during power washing for decontamination of equipment.		

Table 6 Emergency Telephone Numbers

Local Emergency Contacts

Agency or Facility	**Location of agency or Facility**	**Point of Contact**	**Primary & Secondary Phone Numbers**	**Remarks (response time)**
Police	Local Police Department	NONE	1°-**911** 2°-	
Fire Department & HAZMAT	Local Fire Department	NONE	1°-**911** 2°-	
Hospital	Alta Bates Medical Center – Summit Campus 350 Hawthorne Ave, Oakland CA	Emergency Department	1°- (510) 655-4000 2°-**911**	
Ambulance			1°-**911** 2°-	
Cal/OSHA		Enforcement Division	1°- (415) 703-5270 2°-	
MILLENNIUM Site Phone	On-site	Mark Milani	(925)766-4088 (cell)	
CIH (Michael Noel)	Office	Michael Noel	(925) 808-6700	
CIH (Michael Noel)	Field	Michael Noel	(925) 766-4079 (cell)	

APPENDIX A

HEALTH AND SAFETY FORMS

Date: Time:

Briefing Conducted By:	Signature:	Company Name:

This sign-in log documents the field safety briefing conducted in accordance with Title 8 CCR §5192 "Hazardous Waste Operations and Emergency Response" as well as other applicable regulatory requirements. Personnel who perform work operations onsite are required to attend each safety briefing and acknowledge receipt of such briefings daily or as required.

TOPICS COVERED:		
☐ General PPE usage	☐ Decontamination Procedures	☐ Emergency Procedures
☐ Respiratory Protection	☐ Smoking Eating and Drinking	☐ Existing Work Zones
☐ Personal Hygiene	☐ Site Control	☐ New Work Procedures

Personnel Sign-in List

Printed Name	Signature	Company Name

Supervisor's Report of Incident

This is an official document to be initiated by the injured employee's supervisor. Please answer all questions completely. This report must be forwarded to the Health and Safety Section office within 24 hours of the injury.

Injured's name		Soc Sec. No.	Sex	Birthdate
Home address		City	State	Zip
Job Title	Section	Hire date	Hourly wage	Phone

Supervisor

Date of incident	Time	Time reported	To whom
Client name	Client address		Time shift began
Exact location of incident		Did injured leave work?	When?
Has injured returned to work? ☐Yes ☐No		Did employee miss a regularly scheduled shift? ☐Yes ☐No	
Doctor/hospital name		Address	
Witness name		Statements attached ☐Yes ☐No	
Nature of injury		Body part	
Medical attention			
Job assignment at time of accident			
Describe incident			
What caused the accident?			
What corrective action has been taken to prevent recurrence?			
Supervisor/foreman Print name		Signature	Date

Supervisor's Report of Incident

Manager

Comments on incident and corrective action		
Manager Print name	Signature	Date

Health and Safety

Concur with action taken? ☐Yes ☐No Remarks:

OSHA classification
☐ Incident only ☐ First aid ☐ No lost work days ☐ Lost work days ☐ Restricted activity ☐ fatality

Days away from work	Days of restricted work	Total days charged
HS Professional Print name	Signature	Date

APPENDIX B

GENERAL SAFETY RULES FOR CONTRACTORS

INTRODUCTION

The rules and requirements contained in this attachment have been written for the guidance of Contractors who are performing work with Millennium Consulting Associates. Contractors are responsible for implementing and monitoring provisions of the health and safety plan. This booklet prescribes general requirements and regulatory references only, where revisions to such documents provide more stringent guidelines than established here the new guidelines will be followed. Additional specific rules may be necessary to ensure the safety of workers on a particular job. The Contractor, working in collaboration with the Millennium representative, will be expected to establish such additional rules and procedures as may be necessary to conduct a safe operation and comply with all Millennium, regulatory, and insurance requirements and those of the client's. Millennium health and safety professionals are available to assist.

The prime Contractor is responsible for informing its subcontractors of these requirements, for directing and supervising work of subcontractors, and for assuring that its subcontractors adhere to the requirements herein. Millennium may request the Contractor to provide proof of its subcontractor's adherence to all rules and regulations and will prohibit access to the job sites under this contract for those Contractors not in compliance.

In order to assist Contractor in following these instructions, a Millennium Representative may be assigned to the Contractor to act as his agent in health and safety matters relative to work activities at the project sites. Under no circumstances shall any work be started until the Millennium Representative has been contacted, a job orientation has been conducted by the Millennium Representative, and all permits, insurance, Millennium, client, and regulatory pre job requirements have been met.

The Millennium Representative is authorized to stop any work which he/she may consider hazardous to Millennium personnel or equipment or Contractor personnel. This authority may be delegated to appropriate individuals.

General Safety Rules and Requirements

Accident Reporting

All accidents (personal and property damage) shall be reported orally to the Millennium Representative as soon as emergency conditions no longer exist. A written report shall follow within 7 days after emergency conditions are resolved.

Alcohol, Firearms, etc.

Alcoholic beverages, illegal drugs or narcotics, or guns and ammunition are not permitted on Millennium property or job sites. Personnel under the influence of alcohol or drugs shall not be allowed on Millennium property or job sites.

Approvals

The Contractor shall be required to obtain pertinent work permits or authorization and approval from the Millennium Representative before:

- Working on existing pipelines or equipment
- Entering tanks or closed vessels
- Entering any designated high-hazard areas
- Using torches, electrodes, electronic motors, forges, soldering irons, any open flames, or any device which could produce sparks or ignition source
- Closing walkways, roads, or restricting traffic
- Starting excavations
- Removing tanks from excavations
- Backfilling excavations
- Using utilities such as steam, water, compressed air, or electricity
- Sandblasting, spray painting, or guniting
- Storing flammable materials such as gasoline, oil, paints, oxygen cylinders, etc.
- Walking or working on roofs of buildings or equipment
- Drilling, boring, preparing test pits, or using geophysical equipment or any other exploratory equipment requiring penetration of surfaces
- Operating cranes or similar equipment near overhead power lines or pipelines
- Opening cutting through firewalls or berms
- Fueling or repairing Contractor operating equipment on Millennium property or job sites.

Security

For security reasons, entrance to and exit of job sites is restricted to those areas designated as the Contractor's work area.

Speed Limits

All vehicles must observe a maximum speed limit of 10 mph unless otherwise posted.

Vehicle Safety

- All vehicles must be parked in authorized areas only.
- There will be no passing of moving vehicles at job sites where there are narrow roads and short-sight distances.
- Vehicles will only be operated by personnel with valid licenses and good driving records.
- Vehicles shall have all required inspection and operating permits.
- Seat belts shall be used.

Safe Work Practices

Communication

Communication and coordination is vital to prevent accidents on construction sites. Every worker must be aware of equipment operating in his vicinity.

Confined Space Entry

Confined spaces include storage tanks, bins, sewers, in-ground vaults, degreasers, boilers, vessels, tunnels, manholes, pits. etc. These enclosures, because of inadequate ventilation and/or the introduction of hazardous gases and vapors, may present conditions that could produce asphyxiation or injury.
Before entering a confined space, Contractor must notify the Millennium Representative of intent to enter. The Millennium Representative will review with Contractor the safe entry requirements which include:

Removal of Contents. Before entering, confined spaces should be as clean and free of hazardous materials and chemicals as possible. Where appropriate, confined spaces may be purged using water or other suitable means. Purging with hazardous solvents should be avoided where possible.

Isolation. All input lines which discharge into the confined space shall be disconnected and capped or isolated. The use of a single in-line valve shut-off as the sole means of isolating the confined space from any input lines is prohibited.

However, the use of a double in-line valving arrangement with a vent or drain in between the two valves is acceptable provided that dangerous air contaminants are not introduced by such venting. Isolation valves shall be locked closed, vent or drain valves shall be locked open, and the key shall be kept by that person performing the job.

Electrical Lockout. Where electrical devices located within the confined space {motors, switches, etc.) are to be repaired or worked on, the line-disconnect switches supplying the power must be tagged and locked in the "OFF" position. The lock key is to be kept by the person performing the job, and only this person is authorized to unlock the switch and remove the tag upon completion of the job. Where more than one person is working on the line, each must place a lock on the switch and retain his own key.

Where there are multiple sources of power to an electrical device that supplies power to the device through an automatic or manual bus transfer switch, lockout devices must be placed on the breaker nearest to the electrical device that is to be isolated, and an electrician shall test the power supply lines to ensure that power has been secured.

Line-disconnect switches supplying power to any mechanical apparatus in the confined space (mixers, conveyors, etc.) must also be tagged and locked in the "OFF" position. This must be done for any entry, even though work will not be performed on the apparatus itself.

Securing of Covers. All manhole and cleanout covers shall be removed and the openings maintained clear of any obstructions. When hinged doors or lids are provided, they shall be secured so they cannot close. See Excavations and Trenches for guarding requirements.

Testing Atmosphere. A qualified person (NIOSH Publication No. 80-106) using only equipment approved and tagged for Class 1, Division 1 locations shall make appropriate tests of the atmosphere in the confined space and place a record of the test results at the entrance to the confined space. Testing shall ensure the following:

- Combustible gas and vapor concentrations do not exceed 10 percent of the lower explosive limit
- Oxygen content is no less than 20 percent and no greater than 25 percent
- Appropriate respiratory protective equipment and other appropriate personal protective devices have been provided for all employees when concentrations of toxic materials exceed established threshold limit values (TLVs).

Continuous Monitoring. If the nature of the work to be performed introduces, or has the potential to introduce, harmful air contaminants, continuous monitoring of the atmosphere and/or the oxygen content drops below 20 percent, all personnel shall evacuate the confined space immediately.

Ventilation. All confined spaces found to be unsafe must be ventilated by means of mechanical exhaust systems arranged so as to avoid recirculating contaminated air. The Contractor must contact the Millennium Representative to obtain approval not to ventilate. Personnel shall be evacuated immediately in the event of failure of the mechanical ventilation system. The confined space shall be retested prior to reentry following ventilation system repair.

Buddy System. At least two workers shall remain outside the confined space. One standby worker shall be stationed just outside the access opening of the any confined space while such space is occupied. This person shall:

- Maintain continuous awareness of the activities and well-being of the occupant in the confined space
- Be able to maintain communication at all times
- Be alert and fully capable of quickly summoning help
- Be physically able and equipped to assist in the rescue of an occupant from a confined space under emergency conditions.

Safety Gear and Personal Protective Equipment. All Contractor employees must be instructed in accordance with OSHA regulations regarding safety gear and personal protective clothing, had hats, respirators, lifelines, and harnesses. Such instructions shall be received and documented before entering any confined space.

Confined Space Entry Permit. Each subcontractor engaging in the entry of a confined space shall utilize an entry permit meeting the requirements of 29 CFR 1910.146. The permit shall be approved and signed by the Millennium SSO prior to initiation of the entry procedure.

Compressed Gas Cylinders

Valve protection caps. Valve protection caps shall be in place when compressed gas cylinders are transported, moved, or stored.

Cylinder valves. Cylinder valves shall be closed when work is finished and when cylinders are empty or are moved.

Compressed gas cylinders. Compressed gas cylinders shall be secured against rolling or tipping (roped or chained) at all times, except when cylinders are actually being hoisted or carried.

Gas regulators. Gas regulators shall be in proper working order while in use.

Leaks. If a leak develops in a gas cylinder, after donning appropriate safety equipment, immediately remove it to a safe location. If the leak cannot be corrected, report it to the Millennium Representative.

Identification of Contents. Cylinders should be permanently marked or stenciled to identify the type of gas in the cylinder.

Breathing Air. All compressed breathing air shall meet OSHA specifications for breathing air quality. All compressed breathing air cylinders shall have their contents checked at the job site for correct oxygen concentration and rejected for breathing air if the oxygen concentration is not 20.7% ±0.2%.

Oil and oily rags. Oil and oily rags shall be kept away from oxygen equipment.

Cranes, Hoists, and Other Heavy Equipment

Contractor personnel will not be permitted to use hoists and powered apparatus belonging to Millennium unless approval is obtained in each instance from the Millennium Representative.

ROPs,
Roll over protection shall be used when conditions or regulations call for such use.

Cutting or Welding

Hot Work/Welding/Burning. "Hot Work" authorization must be obtained from the Millennium Representative before any welding, cutting, or other "hot work" is done. "Hot work" permits and results of tests are to be submitted to the Millennium Representative at the completion of the job or at the end of each workday.

Welding Flash. Noncombustible or flame-proof shields or screens must be provided to protect welder or others who might be harmed by direct rays or arc.

Personal Protective Equipment. Goggles, gloves, aprons, and other personal protective equipment appropriate to the job shall be used.

High Fire-Hazard Areas

Contractor personnel are responsible to see that a fire watch is maintained and all adjacent combustible materials are protected or removed as designated by the Millennium Representative. Contractor shall provide his own calibrated combustible gas meter or other instruments for checking areas before hot work.

Documentation of calibration shall be submitted to the Millennium Representative for review by the Millennium Health and Safety Section.

Contractor is responsible for all testing and monitoring required by applicable regulations and to assure work place safety.

Millennium shall have the right, not the responsibility, to perform additional testing. Millennium testing shall not be in lieu of Contractor's requirements.

In the event of a bona fide emergency, such as emergency spill response work, and where the Contractor warrants that he cannot conduct the required testing, Millennium may upon written agreement then conduct all tests necessary to assure safety and regulatory compliance. The Contractor shall cosign the "hot work" permit form when tests are conducted by Millennium personnel.

Contractor shall provide his own fire extinguisher(s) for welding and cutting, as designated by the Millennium Representative.

Electrical Safety

Grounding. The noncurrent-carrying metal parts of fixed, portable, or plug-connected equipment shall be grounded. Electrical connections shall include a ground-fault interrupter system. Ground wires shall be tested with an electrical resistance meter to assure conductivity as often as necessary to assure safety. Portable tools and appliances protected by an approved system of double insulation need not be grounded.

Extension Cords. Extension Cords shall be the three-wire type for grounded tools (two-wire is permissible for double-insulated tools) and shall be protected from damage; do not fasten with staples or extend across an aisle way or walkway. Worn or frayed cords shall not be used. Cords shall not be run through doorways where the door could cut or damage them.

Light Bulbs. Exposed bulbs on temporary lights shall be guarded to prevent accidental contact, except where bulbs are deeply recessed in the reflector. Temporary lights shall not be suspended by their electric cords unless designed for this use. Explosion-proof bulb covers shall be used when contact with flammable vapors or gases is likely and shall meet Class I, Division I requirements.

Electrical Receptacles. Receptacles for attachment plugs shall be of the approved, dead-front, concealed contact type. Where different voltages, frequencies, or types of current are supplied, receptacles shall be of such design that attachment plugs are not interchangeable.

Wet Environments. Work done in wet environments shall require ground fault interrupters and water-tight connectors.

Emergency Equipment

Millennium's fire equipment is not to be moved, relocated, or otherwise rendered inaccessible unless specific permission is granted in each case by the Millennium Representative.

Self-contained breathing apparatus, first aid equipment, fire blankets, stretchers, eyewash fountains, and deluge showers are not to be moved, relocated, or blocked without the express permission of the Millennium Representative.

Excavations and Trenches

Permits. Before any excavation work begins, all required permits shall be obtained.

Underground Service Alert. Before any excavation work begins, the existence and location of underground pipes, electrical conductors, etc., must be determined by Contractor who shall in turn notify the Millennium Representative.

Cave In Protection. The walls and spaces of all excavations and trenches (which will be entered by people) more than 4 feet deep shall be guarded by shoring, sloping of the ground, or some other equivalent means, in accordance with Cal/OSHA regulations.

Daily Inspections. Daily inspections of excavations shall be made by the Contractor. If there is evidence of possible cave-in or slide, all work in the excavation shall cease until the necessary safeguards have been taken.

Egress. Trenches more than 4 feet deep shall have ladders or steps located so as to require 10 feet or less of lateral travel between means of access.

Backfill. All trenches shall be backfilled as soon as practical after work is completed and all associated equipment removed.

Housekeeping. All Contractor equipment, such as pipe, rebar, etc., shall be kept out of traffic lanes and access ways. Equipment shall be stored in a manner which ensures the safety of Millennium and Contractor employees at all times.

Fall In Protection. All trenches shall be completely guarded on all sides. Standard guardrails are preferred. However, when wooden or metal barricades are used for trench guarding, they shall be spaced no further apart than 20 feet, and at least two feet from the edge of the trench. Such barricades shall be at least 36 inches high when erected.

Barricades. Battery-lighted barricades shall be used as follows:

- A minimum of two battery-lighted barricades shall be used at corners, one on each side of the barricade.
- At least one battery-lighted barricade shall be used where vehicular traffic approaches the trench at right angles.
- Where trenches parallel roadway, distance between battery-lighted barricades shall not exceed 40 feet unless this requirement conflicts with Item (I), above, and additional units are required.
- All battery-lighted units shall be serviced as necessary to ensure equipment is operating.
- Caution tape shall be stretched securely between barricades. The caution tape shall be at least 314-inch-wide and shall be yellow or yellow and black and may have the words "CAUTION - DO NOT ENTER"
- Barricaded sections immediately adjacent to where pedestrians cross trenches shall be arranged to direct pedestrians to the walkway or bridge.

Encroachment. Use of other trench excavating equipment, or storage of equipment or supplies within a distance equal to the depth of the trench, will not be permitted without approval by the Millennium Representative.

Bridges. All pedestrian bridges shall be of sufficient strength to prevent no greater vertical deflection than one-half inch when a 250-pound weight is applied to the center of the bridge.

- Handrails shall consist of intermediate and top rails on both sides of the bridge. The top rail shall be between 42 and 45 inches above the walking surface and be capable of withstanding a lateral force of 200 pounds against the center of the top rail.
- All surfaces which a person could reasonably contact should be sufficiently free of splinters, nails, or protrusions which may cause injury.
- All bridges intended for vehicular traffic shall be constructed to withstand twice the load of the heaviest vehicle anticipated.

Earth Grading Activity

Vest. All persons within an area where earthmoving are operating shall wear a safety vest or jacket at all times. Vests may be red, orange, or day-glo green in color, but bright or fluorescent orange is preferred. Significantly faded or damaged vest must be replaced.

Communication. Anytime a test pit is to be excavated, the technician shall notify the grading contractor's **authorized** representative for that area. That individual may be acting in the capacity as a dump man, operator, or supervisor from an independent vehicle. Advise that representative of the test pit location and request their cooperation to promote safety during the test period. This should include their advising those under their supervision of your existence in the grading area. Make a notation on your records of the name of the individual with whom you spoke so that the communication is documented.

- Provide notice to the grading contractor
- Identify location of test pit
- Request the cooperation through the completion of the tests and document accordingly.
- A flag must be affixed to any vehicle driving in an earth grading activity area and hazard warning lights shall be operated.

Flags. Every over-the-road vehicle operating in the area of earthmoving equipment activity must carry a flag. The flag must be at least 300 square inches in area with no dimension less than 12 inches. Flags must be high visibility red, orange, day-glo green and mounted approximately 12 feet above grade level.

Hazard Warning Lights. Every over-the-road vehicle operating in the area of earthmoving equipment activity must operate the hazard warning flashers at all times.

Rotating or Flashing Beacon. All vehicles stationary in the grading area shall use a rotating or flashing amber beacon or strobe light on the top of the cab of the vehicle during all field testing.

Orientation of Test Pits. The technician is responsible for selecting a test pit location. Of paramount concern is the technician's safety. The test pit should be located behind the established pattern of grading equipment and outside any existing patterns. The orientation of the pit should include the use of the technician's vehicle as a barrier to potential oncoming traffic. The waste pile created from the excavation of the test pit should be opposite the vehicle so that the test pit is positioned between the vehicle and the waste pile. A flag shall be placed immediately on top of the waste (spoil) pile, satisfying the same requirements as the vehicle flag.

Zone of Non-Encroachment. The location of the test pit must be selected so that no earthmoving equipment will approach closer than 50 feet from the center of the test pit. This is not only for the technician's safety, but to ensure the integrity of the test. Excessive vibration from the operation of earthmoving equipment operating too closely may impair the accuracy or spoil the test results.

Completion of Tests. Immediately upon completion of tests, record the data and withdraw flags and vehicles outside the grading area to record notes and do calculations.

Fire Prevention
The Millennium Representative, or his designee, is authorized to correct any condition which he may consider a fire hazard. In any emergency, the site personnel are authorized to act directly with Contractor's Foreman in regard to fire hazards without waiting for the Millennium Representative.

Floor Openings openings shall be guarded by substantial barriers, railings, and/or covering materials strong enough to sustain twice the load of pedestrians or vehicular traffic. Barriers will be supplied by the Contractor. Where a danger of falling exists for personnel, elevated floor areas must be provided with guardrails. In addition, toeboards shall be provided when the possibility of falling objects striking personnel below exists.

High-Hazard Areas

Although this list may not be all inclusive, there are certain areas and operations at Millennium facilities and job sites where extra precautions must be taken because of the nature of the hazards. When starting up any operation, the Contractor is required to check with the Millennium Representative for a review of the safety and health rules which apply before entering any of the following areas:

- Confined spaces (tanks, manholes, vaults, pits, etc.)
- Laboratories
- Chemical storage and disposal areas.

The contractor is also required to check with the Millennium Representative before any work is done on a flammable gas or solvent line; a tank or vessel that presently contains, or has contained, a flammable material; and before making an excavation anyplace on the site.

Housekeeping

Material should be carefully stacked and located so that it does not block aisles, doors, self-contained breathing apparatus, fire extinguishers, fire blankets, stretchers, emergency eyewash fountains, emergency safety showers, fixed ladders, stairways, or electrical breaker panels.

- Nails protruding from boards must be removed or bent over.
- All work areas shall be kept clear of *form* and scrap lumber and all other debris.
- Combustible scrap, waste materials, and debris shall be removed at regular and frequent intervals.
- Containers shall be provided for the collection and separation of refuse by type. Covers shall be provided on containers used for flammable, combustible, or harmful substances.
- Overhead storage of debris, tools, equipment, pipes, etc., is prohibited.
- At the end of each work day, Contractor shall provide for pick up of all debris such as paper, rags, empty cans and bottles, etc.

Ladders

The use of ladders with broken or missing rungs or steps, broken or split handrails, or with other faulty or defective construction is prohibited.

- Ladders must not be placed adjacent to a door unless the door is locked or guarded.
- Metal ladders shall not be used for electrical work.
- Tie off top of ladder to structure.

Medical Service and First Aid

Emergency Medical Service. Preplanned emergency medical service shall be provided as designated by Contractor and approved by the Millennium Representative.

First Aid Kit. Each Contractor shall provide a first aid kit for his employees which meets minimum OSHA requirements.

Mobile Cranes

Mobile cranes, including portable crane derricks, power shovels, or similar equipment, shall not be operated within ten feet of overhead electrical power lines.

Overhead Work

No overhead work shall be performed when, as a result of that work, the possibility of a falling object striking any person exists. Do not work above any person at any time.

Personal Protective Clothing and Equipment

In certain construction and maintenance operations, personal protective equipment such as safety glasses, chemical goggles, respirators, hard hats, and protective clothing is required. The type of protective equipment to be worn will be determined by the degree of exposure to the potential hazard. There will be very few occasions when hard hats and eye protection will not be required at Millennium job sites. When in doubt of the safety measures to be observed, Contractor shall contact the Millennium Health and Safety Section. This shall not, however, relieve Contractor of his responsibilities to determine appropriate protection.

Eye protection is required when engaging in such operations as the following:

- Drilling, chipping, grinding, wire brushing
- Handling caustics and acids
- Breaking bricks or concrete
- Hammering chisels, drift pins, etc.
- Burning or welding
- Other situations which create a possible eye hazard, e.g., chemical environments.

Photographs

Only Millennium photographers are permitted to carry cameras or take pictures. If progress or finished construction photographs are desired, request for same should be made through the Millennium Representative.

Power Tools

Power and Air-Actuated Tools. Gasoline-powered, electric, or air-actuated tools are not to be used on job sites without prior approval from the SSO. To obtain approval, Contractor must contact the Millennium Representative and/or SSO.

Explosive-Actuated Tools. Explosive-actuated (powder-actuated) fastening tools shall meet the design requirements in "American National Standard Safety Requirements for Explosive-Actuated Fastening Tools" (ANSI A10.3-1970). A tool which does not meet these design standards cannot be used. Power tools shall never be left unattended in a place where they would be available to unauthorized persons. Power tools shall not be used in explosive or flammable atmospheres.

Fall Protection

Appropriate fall protection, such as safety harness and lanyard, must be worn when worker is exposed to falling more than 6 feet. Lanyard or lifeline must be tied off to appropriate structure capable of supporting five times the weight of the person (nominal 1000 pounds).

Appropriate fall protection, such as safety harness and lanyard, must be worn when working above eight feet on straight or extension ladders when the work involves pushing, pulling, or action which may dislodge the person from the ladder.

Safety harnesses are also required on swinging or portable scaffolds when handrails and toeboards are not provided (six feet or more above ground or floor level).

Safety harnesses and lifelines (including extraction devices for top entry spaces) are required on all work performed in confined spaces where an oxygen deficiency or toxic vapors may exist.

All lifelines shall be safety secured to stable and adequate supports.

Safety harnesses and lifelines must be worn on rooftops where there are no guardrails and where the work is within ten feet of the edge.

Salamanders

"Hot work" authorization must be obtained from the Millennium Representative before using a salamander.

Salamanders must be a Factory Mutual or Underwriters Laboratories-approved type.

Position salamanders away from all combustible material to reduce the possibility of uncontrolled fire.

Guard salamanders from traffic to prevent them from being overturned.

Scaffolds

All scaffolds, whether fabricated on site, purchased, or rented, shall conform to the specifications found in ANSI A10.8-1988, Safety Requirements for Scaffolding. Rolling scaffolds shall maintain a three-to-one height-to-base ratio.

The footing or anchorage for a scaffold shall be sound, rigid, and capable of carrying the maximum intended load without settling or displacement.

Unstable objects, such as barrels, boxes, loose bricks, or concrete blocks, shall not be used to support scaffolds or planks. No scaffold shall be erected, moved, dismantled, or altered except under the supervision of competent persons.

Scaffolds and their components shall be capable of supporting at least four times the maximum intended load without failure.

Guardrails and toeboards shall be installed on all open sides and ends of platforms more than 10 feet above the ground or floor.

Scaffolds measuring four to ten feet in height, and having a horizontal dimension of less than 45 inches, shall have standard guardrails installed on all open sides and ends of the platform.

Wire, synthetic, or fiber rope used for suspended scaffolds shall be capable of supporting at least

six times the rated load.

No riveting, welding, burning, or open flame work shall be performed on any staging suspended by means of fiber or synthetic rope.

Tested fiber or approved synthetic ropes shall be used for or near any work involving the use of corrosive substances.

All scaffolds, boatswain's (bosun's) chairs, and other work access platforms shall conform to the requirements set forth in the federal OSHA Regulations for Construction (29 CFR 1926.451) except where the specifications in ANSI A10.8 or state or local regulations are more rigorous.

Smoking and Open Flames

Smoking and the use of open flames are strictly prohibited in areas where flammable liquids, gases, or highly combustible materials are stored, handled, or processed. Obey "No Smoking" signs. Smoke only in designated areas.

Solvents and Paints

Adequate ventilation must be maintained at all times when paints or solvents are used. Personnel should use proper respiratory protection and protective clothing when toxicity of the material requires such protection. Flammable solvents and materials must be used with extreme caution when possible sources of ignition exist. Flammable paints and solvents must be stored in an approved (Factory Mutual or Underwriters Laboratories) flammable liquids storage cabinet when storage is required inside the buildings. If an approved cabinet is not available, paints and solvents must be removed from the building when not in use.

Flammable liquids must be dispensed in safety cans with flash arresters bearing a Factory Mutual or Underwriters Laboratories approval. These containers must be clearly identified as to their contents. Material Safety Data sheets, for materials used by the Contractor, shall be maintained by the Contractor, and a copy provided to the Millennium Representative.

Tarpaulins

When tarpaulins are required for the detection of hot slag, dust, paint drippings, etc., or as security barriers, they shall be flame-resistant and in good condition.

Tools

Hand and power tools shall be kept in safe operating condition. Mushroomed heads on cold chisels, star drills, etc., are unsafe and should not be used. Hammers should have handles which are not cracked, split, or broken.

Nonsparking tools may be necessary in certain areas where flammable materials are handled or where sparks could create an explosion.

Transporting Material and Equipment

Extreme care must be taken while carrying sections of pipe, conduit, and other materials to assure safety to Millennium, Contractor, and client personnel and property. This includes, but is not limited to, flagging and use of two people to carry pipe of lengths greater than 10 feet. Tools, materials, and equipment must not be left unattended in access ways. Tools, material, and equipment shall not be removed from the job site without permission of the Millennium Representative.

Walking and Work Surfaces

Workroom floors shall be clean and, to the extent possible, dry. Drainage mats, platforms, or false floors should be used where wet processes are performed. Floors shall be free from protruding nails, splinters, holes, and loose boards or tiles. Permanent aisles or passageways shall be marked. Floor holes shall be protected by covers that leave no openings of more than one inch wide. Floor openings into which persons can accidentally walk shall be guarded by standard railing and toe boards. Open-sided floors, platforms, and runways higher than four feet shall be guarded by standard railings. Toe boards shall be used wherever people can pass below, or where hazardous equipment or materials are located below.

Warning Signs

All posted warning, safety, and security signs and barriers shall be observed. Additionally, Contractor shall provide warning signs, barriers, barricades, etc. wherever such protection is needed. Where signs and barricades do not provide adequate protection, particularly along a road, flagmen shall be used.

Contractors are expected to brief their employees on these requirements and enforce these rules with their employees. The SSO may stop or suspend work at any time the Contractor fails to comply with the Health and Safety Plan.

Regulatory References

(a) *Standard Operating Safety Guides,* USEPA, November 1984

(b) *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities,* NIOSH 85-115, 1985

(c) Title 29 of the Code of Federal Regulations, Part 1910 (29 CFR 1910), Occupational Safety and Health Standards (USDOL/OSHA), with special attention to Section 120, Hazardous Waste Operations and Emergency Response

(d) Title 29 of the Code of Federal Regulations, Part 1926 (29 CFR 1926), Safety and Health Regulations for Construction (USDOL/OSHA)

(e) Title 8 of the California Code of Regulations, Chapter 4, Subchapter 7, (commencing with Section 3200) General Industry Safety Orders (Cal/OSHA), with special attention to Section 5192, Hazardous Waste Operations and Emergency Response

(f) Title 8 of the California Code of Regulations, Chapter 4, Subchapter 4, (commencing with Section 1500) Construction Safety Orders (Cal/OSHA)

(g) Title 22 of the California Code of Regulations, Division 4, Chapter 30 (commencing with Section 66000) Environmental Health Standards for the Management of Hazardous Waste (California Environmental Protection Agency, Department of Toxic Substances Control)

(h) Title 22 of the California Code of Regulations, Division 2, Chapter 3, (commencing with Section 12000) Safe Drinking Water and Toxic Enforcement Act Regulations (California Health and Welfare Agency)

(I) National Oil and Hazardous Substances Contingency Plan

BEACON
ENVIRONMENTAL
SERVICES, INC.

PROPOSAL FOR SOIL-GAS SAMPLING AND ANALYTICAL SERVICES
Havens Elementary School
Oakland, CA

Background

Beacon Environmental Services, Inc. (BEACON), a small business concern (NAICS 541380), has been invited by Millennium Consulting Associates to provide a Proposal and Cost Estimate for soil-gas services at the Havens Elementary School Site in Oakland, CA. The Proposal and Cost Estimate are based on information provided to BEACON by Millennium Consulting Associates, including the California Department of Toxic Substances Control (DTSC) Interim Guidance Evaluating Human Health Risks from Total Petroleum Hydrocarbons (TPH).

Objective

Collection of passive soil-gas (PSG) samples from the shallow subsurface will provide data on the identity and relative concentrations of targeted volatile and semi-volatiles organic compounds (VOCs and SVOCs) which may be present, without generating waste from soil cuttings. This data will be used to identify source areas of contamination and to delineate the lateral extent of the contaminants.

Survey Design

Millennium Consulting Associates will determine actual sampling locations. A map showing the proposed two-phase sampling plan, with 13 samples collected in the Primary Phase and nine (9) samples collected in the Secondary Phase, is provided in **Figure 1**.

Sampling Procedures

A small, easy-to-carry BESURE Sample Collection Kit™ containing sufficient equipment to collect at least 24 field samples will be provided to Millennium Consulting Associates personnel for collection of soil-gas samples following the protocols of BEACON's passive method. BEACON will ship the Field Kit via overnight delivery within two (2) business days following notice to proceed.

To install a PSG Sampler, an approximately 1" diameter hole is advanced to a one to three foot depth using a hammer drill, slide hammer, or comparable equipment. At Millennium Consulting Associates' option, the hole can be advanced to a greater depth. The PSG Sampler (which contains ***two sets of hydrophobic adsorbent cartridges***) is then installed in the upper portion of the hole, which is sealed with an aluminum foil plug and covered with soil. For locations through asphalt or concrete surfacing, a 1 1/4" to 1 1/2" diameter hole is drilled through the surfacing to the underlying soils. As an option, the hole may then be advanced to a greater depth using a smaller diameter drill bit. The upper 12 inches of the hole is then sleeved with a sanitized metal pipe provided in the Kit. After the Sampler is installed inside the metal pipe, the hole is patched with an aluminum foil plug and a thin concrete patch to protect the sampler. The

samplers are exposed to subsurface gas for approximately seven to 14 days, with the exact length of time appropriate to meet the objectives of the survey.

Each sampler is shipped to the site with a length of wire that is wrapped around the vial and twisted around its shoulder to expedite retrieval from the ground. Following the exposure period, the Samplers are retrieved and shipped to BEACON's laboratory for analysis. It is not necessary to use ice or preservatives during shipment; however, the samplers are sealed and shipped under strict chain-of-custody procedures. A trip blank, which will remain with the other PSG samples during preparation, shipment, and storage, will be included with each batch of field samples returned to BEACON.

BEACON provides in the BESURE Sample Collection Kit™ pre-cleaned metal sleeves when sampling through impermeable surfacing to protect the Samplers. These sleeves prevent any horizontal migration of vapors in the more porous substrate from influencing the soil-gas samplers. The metal sleeves are advanced below the substrate and tapped into the underlying soils so that the Samplers will only be adsorbing compounds in soil gas that is moving vertically through the soils beneath, and not in the vapors that may be migrating laterally through the more porous substrate. Other soil-gas vendors simply create a hole 2 to 3 feet deep, and leave their samplers unprotected to the horizontal migration of vapors in the substrate. This easy-to-perform but important procedure of using the metal sleeves is critical to an accurate and reliable soil gas survey (see **Attachment 1**).

Note: The adsorbent cartridges used by BEACON are hydrophobic, which allows the samplers to be effective even in water-saturated conditions. Extensive empirical evidence, which is supported by a government study, has proven that hydrophobic adsorbents work perfectly well in high moisture conditions and should not be encased by a hydrophobic membrane.[1] The use of surrogates and internal standards by BEACON during the analysis of samples verifies that moisture is not a problem during the analysis of the samples. Therefore, water does not adversely impact adsorption of compounds in the field or the analysis of the samplers at the laboratory. An analytical method that does not use internal standards or surrogates during the analysis of each sample cannot provide proof of performance that the system was functioning properly for each sample.

A two-person team can install approximately 50 to 100 samplers per day depending on the number of sample locations that are covered with asphalt, concrete, or gravel surfacing. For retrieval of the Samplers, one person can retrieve approximately 50 samplers per day and patch the holes through the surfacing. It is anticipated that one day will be required to install the samplers and one day will be required for retrieval.

Figure 1 — Installation of Samplers with BESURE Sample Collection Kit™

Sample Custody Procedures

A chain-of-custody accompanies the field samples at all times from the time the samples are collected until final analysis. Field kits are shipped with tug-tight custody seals to ensure that samplers are not tampered with during transport. Once samples are received at BEACON's laboratory, the sample custodian receives the samples and logs the samples into the laboratory's Sample Receipt Log per BEACON's *Quality Assurance Program Plan for the Analysis of Soil-Gas Samples*.

BEACON's laboratory is maintained in a safe and secure manner at all times. The facility is locked when not occupied and is monitored for fire and unauthorized access. BEACON personnel escort all visitors at all times while inside the facility.

Analytical Procedures

Soil gas samples will be analyzed by BEACON using thermal desorption-gas chromatography/mass spectrometry (TC-GC/MS) instrumentation, following EPA Methods 8260 and 8270 procedures. Samples will be analyzed for those compounds on the attached list, including TPH and carbon ranges. Analytical results will be based at a minimum on a one-point calibration; however, all but the heaviest SVOCs will be based on an ***initial five-point calibration***. In addition, a tune is performed daily and a method blank is run following the daily calibration. ***Internal standards and surrogates*** are included with each sample analysis. The laboratory's reported quantitation level (RQL) for each of the targeted compounds is 25 nanograms (ng) and the RQL for TPH is 1,000 ng; however, the actual analyte method detection limits (MDLs) are much lower. Other specific analytes may be targeted, if requested prior to analysis. Two sets of adsorbent cartridges are included in each Sampler for duplicate or confirmatory analysis. BEACON will analyze ***field sample duplicates*** from three (3) selected sample locations identified on the chain-of-custody by Millennium Consulting Associates.

Notes: The low point on BEACON's initial calibration curve is 5 nanograms and the reporting limit for each of the compounds is 25 nanograms to assure that the low concentrations reported are accurate and defensible... as dictated by the EPA Methods. When high concentrations of contaminants are identified, the sample can be split or diluted to maintain an accurate quantification.

Lesser passive soil gas methods are known to base their results on an external calibration method and calibrate at quantities that are greater than an order of magnitude above their reporting limits (*i.e.*, claim a reporting limit of 25 ng but have 250 ng or higher as the low-point of the calibration). These methods also do not include internal standards or surrogates with each analysis to provide proof of performance that the analytical system was functioning properly for each and every analysis and to provide consistent reference points for comparison of measured quantities.

Analyses of the samples will be performed at BEACON's laboratory using state-of-the-art instruments that include those listed below. The Markes thermal desorption instruments outperform older thermal desorption equipment used by other vendors, which cannot target as broad a range of compounds with as much sensitivity or accuracy.

- Agilent 6890-5973 Gas Chromatograph/Mass Spectrometer,
- Markes Unity thermal desorber,
- Markes UltrA autosampler, and
- Markes Mass Flow Controller Module.

Report

Preliminary laboratory data can be provided to Millennium Consulting Associates typically within five business days following the laboratory's receipt of samples. Within 10 business days of the laboratory's receipt of samples, a final report will be provided that will contain:

project objectives,
the investigation plan,
the QA/QC program and findings,
laboratory data (in nanograms),
a base map,
up to three color isopleth maps,
field procedures,
laboratory procedures,
Field Deployment Reports, and
Chain-of-Custody documentation.

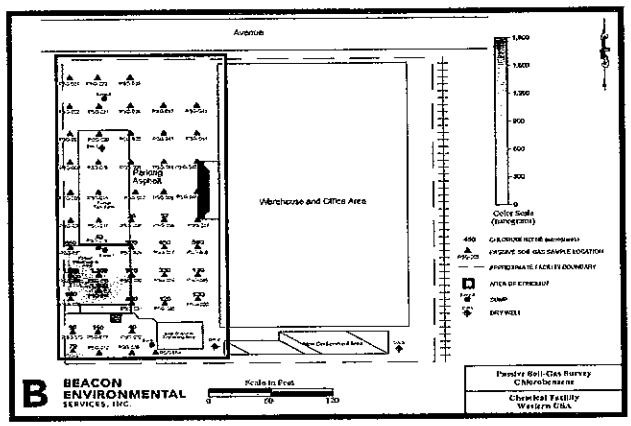


Figure 2 – Example Color Isopleth Map

BEACON requests that Millennium Consulting Associates provide electronically a CAD drawing of the site. BEACON can also incorporate GPS or GIS informational data into the maps. If requested, BEACON will provide the color isopleth maps as layers for use with CAD software or provide data files of the contours for use with GIS software. BEACON will provide post survey support to assist in interpreting the data.

Key Personnel and Relevant Experience

The principals of BEACON have many years of experience in characterizing sites for organic contaminants using innovative soil-gas sampling technologies. BEACON was founded in 1999 by Mr. Harry O'Neill, who is the company president and has managed and reviewed data from 1,000s of soil gas surveys. Prior to forming BEACON, Mr. O'Neill managed the soil-gas sampling program for Quadrel Services, Inc., an innovative company that lead the acceptance of passive soil-gas sampling at the national and international level. Mr. Steve Thornley is the company's Laboratory Director, who is responsible for sample analyses and ensures that all project samples are analyzed and reported following the highest level of quality assurance procedures in the industry. Mr. Thornley has analyzed and reported data from more than 50,000 soil-gas samples and follows established analytical procedures that allow BEACON to provide accurate, reliable, and defensible data. Dr. Joe Odencrantz is the company's Technical Director and Western Region Manager, who is responsible for ensuring projects are executed under the

direction of a licensed, professional civil & environmental engineer. Dr. Odencrantz has written numerous applied research articles on applications of BEACON's technology which are published in conference proceedings and peer-reviewed journals.

Following are a few references from clients who have applied BEACON's passive soil-gas services.

Multiple Superfund Sites
EPA Region VI
Mr. Vince Malott
Dallas, TX
Phone: 214-665-8313
Number of samples: 900
Completion Date: October 2007 to September 2009

Passive soil gas samples were collected from Superfund sites and analyzed for petroleum and chlorinated compounds to identify source areas and delineate the lateral extent of the contamination. Samplers were installed in one-foot deep holes and were exposed for seven days. Survey results clearly defined areas of releases and contaminant migration pathways.

Hanford Reservation, WA
Vista Engineering Technologies
Dr. Wes Bratton
Kennewick, WA
Phone: 509-737-1377
Number of samples: 400+
Completion date: August 2000 to August 2006

Passive soil-gas surveys have been performed at the Hanford Reservation to delineate the extent of chlorinated and petroleum-related contaminants, primarily carbon tetrachloride (CTC). BEACON identified carbon tetrachloride contamination in soils at a 60-foot depth, with the passive soil gas samplers installed to a four-inch depth and the samplers remaining in the field for only three days.

Edwards AFB, CA
Earth Tech, Inc.
Mr. Robert Kohlhardt
Sacramento, CA
Phone: 916-929-4143
Number of samples: 1,000+
Completion date: January 2001 to March 2004

BEACON has analyzed more than 1,000 passive soil-gas samples collected at various sites on Edwards Air Force Base. Sample delivery groups ranged from 82 to 416 samples to target a full range of volatile organic compounds (VOCs) and lighter semivolatile

organic compounds (SVOCs). The objectives of the surveys were to identify source areas and migration pathways of targeted contaminants, with chlorinated solvents being the primary compounds of concern.

Oak Ridge National Laboratory, TN

Formerly with NFT Incorporated
Mr. Steve Short
Oak Ridge, TN 37830
Phone: 865-482-1056
Number of samples scoped: 200
Completion date: July 2004

Passive soil-gas samples were analyzed to delineate the lateral extent of chlorinated contaminants. Data deliverables require CLP data packages and project specific electronic data deliverables (EDDs) uploaded to the client's site. The client visited BEACON's laboratory and other soil-gas vendors prior to selecting BEACON.

1 The Marines Project: A Laboratory Study of Diffusive Sampling/Thermal Desorption/Mass Spectrometry Techniques for Monitoring Personal Exposure to Toxic Industrial Chemicals, April 2002, Warren Hendricks, Methods Developments Team, Industrial Hygiene Chemistry Division, OSHA Salt Lake Technical Center, Salt Lake City, UT 84115-1802.

Beacon Project No. 2294
Target Compound List
Analysis by TD-GC/MS via EPA Method 8260/8270

TPH_g

TPH_{diesel}

$TPH_{mo/residual\ range}$

C5-C8 Aliphatics

C9-C18 Aliphatics

C19+ Aliphatics

C6 – C8 Aromatics
- Benzene
- Toluene
- Ethylbenzene
- p&m-Xylenes
- Styrene
- o-Xylene

C9-C16 Aromatics
- Isopropylbenzene
- 1,3,5-Trimethylbenzene
- 1,2,4-Trimethylbenzene
- Naphthalene
- 2-Methylnaphthalene
- Acenaphthylene
- Acenaphthene
- Fluorene
- Phenanthrene
- Anthracene
- Fluoranthene
- Pyrene

C17+ Aromatics

Methyl-t-butyl ether (MTBE)

Hexane

Benzene

Toluene

Ethylbenzene

p & m-Xylene

o-Xylene

Naphthalene

2-Methylnaphthalene

Acenaphthylene

Acenaphthene

Fluorene

Phenanthrene

Anthracene

Fluoranthene

Pyrene

Note: Additional compounds may be added to meet project specific requirements. The standardized reporting quantitation level (RQL) for each compound is 25 nanograms (ng) and the RQL for each Aliphatics range is 1,000 ng; however, the actual analyte method detection limits (MDLs) are much lower.

323 Williams Street, Bel Air, MD 21014 phone: 410-838-8780 fax: 410-838-8740 www.beacon-usa.com

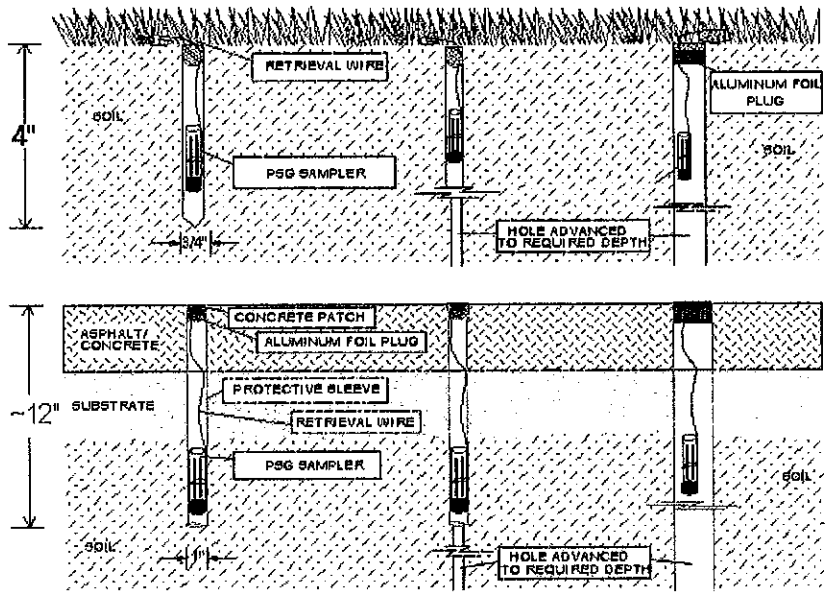
Attachment 1

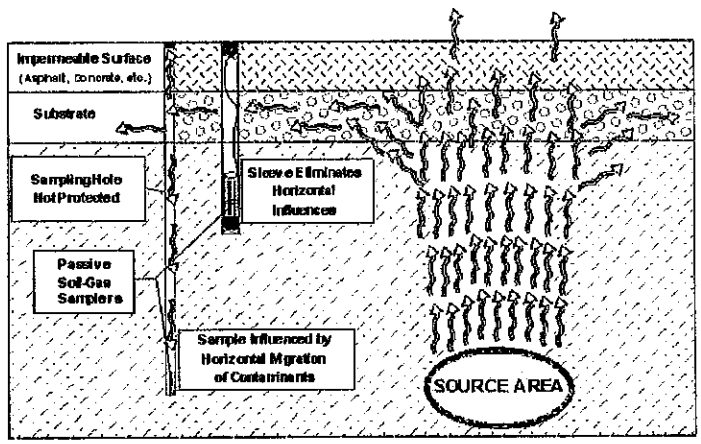
EFFECTIVE PASSIVE SOIL-GAS SAMPLING PROCEDURES

PSG Samplers need only be **installed to a 4-inch depth** because of the sensitivity of the method. However, the method is extremely versatile and installation procedures can be adapted to meet project objectives or client requirements.

When a PSG Sampler is installed in the ground, the top of the hole is completely sealed by collapsing the soils above the Sampler or patching the drilled hole through the surfacing. Other vendors use a permeable cork to plug their installation hole, which allows subsurface gases to escape before the adsorbent captures the organic compounds (reducing sensitivity) *and* permits vapors from above the surface, as well as surface water, to enter the hole (false positives). BEACON's PSG Samplers are not susceptible to these influences because they are effectively sealed in the subsurface.

As mentioned above, BEACON's Samplers are versatile and for some projects a higher sensitivity is required because contaminants are present at low concentrations or soils are fairly impermeable. In these situations, the sampling hole is advanced to a greater depth using a hammer drill, slide hammer, or direct push equipment. *Because the soil vapors that enter the hole will migrate upwards in this newly created preferential pathway, it is not necessary to push the Sampler to the bottom of the hole.* Therefore, the Sampler can still be installed in the upper 4-inches of the hole





Samplers installed through an impermeable surface are sleeved in pre-cleaned protective metal sleeves (provided by BEACON). These sleeves prevent any horizontal migration of vapors in the more porous substrate from influencing the soil-gas Samplers. As the accompanying diagram shows, the metal sleeves are advanced below the substrate and tapped into the underlying soils so that the Samplers will only be adsorbing compounds in soil gas that are moving vertically through the soils beneath, and not in the vapors that may be migrating laterally through the more porous substrate. Other soil-gas vendors simply create a hole 2 to 3 feet deep, and leave their samplers unprotected to the horizontal migration of vapors in the substrate. This easy-to-perform but important procedure is yet another reason why BEACON's method has achieved the reputation as being the most accurate and reliable soil gas technology available.