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RESIDENTIAL

Alameda County Environmental Health Care Services
Local Oversight Program
1131 Harbor Way Parkway, Suite 250
Alameda, California 94502-6577

Date: November 13, 2006

Your Reference: RO2733

Attn. Mr. Barney Chan, REHS

SUBJECT: Addendum to Corrective Action Plan
- Oak Walk Redevelopment Site Emeryville, CA

Dear Mr. Chan:

A copy of the *Addendum to Corrective Action Plan - Oak Walk Redevelopment Site, Emeryville California,* that was prepared by our consultants The San Joaquin Company Inc. (SJC) is enclosed with this letter.

Please note that as the developer BayRock Residential, LLC has no responsibility either as discharger or property owner in relation to any of the unauthorized releases of regulated materials that occurred on and off site from the subject property. Our undertaking of environmental corrective action work on the property is strictly voluntary in nature.

With respect to the Addendum to Corrective Action Plan transmitted herewith I state the following:

"I declare, under penalty of perjury, that the information and recommendations contained in the document transmitted herewith are true and correct to the best of my knowledge"

If you have any technical questions about the plan please call Dr. Watkins at questions, or if I can be of assistance to you in any way, please call me at (510) 336-9118. For administrative questions please call me at (510) 873-8880 ext. 205.

Sincerely,
BAYROCK RESIDENTIAL, LLC

Peter Schellinger
Development Manager

Enc: Report: *Addendum to Corrective Action Plan - Oak Walk Redevelopment Site, Emeryville, California*

cc: Dr. Dai Watkins- The San Joaquin Company Inc.

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1120 HOLLYWOOD AVENUE, SUITE 3, OAKLAND, CALIFORNIA 94602

ADDENDUM TO CORRECTIVE ACTION PLAN

Oak Walk Redevelopment Site
Emeryville, California

for

BAYROCK
RESIDENTIAL

November 2006

Project No.: 0004.085

TELEPHONE: OAKLAND, CALIFORNIA (510) 336-9118 TRACY, CALIFORNIA (209) 832-2910

PROFESSIONAL CERTIFICATION

This document is an addendum to the Corrective Action Plan for The Oak Walk Redevelopment Site, Emeryville, California that was issued in July 2006 by The San Joaquin Company Inc. and prepared for Bay Rock Residential, Inc. The plan and this addendum were prepared under the direction of the engineer whose seal and signature appear below. The work was performed in accordance with generally accepted standards of engineering practice based on information available to us at the time of its preparation and within the limits of the scope of work directed by the client. No other representation, express or implied, and no warranty or guarantee is included or intended as to professional opinions, recommendations, or field or laboratory data provided.

REGISTERED PROFESSIONAL ENGINEER
D. J. WATKINS
No. 28602
Exp. 3/31/08
CIVIL
STATE OF CALIFORNIA

11/13/06

D. J. Watkins, Ph.D., P.E.
Civil Engineer
The San Joaquin Company Inc.

1.0 PURPOSE

This document is an addendum to the Corrective Action Plan for the Oak Walk Redevelopment Site (The San Joaquin Company Inc. 2006). It has been prepared in response to a directive issued in a letter dated October 12, 2006 by the Alameda County Environmental Health Care Services Agency, Environmental Health Services (**ACEH**) (Alameda County Environmental Health Care Services Agency 2006). This addendum addresses technical comments in the ACEH letter regarding the Corrective Action Plan. A copy of the ACEH letter is included as Appendix A-1 of this document.

2.0 CASE NUMBERS

The ACEH has assigned the following Case Number to the Oak Walk Redevelopment Site: RO0002733.

The California State Water Resources Control Board (**SWRCB**) recently assigned the following Global Identification Number to the Oak Walk Redevelopment Site: T06019705080

3.0 RESPONSE TO TECHNICAL COMMENTS

Technical comments for which responses were requested by the ACEH in its letter of October 12, 2006 are addressed below.

3.1 Grout Curtain Installation

With respect to the proposed installation of grout curtains designed to inhibit the transport of contaminants in groundwater flowing down-gradient through the paleo streambed channels that cross the Oak Walk Site, the ACEH had the following questions:

<u>3.1.1 What will be the affect of grout curtains on the subsurface of adjacent properties?</u>

Changes in the hydrogeologic and contaminant transport regime on adjacent properties induced by installation of the grout curtains can be assessed by construction of hydrogeologic models of a channel of paleo-streambed deposits passing through a field of alluvial fan deposits of lower permeability under two conditions: 1) Case A, a model of an unobstructed streambed channel; and (2) Case B, a model of the same streambed channel with a grout curtain constructed across it. The hydrogeologic conditions for each of those cases is shown on Figure A-1, which is presented after the text of this document. In each case, the distribution of equipotential lines (groundwater contours) and traces of particles of water being transported through the system are shown. The graphic presentations were generated by use of Visual Bluebird v2.0, which is a computer program used to model complex hydrogeological regimes (Craig and Matott 2005).

Case A on Figure A-1, shows the results of analysis of a simple groundwater flow model consisting of a 30-ft wide sand-filled channel of relatively high permeability cutting through a field of materials of lower permeability with the axis of the paleo-streambed channel being parallel to the regional direction of groundwater flow.

The direction of flow in the modeled area is seen to be from east to west (from the top of the Figure towards the bottom). The location of proposed Grout Curtain No. 1, which is not yet installed in the Case A hydrogeologic model, is shown by the dotted line that crosses the channel near its mid-point.

Case B on Figure A-1, shows the results generated by the hydrogeologic model when a curtain wall is installed across the paleo stream bed channel.

3.1.1.1 HYDROGEOLOGIC MODELING PARAMETERS

The hydrogeologic modeling parameters used in the models were developed as follows:

Hydraulic Conductivity of Paleo-Streambed Channel

Based on the observed particle size distribution of the paleo-streambed deposits observed during the site characterization program conducted at the Oak Walk Site (The San Joaquin Company 2005), the hydraulic conductivity of that material was assigned the value: 1×10^{-2} cm/sec (28 ft/day), *i.e*,

$$K_{\text{channel deposits}} = 28 \text{ ft/day}$$

Hydraulic Conductivity of Materials in the Field of the Alluvial Fan

An indication of the relative permeability of soils on either side of a boundary that separates different types of soil materials can be made by considering the refraction of hydraulic flow lines that occur as those flow lines cross the boundary between the materials. A schematic representation of the equipotential lines (groundwater contours) and flow lines near the northern boundary of the paleo-streambed channel that crosses the Oak Walk Site from east to west (see Figure I-24 of Vol. I of the CAP for general location) is shown on Figure A-2. The local linearized flow lines show how they are refracted locally as they pass from the alluvial fan materials into the paleo-streambed channels. The flow lines at the material boundary are orthogonal to the local equipotential lines that are shown on Figure A-1. Those linearized equipotential lines are local approximations to the actual curvilinear eqipotental lines that are also are drawn on Figure A-1 at the scale of the site as a whole. The relationship between the hydraulic conductivity of the sandy materials in the paleo-streambed channels, $k_{\text{channel deposits}}$, and the materials in the field of the alluvial fan, k_{field}, can be assessed by use of the following equation (Casagrande 1937):

$$K_{\text{field}} / K_{\text{channel deposits}} = \text{Tan}\,\theta_1 / \text{Tan}\,\theta_2 \qquad \text{EQUATION (1)}$$

From the local flow line geometry shown on Figure A-2, $\theta_1 = 7.5^0$ and $\theta_2 = 39.5^0$. Thus, by substitution into Equation 1, an estimate of: $K_{field} = 0.16\ K_{channel\ deposits}$ is obtained

It is important to recognize that the estimate for K_{field} applies to a representative elementary volume (Harr 1962, Watkins 1969, Freeze and Cherry 1979, Witherspoon, *et. al.* 1981, Watkins, *et al.* 1983, Girard and Edelman 1994) of the alluvial fan in and around the Oak Walk Site, *i.e.* it is the mean hydraulic conductivity of a sufficient mass of that material that would produce the same measurement of hydraulic conductivity if measured on another volume of the material of the same size. It is not the widely varying hydraulic conductivity of the smaller-sized components of the alluvial matrix, such as very low permeability clay or more permeable thin beds of silt or sand, each of which may have significantly different specific hydraulic conductivities than those exhibited by the alluvial fan materials when considered at the scale of the minimum elementary volume.

It should also be recognized that the calculation that the hydraulic conductivity on the field of the alluvial fan is 0.16 times that of the hydraulic conductivity of the paleo-streambed channel can only be considered a general estimate due to the innate simplifications needed to reduce the highly complex and locally variable flow regime to a tractable degree of simplicity. Under these circumstances, it is prudent and conservative to assign at least one order of magnitude difference between K_{field} and $K_{channel\ deposits}$. Accordingly, we have assigned following hydraulic conductivities to the clayey alluvial deposits in the field of the models shown on Figure A-1:

$K_{field} = 2.8$ ft/day

Hydraulic Conductivity of the Grout Curtain

For the Case B model, it was assumed that the permeability of the grout curtain installed across the paleo-streambed channel will be 1.0×10^{-6} cm/sec (0.0028 ft/day). This is a typical hydraulic conductivity for perfectly grouted sands. In practice, imperfection in the grout curtain installed in the field will likely increase its actual effective hydraulic conductivity. However, in the context of an evaluation of up-gradient effects of the grout curtain installation, the 0.0028 ft/day assumption for its permeability is appropriately conservative. Accordingly for the hydrogeologic model:

$K_{grout\ curtain} = 0.0028$ ft/day.

Groundwater Gradient

The groundwater gradient used in the model of unmodified flow in the paleo-streambed channel (Case A on Figure A-1) was set at 0.0094 ft/ft, as measured from the groundwater contours shown on Figure A-2 that were derived from the measured groundwater elevations on November 8, 2004 in the monitoring well array as reported in Table I-1 of Vol. 1 of the CAP. So that

$i = 0.0094$ ft/ft

Groundwater Flow Rate

To calibrate the Case A groundwater flow model against the observed hydraulic heads (groundwater elevations) in the monitoring wells installed on the Oak Walk Site, the assumed rate of groundwater flow through the model strata was adjusted in the software until the equipotential lines generated by the model matched those that have been observed in the wells. For the model representing the upper 50 ft of the subsurface, that rate was found to be:

$$Q = 0.566 \text{ ft}^2/\text{day}$$

for each unit width of the modeled area.

3.1.1.2 CHANGES IN FLOW AND CONTAMINANT TRANSPORT DUE TO GROUT CURTAIN

The installation of a grout curtain in a paleo-streambed channel will cause changes in groundwater table elevations in the area up-gradient and down-gradient from the grout curtain and changes to the pathways along which particles of water flow through the subsurface. These changes are discussed below.

Changes in Groundwater Elevations Up-gradient from Grout Curtain

Consider the locations labeled Location 1 and Location 2 for Case A on Figure A-1. Location 1 is in the center of the paleo-streambed channel at the location where the grout curtain will be installed. Location 2, also in the center of the paleo-streambed channel, is 50 ft. up-gradient of Location 1. By interpolation between the equipotential lines, the water table elevation at Location 1 is 38.7 ft. above the National Vertical Datum (**NAVD**) and, at Location 2, the elevation of that water table is 39.5 ft. NAVD. Those elevations are close to those that have actually been observed by SJC and others at the Oak Walk Site.

As is represented in the model for Case B, installation of the grout curtain causes the groundwater elevation at Location 1, which is now immediately up-gradient of the grout curtain, to increase to 40.0 ft. NAVD and at Location 2 to rise to 40.5 NAVD.

The above results predict that the water table immediately to the east of Grout Curtain No.1, which location is on the off-site property adjacent and to the east of the Oak Walk Site, will rise approximately 1.3 ft following installation of the grout curtain. Fifty feet further to the east, which point is also off-site property, the predicted increase in the elevation of the water table is only 1.0 ft. It is estimated that, at a distance of no more than 200 ft. east of the Oak Walk Site boundary, there will be no change in the groundwater table elevation compared to the extant conditions.

Changes in Groundwater Flow Pathways Due to Installation of Grout Curtains

The pathways followed by particles of water within the paleo-streambed channel for Case A, when no grout curtain is present are shown on Figure A-1. As would be expected, for simple down-gradient flow in a channel cut through a uniform field of less permeable deposits the flow pathways are unremarkable and simply run parallel to the sides of the channel.

For Case B, which models the conditions after the grout curtain has been installed; the pathways following the same water particles that are traced for Case A l are realigned so that as they flow from east to west they are detoured around the grout curtain. Those water particles that, at the eastern end of the model, are located close to the walls of the paleo-streambed channel are displaced to a maximum distance to the north and south of some 25 ft. However, examination of Figures I-19, I-20 and I-24 in Vol. I of the CAP reveals that the area where the pathway is displaced to the north is beneath 41st Street, where any minor changes in the groundwater regime will be inconsequential. To the south, the pathways are diverted into areas that are currently affected by contaminants flowing westward from the off-site release sites to the east of Adeline Street.

It is important to recognize that, with respect to contaminant transport, when the water particles pass from the sands in the paleo-streambed channel into the adjoining aquifer materials, which are dominated by clays and silty clays, the rate of migration of the particles will be slowed by at least an order of magnitude and there will be a very large increase in adsorption of the petroleum hydrocarbon compounds onto the clayey soil matrix. By action of those mechanisms, the proposed grout curtain will greatly reduce the rate at which contaminants are transported in the groundwater from the discharge sources to the east of Adeline Street across the Oak Walk Site and westward from there across San Pablo Avenue.

> NOTE: The effects of installation of the other proposed grout curtains will be similar to those described above that are specific to the grout curtain to be installed at the northeastern corner of the Oak Walk Site.

<u>3.1.2 How would the resultant changes in the groundwater flow regime affect the health risks on neighboring properties?</u>

As has been discussed above, it is expected that there will be some increase in the elevation of the groundwater table in areas up-gradient from the proposed grout curtains that will be installed along the eastern edge of the site (*i.e.*, on the Ennis and the 1075 41st Street properties). However, groundwater beneath those properties is affected by solvents, principally mineral spirits, which do not contain benzene, toluene, ethylbenzene, xylene isomers (the **BTEX** compounds) or other components of significant concern to human health. Accordingly, the eastern grout curtains will generate no material change to any health risks that might be present on the properties.

The effect of the proposed grout curtain on the western boundary of the Oak Walk property on areas down-gradient from the Oak Walk Site (*i.e*, the subsurface beneath San Pablo Avenue) will be to benefit the processes of intrinsic remediation of soil and groundwater in that area.

REQUEST FOR REGULATORY GUIDANCE

The results of the analysis of the up-gradient effects of installation of the proposed grout curtains that are presented above were based on appropriately conservative modeling parameters. However, it is recognized that in such a complex hydrogeologic system as prevails on the Oak Walk Site it is difficult to make precise, *a priori* predictions of effects such as up-gradient increases in groundwater elevations behind grout curtains. If ACEH has significant concerns about such issues, installation of the grout curtains could be omitted from the Corrective Action Plan.

The planned grout curtains are intended to address the regional transport of petroleum hydrocarbons in groundwater from the release sites to the east of Adeline Street at the former Frank Dunne and Boysen paint manufacturing facilities. Installation of the grout curtains will significantly slow the transport of chemicals of concern onto the Oak Walk Site and from there across San Pablo Avenue and into the neighborhood to the west of that thoroughfare. If they are not installed, there will be no increase in health risks on the redeveloped Oak Walk Site because the hydrocarbon mixtures flowing onto the site do not contain any of the BTEX compounds or other components that might pose significant health risks to future residents.

As currently planned, the grout curtains will be installed as an early element of the corrective action program but a corrective action plan that omits the ground curtains is also acceptable to Bay Rock. At this stage of project planning, a specific directive from ACEH to either install or omit the grout curtains is now required to permit the project to proceed without costly delay.

<u>3.1.3 Were other alternatives considered to treat groundwater as opposed to blocking and redirecting it?</u>

The technologies for management of contaminated groundwater proposed in the CAP are not restricted to interception of paleo-streambed channels by grout curtains. Provision is made for extraction of a total of 40,000 gallons of affected groundwater from the subsurface and shipment of the extracted water to an off-site facility for treatment. See Section 5.3.2 on Page 34 of Volume I of CAP.

As has been demonstrated in Section 3.1.1.1 above and is shown on Figure A-1, installation of the grout curtains will not "block" or significantly "redirect" groundwater flow. Some water particle flow paths originating upstream of the grout curtains will be forced out of the paleo-streambed channel as they pass around the grout curtain but on its down-gradient side they will again be directed into the stream channel. Some groundwater will, in fact, flow, through the grout curtain, which will not be totally impermeable ($K_{grout\ curtain}$ will be less than 0.0028 ft/day). As can be seen from the Case B modeling result presented on Figure A-1, the groundwater flow paths are shifted only a relatively small distance to the north or south of the streambed channel before they regain their original direction of flow within the paleo-streambed. The beneficial effect of the grout curtain is not that it blocks or redirects all flow but that, by forcing contaminated groundwater to temporarily leave the paleo-streambed channel, groundwater flow velocity is slowed by at least an order of magnitude and there is a very large increase in adsorption of contaminants onto the clayey matrix of the sedimentary deposits through which the channel passes. Taken together, those processes will act to greatly slow the rate of contaminant transport from the up-gradient sources that crosses the Oak Walk site and continues on into the neighborhood to the west of San Pablo Avenue with no significant impact on adjacent properties.

Development of a Corrective Action Plan for the Oak Walk Site required a design approach that synthesized all of the site-specific geotechnical engineering, hydrogeologic, redevelopment planning, construction scheduling and economic parameters that prevail under the site- and project-specific conditions. In such an environment, a balanced design process almost always yields a unique site- and project-specific corrective action plan where changes in one symbiotic element of which would require significant changes in the scope of other elements of the program.

At the early stages of the design process, several possible approaches for ameliorating groundwater contamination at the site were reviewed to make general assessments of which approach would be practical in the context of the site-specific conditions. Due to the very large volume of granular material in the paleo-streambed channels, complete removal of those soils (to improve groundwater quality as well as reduce the rate of contaminant transport across the site), which, given their depth below the water table, may well not be technically feasible, was quickly eliminated due to unmanageable cost - some $1,000,000. Similarly, the cost of extraction and disposal of very large volumes of affected groundwater could not be sustained by the redevelopment project, which is the only source of funding that would be available to implement a corrective action program at the site. (The estimated volume of contaminated groundwater in the pore space of the paleo-streambed channel that crosses the northern portion of the Oak Walk Site is on the order of 700,000 gallons. Extracting and treating that volume of water would cost on the order of $650,000.) Alternates such as pump and treat technologies, which are infamous for their ineffectiveness, were also dismissed from consideration due not only to very high costs but to the very long, indeterminate time required for their implementation. Such extended and indeterminate time frames would not be viable given the required scheduling of a redevelopment project. Alternate barrier systems, specifically clay cut-off walls, were found to be impractical on this site due to the depth of cut-off required (30 ft) and the propensity for the granular materials in the paleo-streambed channels to collapse into the trenches excavated to install the cut-offs, the effect of which is to form very large permeable voids in the cut-off walls that render them of little beneficial value.

The California Regional Water Quality Control Board - San Francisco Bay Region (**RWQCB**) has found that the shallow aquifers in the area of the Oak Walk Site are not a source of drinking water and that, in cases where any potential risk to human health or to the quality of surface waters is not significant, active groundwater remediation efforts are not required (California Regional Water Quality Control Board - San Francisco Bay Region 1999). Given that regulatory guidance and the fact that the remediation of soil and installation of engineered barriers (impermeable membranes beneath the floor slabs of each ground floor residence on the site) will eliminate any significant health risks to future residents of the site (see the Tier II Health Risk Assessment in Volume II of the CAP), it could be argued that no groundwater remediation need be included in a CAP for the Oak Walk site to be redeveloped as planned.

However, in response to the ACEH's directive in their letter to Bay Rock dated July 11, 2006, which stated "…highly contaminated… groundwater should be considered for remediation (to the extent possible)," groundwater treatment and grout curtain elements were included in the CAP. At an estimated cost in excess of $143,000 (see Engineers Estimate for Corrective Action in Appendix I-B in Volume I of the CAP), we believe that those integrated elements of the proposed groundwater remediation program are responsive to the regulatory direction issued by ACEH.

3.2 Groundwater Remediation

With respect to the proposed extraction and off-site disposal of contaminated groundwater, which will be effected by extracting 20,000 gallons of affected groundwater from each of two ponds, one located near the former location of Monitoring Well MWT-7 and the other near the location of Monitoring Well MW-2. (See Figure I-24 in Volume I of the Corrective Action Plan for locations of monitoring wells and extraction ponds), the ACEH had the following questions:

<u>3.2.1. How will the reduction in groundwater contamination be determined?</u>

A general estimate of the beneficial effects of the groundwater extraction will be made by analysis of grab samples of the groundwater that flows into each extraction pond following its excavation and comparison of those results to analysis of a grab groundwater samples from each pond after extraction of 20,000 gallons of affected groundwater has been completed. However, it is recognized that analysis of grab samples from open ponds can, due to evaporated losses, underestimate the actual concentration of analytes of concern in adjacent groundwater. Accordingly, the achieved reduction in analytes of concern due to the extraction of groundwater from the ponds shown on Figure I-24 of the CAP will be further analyzed as follows:

The effectiveness of Extraction Pond No. 1, which will be located in the streambed channel deposits that cross the northern area of the site from east to west, will be further determined using the concentrations of those analytes present in Monitoring Well MWT-7, MWT-11 and MWT-12 on May 19, 2004 or November 6, 2004, as applicable, with the concentration of those analytes in Monitoring Well MWT-13, which will be installed as part of the post-remediation groundwater monitoring program (see Figure I-29 of Vol. 1 of the Corrective Action Plan for tentative location), the precise location of which well will be determined following further delineation of the paleo-streambed channel after excavation of Exploratory Trench No. 9 (see Figure I-24 of Vol. I of the Correction Action Plan for location).

In the case of Extraction Pond No. 2, it will be possible to analyze the beneficial effects of the groundwater extracted from that pond by comparing the results of analytes of concern in a sample recovered from the adjacent extant Monitoring Well MW-2 during the post remediation sampling with the results from a sample recovered following the extraction of 20,000 gallons of groundwater from that pond.

3.2.2 Will more groundwater be extracted, if needed to reach the goal of 40% reduction in concentrations of groundwater contamination?

The maximum volume of groundwater to be extracted from each of the ponds will be 20,000 gallons.

As was noted in Section 3.1.3 above, The California Regional Water Quality Control Board - San Francisco Bay Region (**RWQCB**) has found that the shallow aquifers in the area of the Oak Walk Site are not a source of drinking water and that, in cases where any potential risk to human health or to the quality of surface waters is not significant, active groundwater remediation efforts are not required and the natural processes of intrinsic remediation can be relied upon to remediate sites after the source or sources of the contamination have been removed (California Regional Water Quality Control Board - San Francisco Bay Region 1999). However, in response to the ACEH's directive in the letter dated July 11, 2005, the Corrective Action Plan includes several elements designed to reduce the concentrations of analytes of concern in groundwater where they are significantly higher than is the case for the site as a whole. The ACEH's guidance stated that "…highly contaminated… groundwater should be considered for remediation (to the extent possible.)." The 20,000 gallon limit on extraction from each of the proposed groundwater extraction ponds was set in the context of that guidance as a "best effort" to achieve a reduction of peak contaminant concentrations within a cost structure that is viable for the redevelopment project. As is stated in the Engineer's Estimate for Corrective Action included as Appendix I-B in Vol. I of the Corrective Action Plan, the estimated cost for extraction and disposal of 20,000 gallons of contaminated water from each Pond (Task 6) is $60,200. Any increase in that cost, which represents only one element of the overall Corrective Action Program, would not be economically viable in the context of the proposed site redevelopment.

3.2.3 Given the unknown mass of contaminants, is a 40% reduction in contaminant concentrations by extraction of 20,000 gallons from each pond a realistic goal?

Based on SJC's experience with extraction of contaminated groundwater from remediation ponds, although it is recognized that the 40% cited is a general estimate, we believe that projected goal is realistic.

The CAP calls for contaminated water to be slowly extracted by skimming water from near the surface of the water that accumulates in the groundwater extraction ponds. Because the petroleum hydrocarbons affecting the Oak Walk Site have a lower specific gravity than water, this technique, with which SJC has had considerable practical experience at other sites, permits the groundwater affected by the highest concentration of COC's to be preferentially extracted. This procedure permits a greater mass of contaminants to be removed per gallon of groundwater extracted than would be achieved by rapid pumping for the full depth of the water column, such as is the case when "pump and treat" systems that rely on extraction of groundwater from relatively small-diameter wells that penetrate well below the water table are employed.

Supporting evidence for the beneficial effect of extraction of limited volumes of contaminated water from areas affected by concentrations of contaminants is available in the groundwater-quality data that has already been gathered at the Oak Walk Site. As seen in Tables 2 and 10 of SJC's Site Characterization (The San Joaquin Company Inc. 2005), the concentration of total petroleum hydrocarbons quantified as gasoline (**TPHg**) was 180,000 μg/L and the concentration of benzene was 2,800 μg/L in Monitoring Well WCEW-1 (see Figure I-24 of Vol. I of the Correction Action Plan for location) on September 26, 1997. That well is located at the northeast corner of the intersection of 40th Street and San Pablo Avenue where groundwater was very heavily affected by releases of petroleum hydrocarbons from the former Celis Service Station. Subsequently, approximated 2,000 gallons of floating product and groundwater were extracted from that well (URS Corporation 2006). By May 19, 2004, the concentration of TPHg in the groundwater in that well had fallen to 3,700 μg/L and the concentration of benzene had fallen to 90 μg/L. Those latter concentrations represent a 98% and 97% reduction in concentrations of TPHg and benzene, respectively. There were also similar reductions in the other analytes of concern.

The effects of the extraction of the relatively small amount of groundwater from Well WCEW-1 is also reflected on Figure I-18 in Vol. I of SJC's Correction Action Plan, which shows isocons of benzene in groundwater on the Oak Walk Site in May 2004. Examination of that Figure shows that the 1,000 μg/L isocon of benzene passes to the south of Well WCEW-1, but is situated a considerable distance further north at up-gradient locations - notably, in May 2004 the concentration of benzene in Monitoring Well MW-2 was in excess of 7,000 μg/L. This unusual distribution of benzene in groundwater is consistent with a scenario whereby significant reduction in benzene concentrations was achieved by the extraction of a modest volume of contaminated groundwater from Monitoring Well WCEW-1 in 1997-1998.

We also note that, as is discussed in detail in Section 4.0 starting on Page 42 of Volume II including refereed Table II–11 of the CAP, the planned soil remediation will be sufficient to reduce health risks in the most severely contaminated areas of the Oak Walk Site to well below the permissible levels established by the American Society for Testing and Materials (**ASTM**), the United Sates Environmental Protection Agency (**USEPA)** and the California Safe Drinking Water and Toxic Enforcement Act of 1986 (**Proposition 65**). In addition, the CAP calls for an impermeable membrane to be laid beneath all ground floor residential units to be constructed on the site (see Section 5.5 of Volume I of the CAP starting on Page 41). That membrane will entirely eliminate any health risks to which residents might be exposed so that the planned use of the site could proceed even if no active groundwater remediation was undertaken.

As is noted in Section 3.1.3 above, the elements of the CAP that address remediation of groundwater were not intended to achieve a specifically-quantified outcome. They are proposed as a “best effort” undertaken in the context of the RWQCB’s guidance related to active remediation of aquifers in the Eat Bay Plain Groundwater Basin and ACEH’s guidance that "…highly contaminated… groundwater should be considered for remediation (to the extent possible).”

3.3 Excavation of Hydrocarbon-affected Soil

The ACEH letter of October 12, 2006 directs that the results of analyses of soil samples from the floors of remedial excavations should be used in a post-remediation risk assessment.

As is stated on Page 6, Section 1.6, Vol. II - Tier 2 Health Risk Assessment of the Corrective Action Plan, the results of analyses of confirmation sampling, which includes soil sampling in the base of the remedial excavations, will be used to support a planned post-remediation Tier 2 Risk Assessment.

3.4 Post-remediation Groundwater Monitoring

The ACEH's letter of October 12, 2006 states that ten monitoring wells are proposed to implement a post-remediation monitoring program. That is not correct. As is stated in Section 6.2 on Page 47 of Volume I of the CAP, following completion of construction of the buildings and infrastructure on the site, a total of **18 wells** - ten proposed new wells, numbered MW-9 through MW-16C, together with the eight existing off-site groundwater-quality monitoring wells WCEW-1, MW-2 through MW-8, will provide the well array necessary to monitor post-remediation groundwater quality. See Figure I-29 in Vol. 1 for well locations.

Following are responses to the other technical issues raised in the ACEH’s October 12, 2006 letter that relate to post-remediation groundwater-quality monitoring.

<u>3.4.1 Additional vertical delineation of affected soil and groundwater.</u>

The well cluster MW-16A, MW-16B and MW-16C proposed in the CAP is designed to investigate the vertical distribution of contaminants in groundwater. Of the three, Monitoring Well MW-16C will have a screened interval from 20 to 25 ft BGS. That screen interval was selected based on a synthesis of the vertical distribution of COCs detected in soil samples recovered from the Site and examination of the hydrostratigraphy of the subsurface revealed in the logs of the previously-completed borings. If the samples recovered from proposed monitoring well MW-16C are found to contain detectable concentrations of COCs, a fourth well, MW-16D, will be added to the cluster. Should it be necessary to install that well, the depth of the screened interval will be selected based on the results of the analysis of soil and groundwater samples recovered from MW-16A through MW-16C. However, as is SJC's standard practice, the screened interval actually installed may be modified at the time of installation based on observations of the local stratigraphy as interpreted in the field by the licensed geotechnical engineer in responsible charge of the work. As stated, it is currently assumed that MW-16D will be installed, if necessary, after groundwater-quality data is available from wells MW-16A through MW-16C. However, if geotechnical observations made in the field at the time that those wells are installed indicates an obvious need for a deeper well, the engineer may decide to install MW-16D contemporaneously with the other wells in the cluster.

3.4.2 Use of short screens and multi-channeled wells

On pages 47 and 48 of Volume I of the CAP, SJC provided a detailed discussion of the geotechnical and hydrogeologic engineering bases for the design of the screened length of the proposed post-remediation monitoring well array, including the specifics of the wells in the cluster MW-16A through MW-16C. As was included in that discussion, SJC recognizes that where the subsurface is composed of materials of essentially uniform permeability, concentrations of COCs decline in a Gaussian distribution with depth from the subsurface down to a depth of some 10 ft beneath the groundwater table where they are reduced by at least an order of magnitude compared to those prevailing just below the water table (American Society of Testing and Materials 2004). However, the hydrostratigraphy of the subsurface beneath the Oak Walk Site is radically different from that which would prevail in a uniform or nearly uniform hydrogeological system. As can be deduced by an examination of the Exploratory Trench and Boring Logs compiled in Appendix I-A in Vol. I of the CAP, the hydrogeological strata down to depths up to 35 ft. BGS are dominated by complex deposits of clays and silty clays with a few interbeds of silty and clayey sands.

To obtain accurate representative concentrations from such alluvial fan deposits it is essential that samples are recovered from volumes of the subsurface that are representative of at least a minimum representative elementary volume of the hydrogeologic system (Bear 1972). This is particularly the case when the source of the contamination is remote from the sampled location, as it as the Oak Walk Site, and contaminant concentrations have been greatly affected by mechanical dispersion through thin lenses and strata composed of minor sands, sandy clays, silts and silty clays that are typical of alluvial fan environments. In such environments, samples recovered from discrete points may well not be representative of the actual conditions that would be determined on the scale of a minimum elementary volume and, due to the thinness of such relatively microscopic features of the strata, individual samples from discrete points, such as are recovered in hydroprobe or similar discrete sampling tools, can lead to misrepresentation of the contaminant concentrations that actually characterize contaminant transport in the hydrogeologic regime. In fact, in such clayey strata such as those present beneath the Oak Walk Site, the concentrations of COC's present in samples recovered from a specific small volume of the boring wall may frequently grossly under-represent the concentrations of COCs in a representative elementary volume of the subsurface.

Before developing the design of the proposed post-remediation groundwater monitoring well array for the Oak Walk Site, SJC took time to examine the stratigraphy exposed in the well logs prepared at the time borings were drilled on the site and to assess that stratigraphy in the context of our extensive experience with hydrogeologic and contaminant transport investigations in the alluvial fans along the eastern side of San Francisco Bay and similar depositional environments. We particularly noted our experience with purging and recovery of groundwater-quality samples from Monitoring Well MWT-1, which, after purging, required in excess of 24 hours of recovery time before the minimum volume necessary to fill two one-liter jars and four small volatile organic analysis (**VOA**) jars flowed into the well. This is consistent with the soil strata seen when that well was logged and the hydraulic conductivities on the order of 1.0 x 10^{-8} cm/sec to 1.0 x 10^{-9} cm/sec that were measured in samples of clay from other borings drilled at the site that are recorded on Page 13 in Vol. I of the CAP. With the water table at a depth of some 6.5 to 8.5 ft. BGS, the effective screened interval of MWT-1 was some 12 ft. Clearly, if this well had been screened over a smaller length, given the low permeability of the clay materials in the strata which it intersects, it may easily have occurred that a well with a shorter effective screened length might have intersected so few of the more permeable very thin silt or silt and sand layers that occur in those materials that the well might have been essentially unusable as a source of groundwater samples that properly reflect contaminant concentrations in that area of the Site.

We also note that when attempting to recover groundwater samples in such materials as are present beneath the Oak Walk Site, it is necessary that a short well screen interval intersect a sufficiently-permeable zone that pumped groundwater will flow to the well from at least a moderate distance around the well. If a sample extracted from only a short, discrete interval captures only water trapped in a thin lens of permeable material of finite areal dimension, it may not produce the representative groundwater-quality data that is more likely to be recovered from a well with a longer screen length that is more closely equal to the dimensions of the minimum representative elementary volume. Well screens matched to the dimensions of the representative elementary volume are more likely to intersect more continuous thin or silty strata that in such environments are those which, particularly with increasing distance from the source, normally contain groundwater having the highest concentrations of COCs.

The pitfalls that can be encountered when attempting to investigate the hydrogeology and contaminant transport conditions in alluvial fans and similarly complex depositional environments if groundwater sampling systems are designed with insufficient consideration for site-specific phenomena and sampling strategies that are not commensurate with the minimum elementary volume that prevails under site-specific conditions are well documented in the literature (Salvany, et.al. 2004, Taylor and Lewin 1996).

For the reasons stated above, SJC respectfully disagrees with the opinion expressed in the ACEH Case Officer's letter regarding the appropriate screen length for the wells installed in the specific environment of the Oak Walk Site and, unless specifically directed otherwise, we plan to install wells according to the original design presented in the CAP. Of course, if the stratigraphy revealed in any specific well boring indicates that more than one strata of significantly higher permeability is encountered within the originally designed screen interval of a well, the professional geotechnical engineer in responsible charge of the work who will be present in the field at the time the borings are drilled and the wells installed will direct that the appropriate changes be made to the screened length of the well.

With respect to the use of multi-channeled wells, it has been the experience of the author of this report, who was involved in the early development of several of the designs for such systems, that it is difficult to purge reliably the individual channels of such systems and they lack reliability over the long period of use anticipated at the Oak Walk Site. We, therefore, plan to use a cluster of wells, each of which has a separate screened interval, to investigate changes of contaminant concentration with depth in the area of the site were BTEX compounds have been observed to be at a maximum.

3.4.3 Request for another post-remediation monitoring well to be installed in the area of former well MWT-7.

As can be seen by examining Figures I-2 and I-29 in Volume I of the Corrective Action Plan, the former location of Monitoring Well MWT-7 will, following redevelopment of the Oak Walk Site, be located beneath the structure of the principal building in the redevelopment. After additional stratigraphic information has been developed based on observations made in proposed Exploratory Trench No. 9 that is located as shown in Figure I-24 of Vol. I of the CAP, it is intended that proposed Monitoring Well MW-14 (see Figure I-29 in Vol. 1 for tentative location) will ensure that a monitoring well is located in the same paleo-streambed channel in which MWT-7 was located.

3.4.4 Monitoring of groundwater at former SFFBC tank site

The former site at which tanks were installed by the San Francisco French Bread Company (**SFFBC**) (see Figure A-2 for location), is, today, partially owned by The Oaks Club Room, LP (**Oaks Club**) and partially by the City of Emeryville. The part owned by the Oaks Club is on the Oak Walk Site and the part owned by the City is beneath 40th Street. Neither the Oaks Club nor the City have responsibility for discharges released at the SFFBC Site, but, under California Law, they have joint responsibility together with the discharger (*i.e.,* the San Francisco French Bread Company and its successors) for that site as property owners.

With respect to groundwater monitoring at the SFFBC Site, a well had been installed at the former tank site for the SFFBC by the Science and Engineering Analysis Corporation (**SECOR**) (Science and Engineering Analysis Corporation 1994). When the extension to 40th Street was constructed in the 1990s, that well was destroyed and, although according to a filing made with the ACEH, the City of Emeryville planned a replacement well for the one that was installed by SECOR, such was not installed. However, in conjunction with the environmental site characterization of the Oak Walk Site, Bay Rock Residential LLC (**Bay Rock**) voluntarily and at their expense, installed MW-3 at the location shown on Figure A-2 so that groundwater-quality monitoring capability could be restored at the former SFFBC tank site. The results of analyses of soil and groundwater recovered from MW-3 are recorded in Table I-4 of Volume I of the CAP and future rounds of groundwater sampling and analysis are planned for that well as part of the post-remediation groundwater monitoring program for the Oak Walk Site that is described in the CAP.

It is important to note that the groundwater-quality information gathered by SJC from MW-3 (and by others from its predecessor that was destroyed at the time that portion of 40th Street was constructed) is not the only site characterization information that has been available for several years that relates to the SFFBC gasoline tank leakage. As was summarized in the environmental site characterization report for the Oak Walk Site (The San Joaquin Company 2005) and in the corrective action report for the Andante property to the south of 40th Street (The San Joaquin Company 2003) both of which were filed with the ACEH, prior to the extension of 40th Street, Levine-Fricke undertook an extensive investigation of that street's right-of-way, including areas beneath 40th Street adjacent to the SFFBC tank site for the purpose of remediating affected soil and, indirectly, groundwater in that area (Levine-Fricke 1994, 1993a, 1993b). As has been noted previously, SECOR also investigated the site of the SSFBC tank (Science and Engineering Analysis Corporation 1994). All of the data gathered by the investigations and remedial activities in 40th Street on and around the SFFBC Site by the various consulting engineers were discussed in detail and tabulated in the environmental site characterization report prepared for the Oak Walk Site by SJC (The San Joaquin Company 2005). That site characterization report and all of the original source files that were produced by Levine-Fricke, SECOR and others that relate to the 40th Street investigations are on file at the ACEH.

We also note that, as is evident in the groundwater contours shown in Figure A-2, which is included in this document, the apparent direction of groundwater flow from the former SFFBC tank site is to the west-northwest onto the Oak Walk Site itself. Soil contamination and groundwater quality in the area down-gradient of the SFFBC tanks were investigated by means of borings BE-2 and BG-2 and wells MWT-2 and MW-2, the analytical data from which were presented in Tables I-2 and Table I-4 respectively of Volume 1 of the CAP.

After the soil remediation at the former SFFBC tank site, and the groundwater remediation in the vicinity of Monitoring Wells MW-2 and the former site of Monitoring Well MWT-2 that are described in the CAP have been completed, additional groundwater-quality data in the area down gradient from that tank site will be available from samples that will be recovered from Monitoring Wells MW-16A through MW-16C and Wells MW-2 and MW-3 as part of the post-remediation groundwater-monitoring program. Although a final evaluation will not be possible until those data are available, based on the work that SJC has completed to date on both the Oak Walk Site and the Andante property that borders the south side of 40th Street and the work that has previously been completed in 40th Street by City of Emeryville's consultants, we believe that it will be possible to "close" the SFFBC tank site at that time. When the necessary data has been gathered, we plan, in conjunction with the City of Emeryville's consultants, to prepare an engineering report that specifically addresses the environmental condition of SFFBC tank site, which will include recommendations for its future management.

To permit the issue of the SFFBC site to be comprehensively addressed, SJC has maintained close communication with the City of Emeryville's consultants throughout the period of our site characterization studies and corrective action planning related to both the Oak Walk and Andante sites. All information developed for the City of Emeryville has been freely provided to us and we have provided the City's consultants with either printed, CD-ROM formatted or electronic copies of all of the engineering reports we have issued for both the Andante and Oak Walk Sites and have also provided them with interim results as our work has progressed. We expect that cooperative effort to continue as future stages of the work are undertaken. If we receive requests from those parties, we also stand ready to cooperate in a similar manner with the consultants working on the environmental issues that relate to the former Boysen and Frank Dunne paint sites.

3.5 Post-remediation Risk Assessment

As is stated in Section 9 on page 56 of Volume I of the Corrective Action Plan and on Page 6, Section 1.6, Vol. II - Tier 2 Health Risk Assessment of the Corrective Action Plan, a post-remediation risk assessment is included in SJC's Corrective Action Plan.

3.6 Public Notification for CAP

The property of the following owners may be, to some limited extent, due to local changes in the groundwater regime resulting from installation of grout curtains designed to reduce flow through paleo streambed channels, affected by implementation of the Corrective Action Plan:

Residence at 1075 41st Street APN No.: 49-1025-10

Dona Davis/Jeanne Artaxet
32401 Edith Way
Union City, CA, 94587

Ennis Property at 4003-4099 Adeline APN Nos.: 49-1025-11, 49-1025-13-1

David Ennis/Carla Ennis
P.O. Box 10985
South Lake Tahoe, CA 96158

40th, 41st Streets; San Pablo Avenue

City of Emeryville*
Attn. Ignacio Dayrit
1333 Park Avenue
Emeryville, CA 94608

* Installation of the grout curtain in northeast corner of the Oak Walk Site may produce moderate changes in the groundwater regime in its near field that may change the current hydrologic heads and gradients in nearby areas beneath 41st Street. However, such changes are expected to be less than significant in an environmental context. In the case of 40th Street and San Pablo Avenue, implementation of the Corrective Action will significantly benefit the City by removing contaminated soil, extracting affected groundwater and reducing flow through paleo-streambed deposits that will improve environmental conditions in areas of the Oak Walk Site for which the City is a responsible party due to their ownership of the former Celis Service Station property.

3.7 Technical Report Requests

This addendum complies with the directive in ACEH's October 12, 2006 letter to respond to technical comments included in that document and to provide the requested list of neighboring property owners.

Figure I-32 in Vol. 1 of the Corrective Action Plan provides a detailed schedule for the CAP that is broken down into 20 activity categories. Due to uncertainties in the regulatory processes of the numerous agencies involved in approving the Oak Walk Redevelopment, all of which must be complete for the City of Emeryville to approve the project, which approval will be required to obtain project financing, including financing for the Corrective Action Program, it is only possible to present that schedule in the form of durations in weeks following authorization to begin work on the site. However, if the few remaining regulatory questions can be promptly resolved, we expect those processes to be complete by November 30, 2006. Unfortunately, due to the onset of the rainy season in Bay Area, it will now be necessary to postpone any significant work on the site until approximately May 2007. Although that major delay will drive the project schedule, it may be possible to perform some minor elements of the CAP during the winter months. As best we are able to plan at the time of preparation of this Addendum, the tentative schedule for the submittal of the reports requested in the October 12, 2006 letter is as follows:

REPORT	*TENTATIVE SUBMISSION SCHEDULE* *
Remediation Completion	August 30, 2007
Soil Gas Survey	June 30, 2007

Post Remediation Monitoring	1st Quarterly Report December 30, 2008
Post Remediation Risk Assessment	January 30, 2009
Proposed Deed Restriction	January 30, 2009

> * NB: The tentative submission dates cited are predicated upon ACEH's prompt final approval of the CAP. No work on any elements of the corrective action plan can begin until Bay Rock receives final written approval of the CAP from the ACEH. This is because the City of Emeryville will not allow any work on the proposed redevelopment (including any remediation work or any on site work preliminary to the remediation work) to proceed until that written approval has been received. Furthermore no financing can be obtained to implement the CAP until The City of Emeryville release the site for demolition and construction. Under the prevailing conditions of the hosing market any significant additional delay will threaten the viability of the redevelopment project for which the proposed corrective action plan relies for financial support.

3.8 Electronic Submittal of Reports

SJC has prepared electronic versions of The Environmental Site Characterization Report, The Corrective Action Plan and this Addendum to The Corrective Action Plan for the Oak Walk Site in the electronic format required for uploading to the California State Water Resources Control Board's (**SWRCB**) Geotracker database. Following ACEH's recent registration of the site in that database as a Spills-Leaks-Investigations-Cleanup (**SLIC**) site under the Global Identification Number: T06019705080, application was made to the SWRCB for authorization to upload the reports. When that authorization has been received the cited reports will be uploaded to the database.

4.0 REFERENCES

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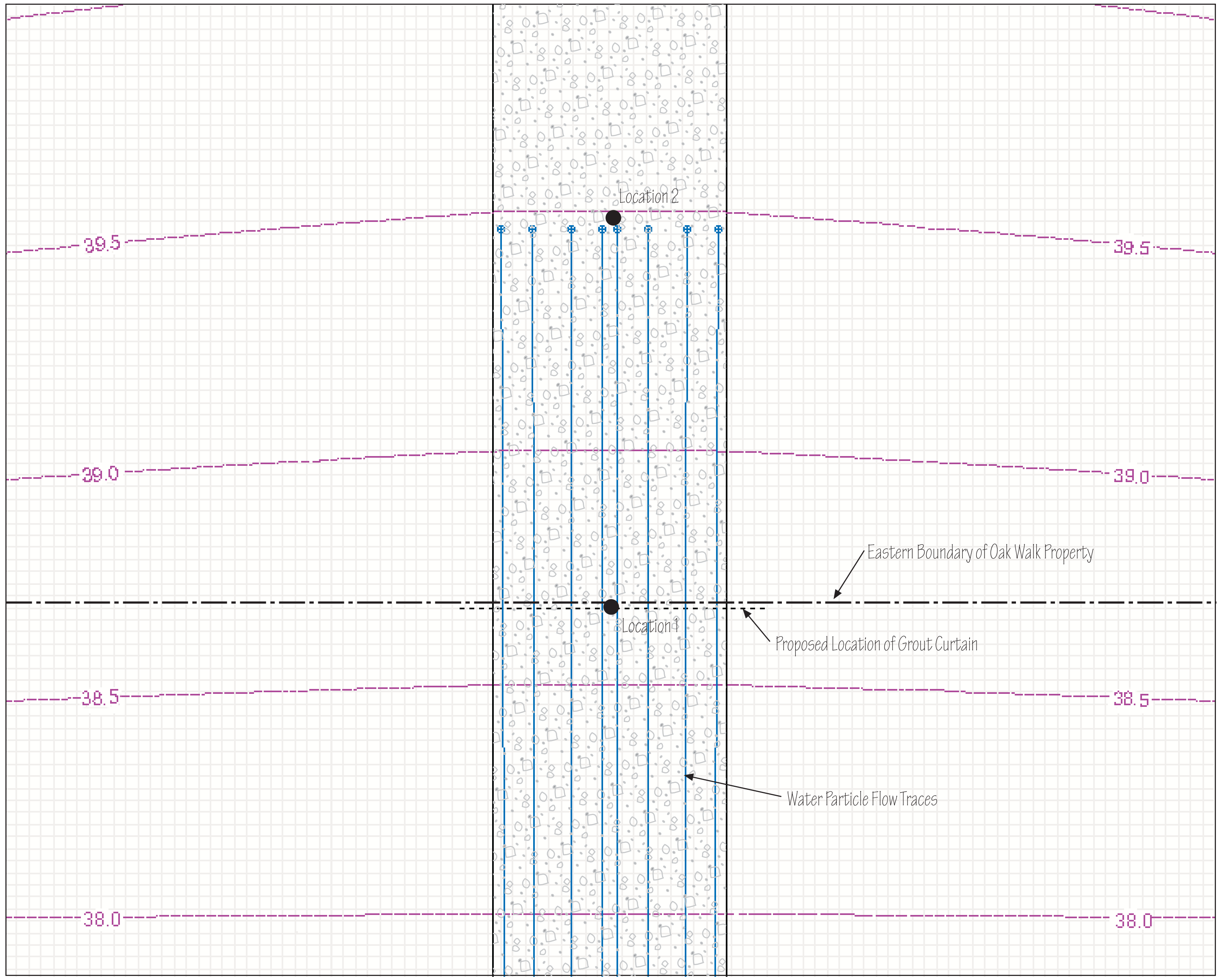
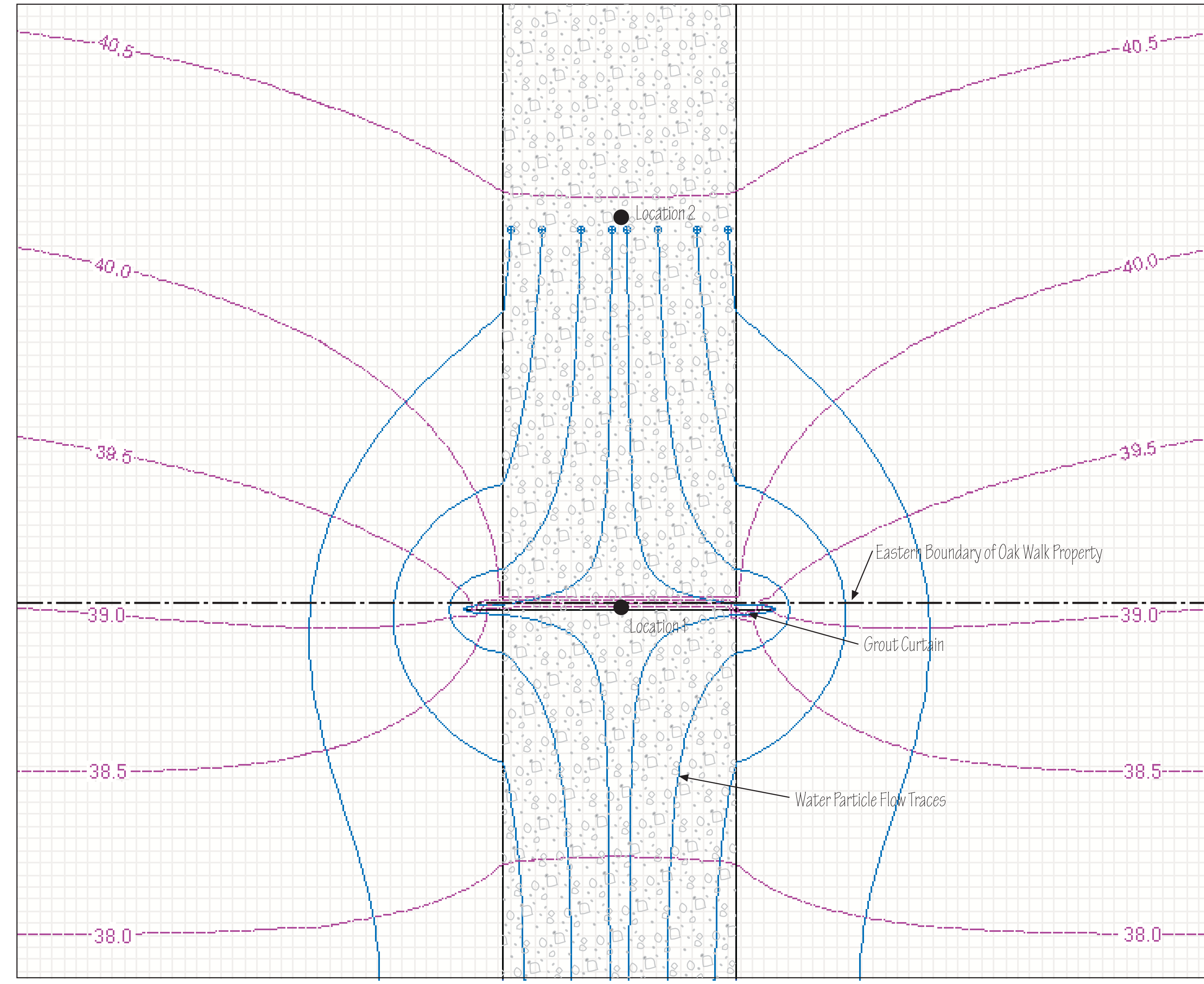
Case A
Free Flow in Stream Channel



Case B
Grout Curtain Installed in Channel



EXPLANATION

39.0 - - - - - Equipotential Lines (head in feet)

Water Particle Flow Trace

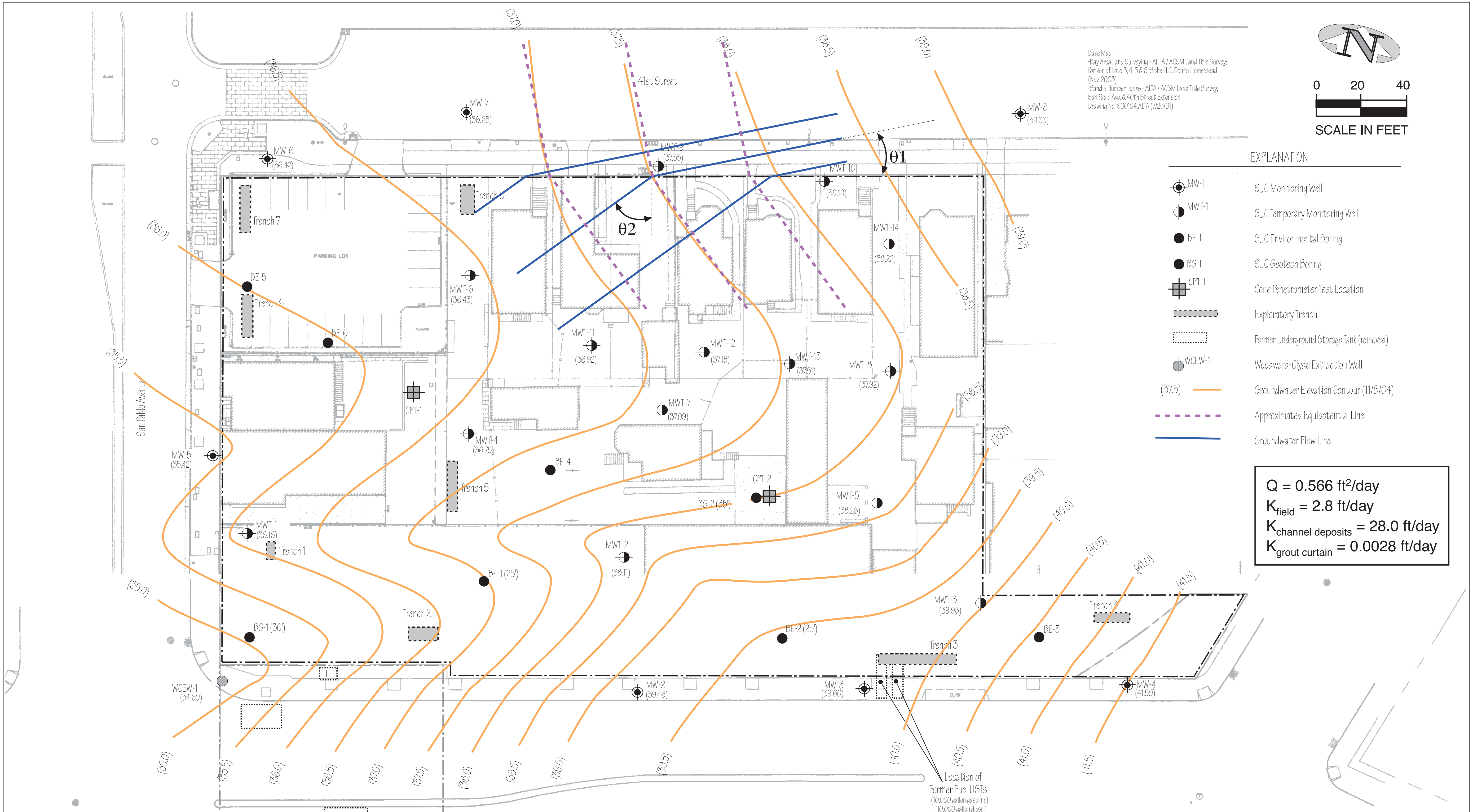
Paleo Streambed

$Q = 0.566\ ft^2/day$
$K_{field} = 2.8\ ft/day$
$K_{channel\ deposits} = 28.0\ ft/day$
$K_{grout\ curtain} = 0.0028\ ft/day$

0 10 20
SCALE IN FEET

MODELED FLOW IN PALEO STREAMBED
Oak Walk Redevelopment Project
Emeryville, California

FIG A-1	**The San Joaquin Company Inc.**	Project Number: 0004.084 Drawn by: GNM Date: 11/07/06



Former USTs
A = 4000gal. Unleaded Gas UST
B = 3500gal. Super Unleaded Gas UST
C = 2000gal. Unleaded Gas UST
D = 6000gal. Regular Gas UST
E = 7500gal. Diesel UST
F = 550gal. Waste Oil UST

NOTE:
All SJC Monitoring Wells (MW), Temporary Wells (MWT) and Borings (B) are TD 20' unless noted otherwise.

REFRACTION OF GROUNDWATER FLOW LINES
Oak Walk Redevelopment Project
Emeryville, California

FIG A-2	**The San Joaquin Company Inc.**	Project Number: 0004.084 Drawn by: GNM Date: 11/08/06

Appendix A-1

Letter from Alameda County Environmental Health Care Services Agency,
Environmental Health Services
dated October 12, 2006

Dw

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

October 12, 2006

Mr. Peter Schellinger
BayRock Residential, LLC
5801 Christie Ave., Ste. 455
Emeryville, CA 94608

Dear Mr. Schellinger:

Subject: Toxics Case RO0002733, Oak Walk Development, 0 San Pablo Ave., Emeryville, CA 94608

Alameda County Environmental Health (ACEH) has reviewed the case file for the subject and adjacent sites including the July 2006 Corrective Action Plan Oak Walk Redevelopment Site prepared by The San Joaquin Company, Inc. The Corrective Action Plan (CAP) includes a Site Description and History, Site Setting and Regional Hydrogeology, Results of Site Characterization, Tier 2 Risk Assessment, Proposed Corrective Action and Post Remediation Monitoring. We generally concur with the proposed Corrective Action Plan and Post Remediation Monitoring, however, we request that you address the following technical comments when performing the proposed work and submit the technical reports requested below.

TECHNICAL COMMENTS

1. **Identification of Sources of Contamination-** It appears that coarse-grained sand and gravel channels exist up-gradient of the site and are likely the sources of TPH as mineral spirits identified in soil and groundwater on-site. It also appears that the former Celis Service Station and former San Francisco French Bread (SFFB) sites have caused TPHg, BTEX and TPHd contamination to portions of the site and are responsible for contamination which has migrated off-site. It also appears that sources of contamination likely exist on-site (in addition to the SFFB site) which have commingled with the known releases. To determine which parties are responsible for which contamination may be academically challenging, however, it may not be the best use of resources and would significantly delay site remediation and development, therefore, we encourage all responsible parties to co-operate in terms of generating compatible and comprehensive CAPs. We acknowledge that the overall understanding of releases and their migration beneath this site and nearby properties has been greatly enhanced by your consultant.

2. **Proposed Corrective Action-** The proposed CAP includes multiple actions. These actions target the highest known impacted areas and will reduce contamination and potential risk in these areas. However, the affect on the total residual mass of contamination at the site is unknown. We have the following comments to the CAP components:

   Grout Curtain Installation- Three grout curtains are proposed, along the eastern and western boundaries and near the southeastern corner of the site, in the assumed areas of the permeable channels. Because the installation of grout curtains will have the effect of decreasing groundwater flow beyond this barrier, please explain what will be the effect on the adjacent subsurface properties. How would this affect the health risk to these neighboring properties? Were other alternatives considered to treat groundwater as opposed to blocking and redirecting it? To ensure that the locations of the proposed trenches are appropriate, three trenches (9-11) will be excavated to verify the presence of paleo streambed channels. We approve this action since this will provide additional information and understanding to the site conceptual model and hydrogeology of the site.

Groundwater Remediation- Two groundwater extraction ponds are proposed in locations near MWT-7 and MW-2, areas where elevated TPH gasoline range and benzene concentrations were detected, respectively. An estimated 20,000 gallons of groundwater is proposed for extraction from each pond. It is estimated that the concentrations of groundwater contamination will be reduced to 40% of the original. How will this determination be done? Will more groundwater be extracted if needed to reach this goal? Given the unknown mass of contaminant, is this a realistic goal?

Excavation of Hydrocarbon Impacted Soil- Soil excavation is proposed in two areas to facilitate the development, Remedial Excavation No. 1 and No. 2, which will be excavated to 7' and 6', respectively. Since these areas may encounter hydrocarbon impacted soil, soil sampling and analysis on 25' grids will be done after soil excavation. This data should be used in your post-remediation risk assessment.

Install Engineered Vapor Barrier- As added insurance to indoor air exposure to organic volatiles, an impermeable membrane, Liquid Boot, is proposed for installation beneath the floor slabs of all buildings at the site. The only exception will be the parking garage. We concur with this action.

Administrative Control- We agree that a deed restriction be placed on the property limiting the future use of the property and ensuring the integrity of the impermeable membrane. The specifics contents of the deed restriction will be determined with discussion with our agency but may include detailed figures of initial and post-remediation soil and groundwater concentration and site use restrictions using Alameda County format.

Post Remediation Monitoring- Ten monitoring wells, seven individual well locations and one well cluster of three wells with varying screen intervals are proposed for post-remediation groundwater monitoring. The fully screened monitoring well diagram indicates a screen interval of 15'. Our office prefers the use of shorter screened wells (3' to 5' sand pack) to isolate the contaminated interval and reduce dilution effects of the long screened wells. Proposed wells 16A-16C, are proposed as fully screened 5-15', 15-20' and 20-25' screened wells to compare groundwater concentrations with depth. We suggest drilling a pilot boring to take depth discrete soil and groundwater samples and we request further vertical delineation if contamination is detected in the deepest screened depth. We recommend that multi-channeled wells be installed if multiple water bearing zones are detected and determined necessary to monitor. We request that another well be installed in the area of former well MWT-7, where elevated TPHg was previously detected. Because the SFFB release has not been adequately investigated, there is a possibility that off-site contamination resulted from this release. Therefore, we request you co-operate with the Green City, ONE, and Celis properties to insure off-site monitoring is coordinated and is sufficient to monitor the plume(s) down-gradient of this site. This request is also made of the Green City, ONE, and Celis properties by copy of this letter.

Soil Gas Survey- Our office appreciates your consultant's opinions doubting the reliability and site applicability for soil vapor samples but does agree that the proposed soil vapor sampling and soil sampling will be useful to supplement the rest of data being accumulated for the site. Because residential buildings are being proposed, unknown amounts of residual hydrocarbons will be left in-place, the complex nature of the releases, and that site closure will ultimately be requested, our office concurs with the proposed soil gas survey.

Post-Remediation Risk Assessment- Prior to your recommendation for site closure, we request that you submit a post remediation risk assessment using current analytical data and site conditions.

3. **Public Notification for CAP-** We request that you provide our office with the names, addresses and parcel numbers for those neighboring sites which might have direct or indirect impacts from the proposed corrective actions. We shall notify these individuals that the CAP may be reviewed for comment either remotely or at the County offices. Only those corrective actions, which might have some impact on the neighboring property require notification prior to their initiation.

TECHNICAL REPORT REQUEST

Please provide the following technical reports according to the following schedule:

- **November 13, 2006-** CAP Addendum responding to technical comments above and proposal for off-site well(s).
- **November 13, 2006-** list of neighboring sites for public notification.
- **November 13, 2006-** tentative schedule for the submittal of the Remediation Completion Report, Soil Gas Survey Report, Post-remediation Monitoring Reports, Post-remediation Risk Assessment and proposed Deed Restriction

ELECTRONIC SUBMITTAL OF REPORTS

Effective **January 31, 2006**, the Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of all reports in electronic form to the county's ftp site. Paper copies of reports will no longer be accepted. The electronic copy replaces the paper copy and will be used for all public information requests, regulatory review, and compliance/enforcement activities. Please do not submit reports as attachments to electronic mail.

Submission of reports to the Alameda County ftp site is an addition to existing requirements for electronic submittal of information to the State Water Resources

Control Board (SWRCB) Geotracker website. Submission of reports to the Geotracker website does not fulfill the requirement to submit documents to the Alameda County ftp site. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for groundwater cleanup programs. For several years, responsible parties for cleanup of leaks from underground storage tanks (USTs) have been required to submit groundwater analytical data, surveyed locations of monitor wells, and other data to the Geotracker database over the Internet. Beginning July 1, 2005, electronic submittal of a complete copy of all necessary reports was required in Geotracker (in PDF format). Please visit the SWRCB website for more information on these requirements (http://www.swrcb.ca.gov/ust/cleanup/electronic_reporting).
In order to facilitate electronic correspondence, we request that you provide up to date electronic mail addresses for all responsible and interested parties. Please provide current electronic mail addresses and notify us of future changes to electronic mail addresses by sending an electronic mail message to me at barney.chan@acgov.org.

We note that not all reports have been submitted to the Geotracker database. Please submit them immediately to this database.

PERJURY STATEMENT

All work plans, technical reports, or technical documents submitted to ACEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "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." This letter must be signed by an officer or legally authorized representative of your company. Please include a cover letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6735, 6835, and 7835.1) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately registered or certified professional. For your submittal to be considered a valid technical report, you are to present site specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this fuel leak case meet this requirement.

If you have any questions, please call me at (510) 567-6765.

Sincerely,

Barney M Chan

Barney M. Chan
Hazardous Materials Specialist

cc: files, D. Drogos
Mr. Dai Watkins, The San Joaquin Co. Inc., 1120 Hollywood Ave., Suite 3, Oakland, CA 94602
Mr. John Tibbetts, 4097 San Pablo Ave., Emeryville, CA 94608
Mr. Ignacio Dayrit, City of Emeryville, 1333 Park Ave., Emeryville, CA 94608
Mr. Constantino Cellis, c/o Mr. Ignacio Dayrit, City of Emeryvile, 1333 Park Ave., Emeryville, CA 94608
Mr. Martin Samuels, Green City Development Group, 3675 Del Monte Ave., Oakland, CA 94608
Mr. Terry Turner, Dunne Quality Paints, 707 Glenside Circle, Lafayette, CA 94599
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