FIELD WORKPLAN

Nine Par Landfill – Preliminary Site Investigation
Zero Waste Energy Development Company
San Jose, California

FIELD WORKPLAN

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1.0 INTRODUCTION

The workplan presented herein has been prepared by Golder Associates Inc. It is a modification of the May 24, 2010 workplan prepared by Worley Parsons for the Zero Waste Energy Development Company. The revisions incorporated in this version of the workplan are intended to address comments received from the Regional Water Quality Control Board, San Francisco Bay Region, and CalRecycle regarding the May 24, 2010 version of the workplan.

Zero Waste Energy Development Company, Inc. (ZWED) is proposing a 150,000-ton per year dry fermentation Anaerobic Digestion (AD) Facility to process and recover energy from the organic portion of municipal solid waste generated by the City of San Jose (City) and surrounding communities. The project is part of an integrated waste management system and compliments the existing and currently proposed waste processing facilities on Los Esteros Road in San Jose, CA. The proposed project will be developed in three phases, with each phase capable of processing approximately 50,000 tons per year of organic materials.

The preferred site is a portion of the former Nine Par Landfill (hereafter the Nine Par Site) in San Jose, California (Figure 1) due to its proximity to Zanker Road Resource Recovery Operation and Landfill (ZRRROL) and the Zanker Material Processing Facility (ZMPF), and the feasibility to promptly obtain the necessary permits and approvals to develop the site and construct and operate the proposed AD Facility.

The City has designated this area for possible redevelopment. The City of San Jose and the City of Santa Clara will execute a land lease with ZWED, which will be responsible for developing, constructing, and operating the proposed AD Facility. Each phase in the development of the AD Facility will include:

- A receiving building (approximately 10,000 square feet)
- 16 compost tunnels (approximately 39,000 square feet)
- 16 digester tunnels (approximately 28,000 square feet)
- Biofilters, storage tanks, and conveyor facilities

The AD Facility will also include compost maturation and finishing areas, underground utilities, aggregate base access roads, and pavement areas.

This workplan describes the technical approach to be used to determine approximate waste area boundaries of the Nine Par Landfill and to characterize the chemical nature of surficial gas emissions, soil, groundwater, landfill gas (LFG), and leachate at the Nine Par Site. The scope of work proposed in this plan is designed to address the following requirements:

- The potential for vapor intrusion into new buildings and work areas must be determined so that planned construction may be designed to mitigate health and safety hazards.

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- The vertical and lateral extent of waste materials at the Nine Par Landfill needs to be determined for foundation, pavement, and structural design purposes and to confirm general waste area characteristics. Collection of this information has already been initiated through the SCS Engineers investigations performed in 2007 (documented in reports dated March and November 2007) and through the ENGEO Incorporated (ENGEO) investigation completed in March 2010. The ENGEO investigation included drilling two exploratory borings, excavating two test pits, and advancing eight cone penetration test (CPT) soundings at various locations within the landfill footprint. Results of the ENGEO field investigation are provided in their report entitled: "Geotechnical Report – Zero Waste Energy Anaerobic Digester Facility" (March 19, 2010).
- Baseline conditions for environmental due diligence need to be characterized prior to establishing responsibility for the property and initiating planned operations to ensure that liabilities for any future environmental issues of concern are determined fairly.
- The physical and chemical nature of waste (fill) materials, soil, landfill gas, and groundwater that will be disturbed/encountered during the planned foundation and earth work should be characterized to ensure that contractors are informed and appropriate safety and management practices are implemented, as required.

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2.0 BACKGROUND

The material presented in this background section is a combination of material presented in Sections 2 and 3 of the May 24, 2010 workplan prepared by Worley Parsons.

2.1 Location

The Nine Par Site that ZWED intends to develop is located at 2100 Los Esteros Road in San Jose, California, and is adjacent to the Zanker Road Resource Recovery Operation and Landfill (ZRRROL) and the Zanker Material Processing Facility (ZMPF). The site location is shown on Figure 1. The property, which is owned by the City, is identified as APN 015-38-005 in the Santa Clara County Assessor's Parcel Map. The Nine Par Site is part of the buffer lands of the San Jose/Santa Clara Water Pollution Control Plant (WPCP). The property is bounded by tidal marshlands and the active Zanker Road Class III Landfill to the north, WPCP sludge drying beds to the east/northeast, Los Esteros Road and the WPCP facility to the south, and Artesian Slough and the inactive WPCP recycle water filling station to the west. The Site is currently vacant and includes a portion of the former Nine Par Landfill . The adjacent Zanker Road Class III Landfill property also occupies and overlies a portion of the former Nine Par Company disposal area.

2.2 Site History

The Nine Par Landfill was used for solid waste disposal during the period from approximately 1938 until 1977. On-site burning of waste materials occurred at Nine Par Landfill until about 1953. After 1953, land disposal was via trench cut and fill methods. Trenches likely extended to the depth of underlying groundwater, near sea level, as evidenced by aerial photos (SCS Engineers, March 2007). Waste quantity and type are poorly documented, however, disposed materials reportedly consisted of a mix of municipal solid waste (MSW), inert debris (some possibly containing asbestos), and possibly septic pumpings.

The Nine Par Landfill was never formally closed, and there is no engineered cap in place. Random fill soils were placed as cover material in the early 1980s and additional fill/cover has been placed since that time. The cover soils were placed and compacted without uniform quality control. Based on the most recent topographic map (2004), the surface elevation ranges from approximately 0 to 34 feet MSL. Cover soil thickness, as determined from the 10 exploratory borings, 18 test pits, and 7 cone penetration test locations, ranges from approximately 4 to more than 20 feet (SCS Engineers, March 2007; ENGEO, 2010).

From the late 1970s until the late 1980s, and after municipal landfilling activities had ceased, the Nine Par Site was used for disposal of grit from aerator tanks and inert biosolids mixed with soil that were

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generated at the adjacent WPCP. Filling took place in low spots and slopes on and around the then-inactive landfill. Records or surveys of these disposal activities were not kept by the WPCP.

In November 2003, approximately 1,200 cubic yards of soil with naturally occurring asbestos (NOA) were placed on the Nine Par Site in what is known as the NOA stockpile area (refer to Figure 2). These wastes were placed, covered, and surveyed under U.S. EPA oversight. The construction design plan for the AD Facility and associated areas (e.g., roadways, parking lots, etc.) completely avoids areas where naturally occurring asbestos (NOA) was disposed of in November 2003.

Since 2005, approximately 250,000 cubic yards of clean soils have been stockpiled on the top deck area of the Nine Par Site. These soils were excavated from San Jose City Civic Center and San Jose Airport improvement projects. Stockpile locations have been mapped by the City. We understand that materials delivered to the Nine Par Site from these projects were part of a City Environmental Services Department Soil Management Program. The soils were screened for contaminants per San Francisco Regional Water Quality Control Board (RWQCB) risk-based guidelines.

Asbestos-containing building materials (ACBM) and naturally occurring asbestos may be present in older fill materials disposed at the site. A 1979 EPA Potential Hazardous Waste Site Log (Section V. Waste Related Information) for Nine Par Landfill indicates that asbestos may be present at the facility; however, the location(s) and type of material that lead the EPA inspector to identify materials as asbestos are unknown. In addition, the area(s) where asbestos materials were suspected to be present were subsequently covered with clean soil. In the event that asbestos-containing materials are encountered during site investigation activities described in this workplan, appropriate avoidance measures will be taken. Before construction activities begin, an Asbestos Dust Mitigation Plan will be prepared to ensure that immediate measures may be taken to avoid or safely handle these materials if they are encountered.

2.3 Previous Site Characterization

A field investigation was previously undertaken by SCS Engineers in 2007 to provide a basis for redevelopment planning, design, and cost estimating. Specific objectives were to confirm:

- The extent of waste placement immediately north of Los Esteros Road.
- Depths and types of existing cover over filled areas.
- Refuse depths and saturation conditions at select locations in the refuse prism.
- Physical and engineering properties of on-site soil stockpiles.
- Physical properties of Bay Mud soils underlying the refuse fill.
- Landfill gas generation potential at the Nine Par Site. Preliminary screening of combustible gas levels in on-site refuse fill was conducted.
- Conduct research on historical landfill operations and site conditions.

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The results of the SCS Engineers investigations are documented in reports entitled "*Preliminary Feasibility Report: Land Use Study for the City of San Jose – Nine Par Landfill Site"* (March 2007), and "*Field Investigation and Site Development Feasibility Summary Report: City of San Jose – Nine Par Landfill Site*" (September 2007).

In March 2010, ENGEO completed a geotechnical investigation for the proposed development at the Nine Par Site. Their report, entitled "*Geotechnical Report, Zero Waste Energy Anaerobic Digestion Facility, San Jose, California*", included a summary of the field exploration and laboratory testing programs, as well as findings and recommendations related to geology and seismicity, subsurface conditions, groundwater occurrence, slope stability, and liquefaction.

The SCS and ENGEO findings indicate that the non-engineered fill cover at Nine Par Landfill is underlain by mixed municipal waste fill including a mixture of highly decomposed organic materials, glass, wood, metal, plastic, and construction and miscellaneous debris. The mixed waste layer varies in thickness from 5 to 20 feet, and waste within the prism below an elevation of 0 feet, MSL is saturated. The waste is underlain by stiff clays or discontinuous sand lenses within the clay. The clays have good shear strength and exhibit hydraulic conductivity on the order of $3x10^{-8}$ centimeters per second (cm/sec). Moisture content of the deep soils underlying the waste are reported to range from 22.8 to 25.1 percent; dry densities reportedly range from 102.4 to 107.4 pounds per cubic foot (SCS Engineers, 2007). Consolidation tests suggest that surface settlements can be expected from any planned additional soil placement or surcharging (SCS Engineers, 2007).

Drill cuttings and mud from ENGEO's exploratory borings through waste were contained and analyzed for a variety of chemical constituents to determine appropriate disposal options. Very low levels of total petroleum hydrocarbons (as diesel and as motor oil) and volatile organic compounds (primarily aromatic compounds) were identified, and nine CAM-17 metals were detected. The samples did not contain detectable levels of chlorinated pesticides (by EPA Method 8081), polychlorinated biphenyls (PCBs [by EPA Method 8082]), or semivolatile organic compounds (by EPA Method 8270).

2.4 Geologic and Hydrogeologic Conditions

A detailed hydrogeologic investigation specific to the Nine Par Site has not been performed; however, hydrogeologic conditions for the adjacent Zanker Material Processing Facility, Zanker Road Landfill, and WPCP facilities are well documented. The following information was obtained from documents specific to those properties.

The Nine Par Site lies within the northern part of the Santa Clara Valley groundwater basin, which contains over 1,000 feet of unconsolidated to semi-consolidated clays, silts, sands, and gravel. Regional

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groundwater studies indicate that the primary freshwater aquifers of the northern Santa Clara Valley are restricted to buried channel deposits within the Pleistocene alluvium. The buried channel deposits are regionally grouped into upper and lower aquifers. Near the bay, these aquifers are separated from each other by the Pleistocene Bay Mud, which forms an extensive clay aquitard. Regional groundwater flow within the aquifer system is toward the San Francisco Bay and is recharged by runoff from the Santa Cruz Mountains and the Diablo Range (Helley et al., 1979).

Investigations completed at the Zanker Material Processing Facility (EMCON, 1974 and 1989), the Zanker Road Landfill (Cooper-Clark and Associates, 1975; EMCON 1992), and on a regional scale (Iwamura, 1980; Poland and Ireland, 1985), indicate that sediments beneath the Nine Par Site contain an "upper" and a "lower" aquifer. Near the Nine Par Site, the upper aquifer is encountered at approximately -45 feet, MSL, and is overlain by the Holocene Bay Mud and Holocene fine-grained alluvium. The Bay Mud was deposited in an estuarine environment and the fine-grained alluvium was deposited in inter-fluvial basins and fresh-water marshes. The upper aquifer is underlain by a laterally extensive clay aquitard that extends to -200 feet MSL. The lower aquifer occurs below this aquitard and forms an extensive drinking water aquifer in the Santa Clara Valley (Helley et al., 1979). Flowing artesian conditions from this aquifer have been reported in the area.

In addition to the upper and lower regional aquifers, shallow water-bearing sand zones have been identified within the Holocene Bay Mud and Holocene fine-grained alluvium, which interfinger beneath the site. These shallow water-bearing sand zones are separated from the upper aquifer by a regionally extensive Bay Mud aquitard. The quality of groundwater in the shallow water-bearing sands is generally poor because of extensive saltwater intrusion (Iwamura, 1980). Groundwater is recharged mainly from local runoff and percolation. The sands within the shallow water-bearing zone have been characterized in detail beneath the Zanker Material Processing Facility and the Zanker Road Landfill because although groundwater occurs in both the sands and surrounding clays, most groundwater movement occurs in the sands and potential impacts to groundwater therefore, would initially be detected in these sands.

Where encountered in exploratory borings beneath the Nine Par Site (Cooper-Clark and Associates, 1975; SCS Engineers, 2007, and ENGEO 2010) the shallow water-bearing sands range in thickness from less than 5 to approximately 15 feet. This sand zone occurs within the -5 to -20 feet MSL interval. The sands are separated from the upper aquifer by approximately 20 to 30 feet of low-permeability clay (generally classified as CL in the Unified Soil Classification System). These sands are described as silty sand and clayey sand (classified as SM and SC in the Unified Soil Classification System).

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3.0 SCOPE OF WORK

The scope of work described in this workplan was designed using existing information on the Nine Par Landfill Site and information obtained during the recently completed ENGEO geotechnical investigation. The workplan describes the procedures for surficial geophysical surveys and gas-emission monitoring, and for subsurface investigations to characterize physical and chemical conditions within the waste pile and the lithologic and chemical conditions of groundwater and soil-gas around the perimeter of the Nine Par Landfill. The work will be performed in a phased manner so that early data obtained during the surficial work can be used to guide the subsequent subsurface work and maximize the efficiency of the workplan.

The geophysical survey will be performed to determine the lateral boundary of existing waste at Nine Par Landfill and to provide general characterization of waste type distribution. This survey will supplement existing information obtained during a previous geophysical survey and will be used to locate planned exploratory borings. Fugitive landfill gas and odor emission assessments will be conducted across the landfill footprint to provide baseline information on the potential release of harmful gases at the landfill surface and odor emissions at the site prior to planned development.

Subsurface investigations will be performed to assess conditions within the landfill and around the perimeter of the landfill. Three leachate wells will be installed to provide information on the nature of in-place cover soils and waste and allow access for leachate and landfill gas sampling for compositional and chemical characterization. Bar-hole punch sampling will be conducted at 25 to 30 locations in the landfill cover soils to assess methane accumulation and potential gas migration. The results of the bar-hole punch investigation will be used to select 5 to 10 locations for direct push sampling of the landfill gas within the unsaturated waste. These direct-push landfill gas samples will be laboratory-analyzed for major and trace-gas constituents. The perimeter subsurface investigation will be conducted after the limits of waste have been delineated. Direct push technology will also be used for unsaturated-zone soil-gas monitoring, lithologic characterization of the subgrade, and groundwater sampling. The perimeter soil gas assessment will be performed to evaluate lateral landfill gas migration and identify potential landfill gas migration pathways from the landfill to adjacent off-site structures and other receptors; this will help to determine if active landfill gas control is necessary. Soil, gas, and groundwater samples will be collected and analyzed for the key chemical constituents (shown on Table 1).

This scope of work does not address the characterization of the known area at the facility that contains asbestos (see Figure 2). It is understood through review of existing site documents that locations where naturally occurring asbestos was disposed at the Nine Par Site are well defined. Because of the minimal amount of invasive work to be performed as part of this workplan, significant encounters with NOA or ACBM are not anticipated. However, in the event that asbestos-containing materials (either NOA or ACBM) are encountered during site investigation activities, appropriate measures will be taken and an

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Asbestos Dust Mitigation Plan will be implemented to ensure that immediate measures are taken to avoid or safely handle these materials if they are encountered.

Prior to commencement of field work, a health and safety plan will be prepared, and Underground Service Alert (USA) will be notified of planned drilling locations. An underground utility survey will be performed as an added precaution against encountering underground utilities during investigation activities. All exploratory borings will be located outside of the limits of the NOA asbestos stockpile location.

3.1 Task 1 - Background Data Review

Historical waste disposal documents and investigations conducted at the Site will be compiled and reviewed to better understand the nature and extent of waste placement and possible contamination. In addition, records, document surveys, and inspections performed at facility waste areas will be reviewed to evaluate the possibility that asbestos-containing materials may be present in areas outside of the designated NOA stockpile area.

3.2 Task 2 - Geophysical Survey

Different materials below ground have different physical properties. The properties of electrical resistivity and magnetism are commonly looked at in geophysical surveys at landfills. Clay soils conduct electricity but concrete, Styrofoam, and plastics do not. Magnetic surveys can identify changes in the earth's magnetic field caused by buried metal. In refuse, the metal is from discarded household items such as appliances, containers, and auto parts. Metal also is found in construction debris containing wire mesh, rebar, nails, or metal ties. The magnetic field in a site free of metal is generally uniform and featureless. The magnetic field in a site with buried metal has numerous peaks and troughs that are called anomalies. For the Nine Par Landfill we propose using a combination of magnetic and electrical resistivity to determine the lateral extent of the fill. The geophysical surveying will focus on identifying the western waste boundary along Artesian Slough and the northwestern boundary between Artesian Slough and the Zanker Road Landfill. This information will be used for final selection of direct-push exploratory boring locations outside of the landfill footprint. The southern margin along Los Esteros Road was geophysically characterized by SCS Engineers in 2007, and only areas proposed for direct-push subsurface characterization will be reevaluated to confirm the SCS findings.

3.3 Task 3 - Fugitive Landfill Gas Emissions Assessment

Landfill gas emissions from the Site will be assessed to help determine whether active controls would be required prior to site development. We recommend monitoring the fugitive emissions from the existing cover layer using a surface sweep to determine whether there are areas of concern for methane migration, and a bar-hole punch investigation to characterize methane accumulation in the upper portions of the cover soils in identified areas of concern. The focus of the assessment is to determine the location and magnitude of any surface emissions escaping from the cover layer, specifically in areas where

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building improvements are planned. Results from these two steps will help in determining locations of subsurface LFG monitoring near the perimeter of the landfill and within the unsaturated portion of the landfill, as discussed in Sections 3.5 and 3.6.

Surface LFG emissions will be measured using a Flame Ionization Detector (FID) and a methane detector (GEM 2000) during a period when wind is not blowing at a considerable rate, or under inversion conditions. Surface gas emissions will be continuously monitored while walking a 100-foot grid across the entire landfill (the grid pattern is shown on Figure 3). Gas emission readings will be taken at 5 to 10 centimeters above the ground surface. If methane concentrations in excess of 500 parts per million are identified, additional surface inspections and monitoring will be conducted near that area with the objective of identifying the specific source of the methane release. Those areas will be marked for the follow-up bar-hole punch investigation.

After completing the surface sweep, approximately 25 to 30 bar-hole punch samples will be evaluated for methane occurrence. The bar holes will be punched at areas of concern identified in the surface sweep and in areas where building improvements are planned. If areas of concern are not identified during the surface sweep, bar-hole punch locations will be distributed so there are at least two holes in each 500 x 500 foot section of the site. When possible, bar hole locations will be targeted in areas with relatively thin cover soil where gas migration is most likely. The results of this assessment will be discussed in the final report and will be plotted on a map to characterize the lateral extent of surface emissions and to provide baseline conditions.

3.4 Task 4 - Odor Assessment

The purpose of the odor assessment is to determine baseline odor (hydrogen sulfide [H_2S]) prior to development. Odor measurements will be obtained using a hydrogen sulfide meter while walking along the surface sweep grid (100 foot spacings) to be utilized for the LFG emission assessment. In addition, upwind and downwind odor measurements will be recorded to determine baseline odor values. The upwind and downwind measurement points will be determined using wind rose diagrams from the nearest weather station. A total of five upwind and five downwind samples will be collected and analyzed (in the field) with the hydrogen sulfide meter. The results of the odor assessment will be plotted on a map and discussed in the final report. No laboratory analyses will be required for odor assessment.

3.5 Task 5 – Perimeter Soil Gas Sampling and Analysis

Landfill gas migration is of significant concern at older landfills without active LFG collection. The objective of this task is to identify potential gas migration pathways from the landfill to adjacent off-site structures and other receptors in order to determine if active gas control will be needed. Soil-gas samples will be collected using a direct-push technology (DPT) rig at as many as six boring locations outside of the perimeter of the waste footprint at Nine Par Landfill. The DPT gas sampling uses steel rods with

hydraulic pressure to penetrate the ground to a specified depth. Proposed boring locations are shown on Figure 4. These locations will be confirmed following a review of existing information pertaining to waste disposal and on results of the geophysical surveys**.** Following collection of the soil-gas samples, the borings will be advanced for the collection of soil and groundwater samples.

Once groundwater is reached, which is anticipated to be at a depth of less than 5 feet below ground surface, the tip of the rod is broken off and the rods are pulled back to allow a gas chamber to form in the soil, and the gas is sampled via a small diameter tube that runs down the center of the drive rod. Gas analysis will be conducted using both field screening and laboratory analysis. Field measurements will be made with a GEM 2000 LFG detection instrument and a FID. Laboratory analysis will be performed on gas samples collected in Summa canisters provided by the project laboratory. One soil-gas sample will be collected from each location and analyzed for trace volatile gases (referred to as toxic organic compounds, TOCs) by EPA Method TO-15 (Table 1).

3.6 Task 6 – Landfill Gas Sampling and Analysis

Five to 10 exploratory borings will be advanced with DPT equipment through the cover into unsaturated waste. Locations will be selected based on the results of the surface sweep and bar-hole punch investigation, and will target areas when practical where cover thickness has already been determined during previous investigations. The boreholes will be screened for landfill- and trace-gas concentrations with a photoionization detector (PID) and a GEM 2000 gas detector fitted with a hydrogen sulfide module. Once refuse is reached, gas samples will be collected if methane concentrations greater than 3 percent are identified. The samples will be collected in tedlar bags or Summa canisters and will be submitted to a laboratory for fixed gas and volatile organic compound analyses (see Table 1). Each borehole will grouted to the surface with a bentonite slurry; the drive rods will be used as a tremie pipe for grouting.

3.7 Task 7 – Waste Perimeter Assessment

This task will involve advancing the six exploratory borings at the approximate locations shown on Figure 4 (following collection of soil gas samples) to a depth of approximately 25 to 30 feet below ground surface (about -25 feet MSL) for the collection of soil and groundwater samples. Stabilized groundwater is anticipated at approximately zero feet MSL. Borings will be advanced into the low-permeability clay using dual-tube DPT and the soils will be continuously cored for lithologic description and sample collection. The low-permeability clay has been identified in all previous subsurface investigations performed at the Nine Par Site. This clay is laterally continuous beneath the site and occurs from approximately -20 to -38 feet MSL. The clay is overlain by laterally discontinuous water-bearing sand layers where landfill releases would most likely be identified.

A field geologist will log the soil materials according to Unified Soil Classification System methods under the supervision of a California Professional Geologist. Soil samples at minimum 2-foot intervals will be

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field-assessed for VOCs and petroleum hydrocarbons by head-space analysis using a photoionization detector (PID) equipped with a 10.6 electron volt bulb and a flame ionization detector (FID). A GEM 2000 will also be used for methane screening of soil cuttings obtained from the shallow unsaturated zone.

It is anticipated that coarser grain materials will be encountered in a single hydrostratigraphic unit at elevations between approximately -5 to -20 feet MSL. If this single layer is encountered, a groundwater sample will be collected from each boring by installing a temporary polyvinyl chloride (PVC) casing in the borehole, withdrawing the dual-tube core barrels to expose the granular layer, and sampling the water that accumulates in the PVC casing with a new disposable bailer or a peristaltic pump. If these coarser-grained soil lenses are not encountered, a temporary PVC casing will be placed in the borehole and left for several hours in an attempt to collect a groundwater sample from the depth interval of the shallow water-bearing zone. If multiple, higher-permeability soil layers that are separated by more than 2 feet of clay are encountered, additional borings will be necessary to collect depth-discrete groundwater samples from these layers. If this situation occurs, the lowest coarse-grained interval will be sampled in the initial borehole by installing the PVC pipe as described above. The dual-tube barrel will then be pulled back to expose only the lowest granular layer. Shallower granular layers will be sampled in an adjacent borehole by targeting the shallowest layer first and working downward until all discrete granular layers have been sampled.

Once sampling is completed, the borings will be abandoned by grouting via a tremie pipe in accordance with local regulations. All investigative derived waste will be tested for proper disposal.

Groundwater samples will be analyzed for parameters shown in Table 1. If insufficient volume is available for all analyses, samples will be analyzed in the order listed on Table 1. The methods, analysis, and results will be summarized in the final monitoring report.

3.8 Task 8 – Leachate Monitor Well Installation

Three 8-inch diameter borings will be drilled within the landfill footprint at Nine Par Landfill using a hollow stem auger drilling rig. The approximate locations of these borings are shown on Figure 4. These borings will be completed as leachate monitoring wells. All investigative derived waste will be tested for proper disposal.

During drilling, drive samples will be collected and field personnel will log the borings and will collect soil and refuse samples for visual examination, classification, and laboratory testing. Observations will be made regarding the thickness and types of existing cover soils, and the characteristics and depth to the base of the underlying refuse. Samples will be collected by driving an approximately 3-inch outer diameter (OD) by 18-inch long modified California sampler containing 2.5 inch diameter brass or stainless

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steel sample sleeves in advance of the augers. Selected sleeves will be submitted to the analytical laboratory for analysis of chemical constituents shown on Table 1.

Cover soil and refuse samples will be assessed in the field using a photoionization detector (PID) equipped with a 10.6 electron volt bulb and a flame ionization detector (FID) for VOCs and petroleum hydrocarbons at minimum two-foot intervals. A GEM 2000 will also be used for methane, carbon dioxide, oxygen, and hydrogen sulfide screening of soil and fill cutting obtained from the shallow zone and for landfill gas that may be emitted from the unsaturated refuse. Cover-soil samples that contain more than 150 parts per million (RWQCB's environmental screening level for TPH middle distillates) total petroleum hydrocarbons (measured by FID) in the absence of detectable methane will be preserved for laboratory analysis of total petroleum hydrocarbons. Up to two samples per borehole will be analyzed.

The existing non-engineered fill cover material and the underlying refuse layers at the proposed drilling locations are generally expected to range in thicknesses from 4 to 10 feet and from 5 to 20 feet, respectively (SCS Engineers, 2007). As a result, planned leachate monitoring wells will be relatively shallow (less than 30 feet deep).

Leachate monitoring wells will be installed at the approximate locations shown on Figure 4. Wells will be constructed of 2-inch diameter PVC blank casing and 0.02-inch slot screen. Each well will be protected with a steel cover and locking cap, and the surface assemblies will be anchored with concrete pads.

Leachate grab samples will be collected from each well using new disposable bailers and will be submitted to a California certified laboratory for analysis of the chemical constituents listed on Table 1.

3.9 Task 9 - Report of Findings

Following completion of the above referenced scope of work, a report of findings will be prepared detailing the results of the investigations. Included in the report will be an interpretation of the results and recommendations for further actions.

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4.0 SCHEDULE

The schedule below summarizes the time frame for implementation of the proposed scope of work from the date that written workplan approval is received from ZWED and City of San Jose.

Task	Description	Task Duration
Task 1: Background Data Review	Compile and review background data	1 week after work plan approval
Task 2: Geophysical Survey	Perform magnetic survey to determine the lateral extent of the fill and to look for concentrations of material indicative of burial trenches.	8 Days
Task 3: Fugitive Landfill Gas Emissions Assessment	Determine the location and magnitude of surface emissions escaping from the cover layer using surface sweep and bar-hole punching.	4 Days
Task 4: Odor Assessment	Determine baseline odor measurements prior to development.	2 Days
Task 5: Perimeter Soil-Gas Assessment	Complete six soil-gas borings and analyze for LFG constituents (see Table 1).	5 Days
Task 6: Landfill Gas Sampling and Analysis	Complete five to ten landfill gas borings and analyze for LFG constituents (see Table 1).	4 Days
Task 7: Waste Perimeter Assessment	Complete six direct push boreholes, sample and analyze soil-gas, soil, and groundwater for selected chemical parameters (see Table 1).	5 Days
Task 8: Leachate Monitoring Well Installation	Install three leachate wells using hollow-stem auger rig. Collect soil, fill, and leachate samples and analyze for selected chemical parameters (see Table 1).	4 Days
Task 9: Laboratory Analysis, Data Review, and reporting	Two weeks (standard turn-around) for analysis; additional two weeks for data review and reporting.	4 Weeks
Total Timeframe		8 to 10 weeks

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Table 1

Laboratory Analyses to be performed on Landfill Gas, Soil-Gas, Soil, Groundwater, and Leachate Samples

Soil-Gas and Landfill Gas	
Volatile Organic Compounds including Toxic Organic Compounds	EPA Method TO-15
Fixed Gas (CO_2, CO, CH_4, N_2, O_2; Landfill gas only)	ASTM-D 1946
Soil and Fill	
CAM 17 Metals	EPA 6010
Total Petroleum Hydrocarbons	Modified EPA Method 8015
Asbestos* (for asbestos containing building materials)	EPA Method 600/R-93/116
Groundwater and Leachate	
Volatile Organic Compounds	EPA Method 8260B
Total Petroleum Hydrocarbons	Modified EPA Method 8015
CAM 17 Metals	EPA 6000/7000 series
Semi-volatile Organic Compounds	EPA Method 8270C
Organochlorine Pesticides	EPA Method 8081
PCBs	EPA Method 8082
Chlorophenoxy Herbicides	EPA Method 8151
Cyanide	EPA Method 335.2
Sulfide	EPA Method 376.1
Anions (Cl, Fl, NH2, NH3, SO4)	EPA Method 300.0
Bicarbonate and Carbonate Alkalinity	EPA Method 310.2
Calcium, Magnesium, Potassium, and Sodium	EPA Method 200.7
Total Dissolved Solids	EPA Method 160.1
Total Organic Carbon	EPA Method 415.1
Dioxins (Leachate only)	EPA Method 8290

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5.0 REFERENCES

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DRAFT

REFERENCE

http://services.arcgisonline.com/arcgis/services
I3_Imagery_Prime_World_2D (Arial imagery main map)
World_Street_Map (index map)

DRAFT

0 3,000 6,000 Feet

Golder Associates
Sunnyvale, CA

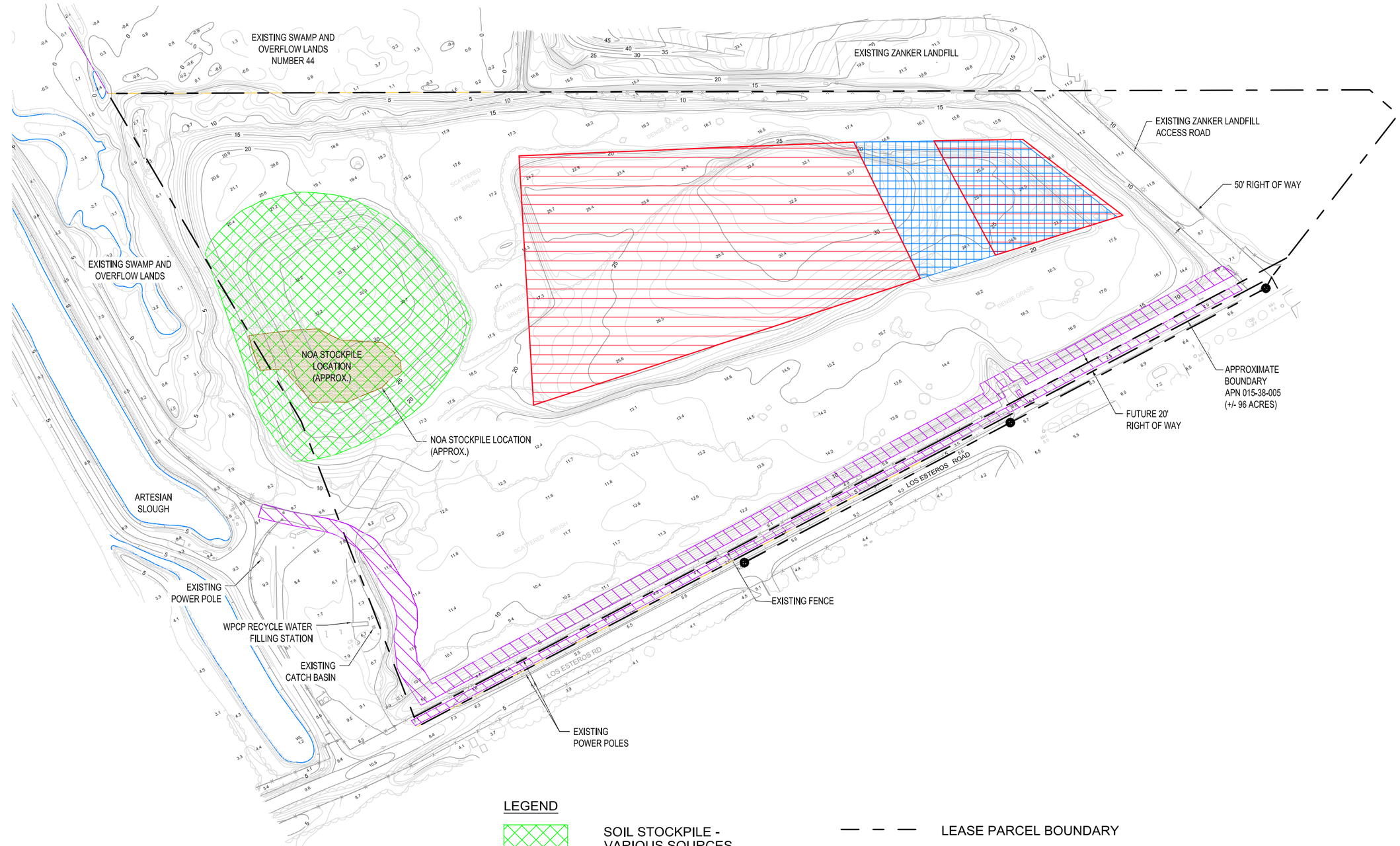
SCALE	AS SHOWN
DATE	7/28/2010
DESIGN	DLM
GIS	DLM
CHECK	TV
REVIEW	TV
FILE No.	
PROJECT No.	103-97163
REV.	

ZERO WASTE ENERGY DEVELOPMENT COMPANY
NINE PAR LANDFILL
PRELIMINARY SITE INVESTIGATION
SAN JOSE, CALIFORNIA

SITE LOCATION

FIGURE 1

Map Document:



LEGEND

- SOIL STOCKPILE - VARIOUS SOURCES
- NEW CIVIC CENTER SURPLUS SOIL STOCKPILE
- AIRPORT - NORTH CONCOURSE SURPLUS SOIL STOCKPILE
- MAGNETOMETER SURVEY AREA (2007) (APPROXIMATE)
- LEASE PARCEL BOUNDARY
- 50 EXISTING CONTOUR

Modified from Worley-Parsons (5/24/10).

ZERO WASTE ENERGY DEVELOPMENT COMPANY
NINE PAR LANDFILL-PRELIMINARY SITE INVESTIGATION
SAN JOSE, CALIFORNIA

SITE PLAN WITH SOIL STOCKPILE AREAS

Golder Associates
Sunnyvale, California

PROJECT No.	103-97163		FILE No.	
DESIGN	TLV	8/17/10	SCALE AS SHOWN	REV.
CADD	KMM	8/17/10	**FIGURE 2**	
CHECK	TLV	8/17/10		
REVIEW	TLV	8/17/10		

XREF Files: GeneralArrangement9-partitleblck_2d7687-30D1D-EM1grdZWES-1-DW-111-717-025GeneralArrangement_Phase123_grayscale IMAGE Files: Nine Par Site Plan 05-13-2010_mo.jpg zwed_logo_new.jpg
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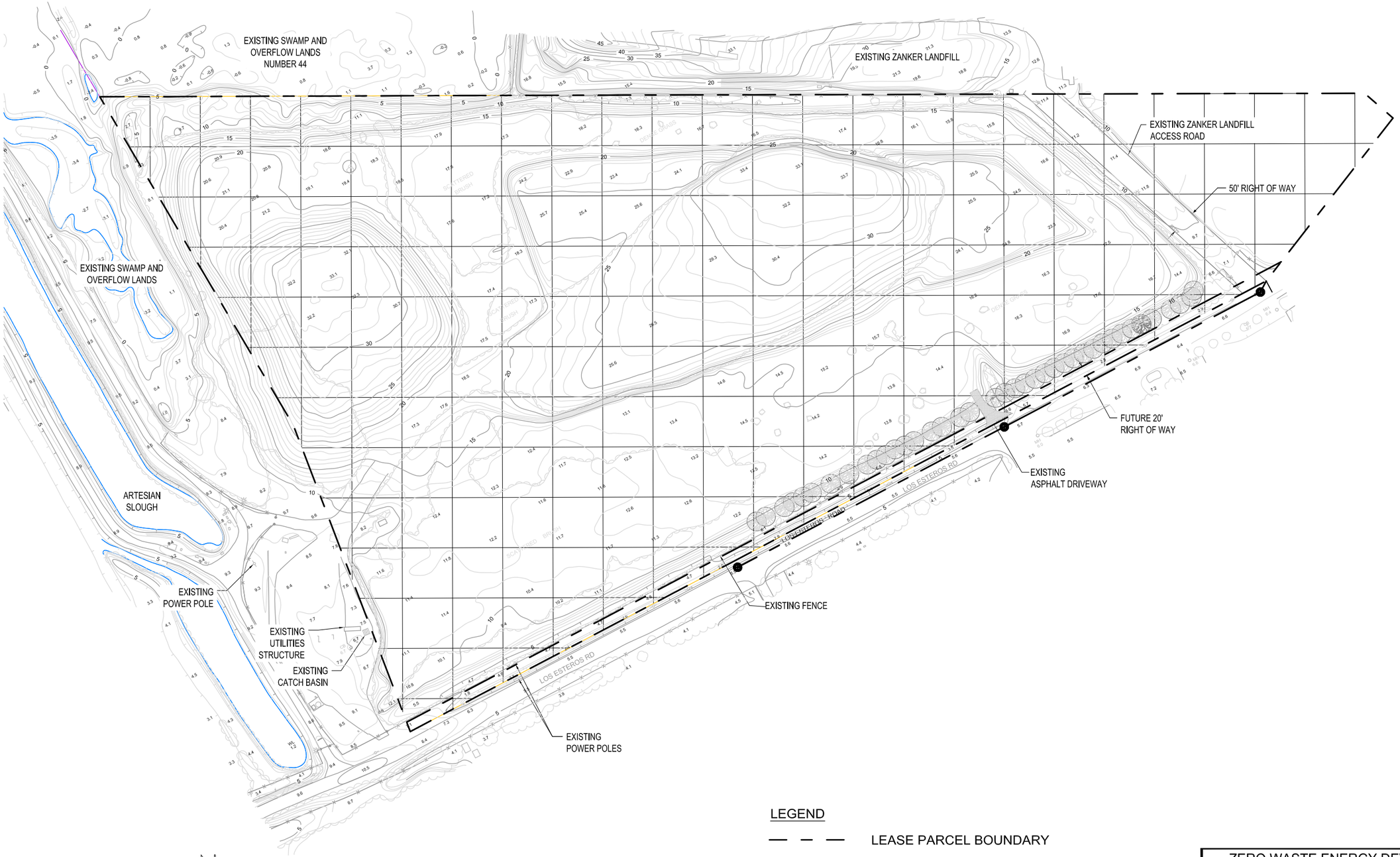

N

0 200 400 600 800

1" = 200 FT

LEGEND

- LEASE PARCEL BOUNDARY
- EXISTING CONTOUR
- EXISTING DRAINAGE INLET
- EXISTING STREET LIGHT POLE
- EXISTING POWER POLE
- EXISTING FENCE

ZERO WASTE ENERGY DEVELOPMENT COMPANY
NINE PAR LANDFILL-PRELIMINARY SITE INVESTIGATION
SAN JOSE, CALIFORNIA

SURFACE GAS EMISSIONS MONITORING GRID

Golder Associates
Sunnyvale, California

PROJECT No.	103-97163		FILE No.
DESIGN	TLV	8/17/10	SCALE AS SHOWN REV.
CADD	KMM	8/17/10	
CHECK	TLV	8/17/10	**FIGURE 3**
REVIEW	TLV	8/17/10	

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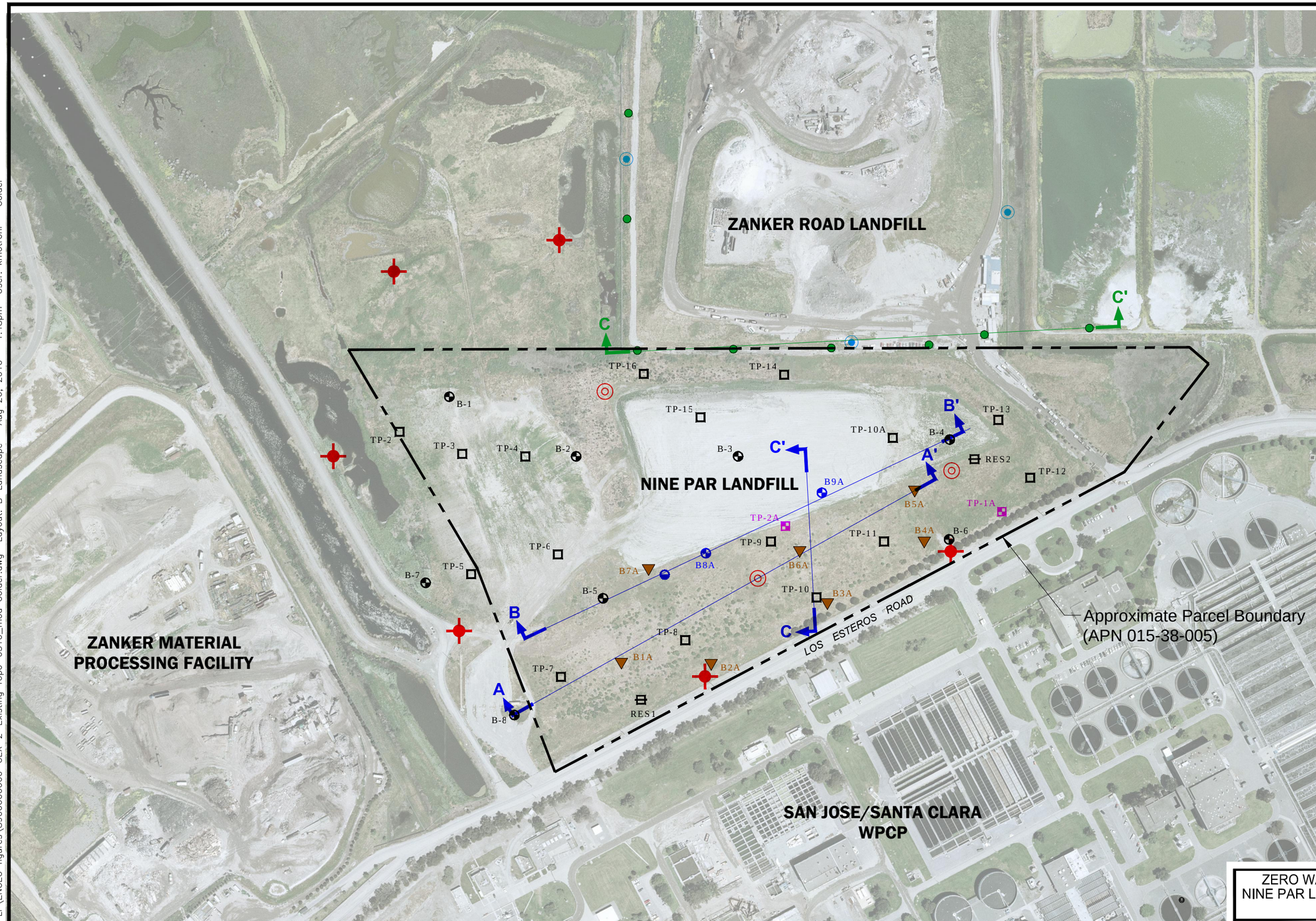

EXPLANATION

EXISTING LOCATIONS:

- B9A — BORING LOCATION (ENGEO, 2010)
- B-8 — BORING LOCATION (SCS, 2007)
- BORING LOCATION (EMCON, 1992)
- B7A — CPT LOCATION (ENGEO, 2010)
- TP-2A — TEST PIT LOCATION (ENGEO, 2010)
- TP-16 — TEST PIT LOCATION (SCS, 2007)
- RES2 — LOCATION OF ELECTRICAL RESISTIVITY TEST (ENGEO, 2010)
- INFILTRATION TEST LOCATION (ENGEO, 2010)
- ZANKER ROAD LANDFILL GROUNDWATER MONITORING WELL
- C — CROSS SECTION LOCATION (ENGEO, 2010)
- C — CROSS SECTION LOCATION (EMCON, 1992)

PROPOSED LOCATIONS:

- POSSIBLE LEACHATE WELL
- POSSIBLE BORING LOCATION

NOTE: ALL LOCATIONS ARE APPROXIMATE

N

300 0 300
SCALE FEET

ZERO WASTE ENERGY DEVELOPMENT COMPANY
NINE PAR LANDFILL-PRELIMINARY SITE INVESTIGATION
SAN JOSE, CALIFORNIA

EXPLORATORY LOCATIONS

Golder Associates
Sunnyvale, California

PROJECT No.	103-97163		FILE No.
DESIGN	TLV	7/30/10	SCALE AS SHOWN REV.
CADD	KMM	7/30/10	
CHECK	TLV	7/30/10	FIGURE 4
REVIEW	TLV	7/30/10	

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