California Regional Water Quality Control Board
San Francisco Bay Region

Linda S. Adams
Acting Secretary for Environmental Protection

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http://www. waterboards.ca.gov/sanfranciscobay

Edmund G. Brown, Jr.
Governor

Date: June 10, 2011
File No. 43S1101 (NMK)

L. Gerald Hunt, As Receiver
c/o Quattro Realty Group, LLC
390 Railroad Avenue, Suite 200
Danville, CA 94526
Attn: Mike Parker
mparker@quattrorealty.com

City of Sunnyvale Redevelopment Agency
456 West Olive Avenue
Sunnyvale, CA 94086
Attn: Gary Luebbers
citymgr@ci.sunnyvale.ca.us

SUBJECT: No Further Action, Former Sunnyvale Town Center Mall, Block 3
Sunnyvale, Santa Clara County

Dear Mr. Parker and Mr. Luebbers:

This letter confirms the completion of investigation for the subject property.

Block 3 is located on the northern central portion of the former Sunnyvale Town Center Mall ("STCM") property, and is bounded by Washington Avenue to the north, West McKinley Avenue to the south, Taaffe Street to the west, and Murphy Avenue to the east (Figure 1). Block 3 is identified on the attached parcel map compiled from Pages 45 to 55, Book 818, Santa Clara County Records. Block 3 is comprised of two individual parcels, and is one of six blocks that comprises the former STCM (Figure 2).

As discussed in the attached Case Closure Summary, environmental due diligence assessments were performed in connection with the purchase and redevelopment of Block 3 by the Downtown Sunnyvale Mixed Use LLC ("DSMU") and the City of Sunnyvale Redevelopment Agency (the "Agency"). Following the 2008/2009 financial crisis, DSMU was unable to proceed with development of the former STCM property, and all work on Block 3 stopped. Foreclosure proceedings subsequently were initiated and, on October 5, 2009, Quattro Realty Group, LLC, was appointed by the Santa Clara County Superior Court as the Receiver of the former STCM property in Wachovia Bank v. Downtown Sunnyvale Residential, et al., and assumed all powers, duties and authorities necessary to control the former STCM property, including Block 3. Since that time, the Receiver and the Agency have been coordinating environmental efforts to prepare the former STCM property for development and ultimate sale to a permanent developer.

Block 3 of the STCM property is currently developed with a Macy's Department store, and four new buildings are under construction (Buildings H, I, J and L). Additional commercial buildings on Block 3 may be constructed in the future.

Tetrachloroethene (PCE) and other VOCs have been detected in soil, soil gas and groundwater on Blocks 5 and 6 immediately to the southeast and east of Block 3. These conditions were caused by releases from historic dry cleaners located on the eastern portion of the former STCM property along the east side of the former Murphy Avenue alignment. Previous investigations have shown that PCE and other VOCs detected in soil gas on the northeastern portion of one parcel on Block 3 (209-35-023) is due to lateral migration of soil gas from the source areas on Blocks 5 and 6. A soil gas extraction system (comprised of the northeast and southeast systems collectively operated in 2008/2009. The soil gas extraction system removed over 300 lbs of PCE and substantially lowered PCE soil gas concentrations. The re-activation of this system is proposed for Blocks 5 and 6 and northeast operation includes two extraction points on Block 3. This program will mitigate potential impacts from the migration of VOCs in soil gas from source areas on Blocks 5 and 6.

A groundwater remediation program consisting of Zero Valent Iron injections and the installation of a vegetable oil bio-barrier along the downgradient side of the STCM, including on and downgradient of a portion of Block 3 onto which impacted groundwater had migrated, was also conducted in 2008 and has been shown to be effective in reducing PCE mass and lowering dissolved PCE concentrations in groundwater. This treatment system was designed to remain functional for approximately 10 years and to mitigate any potential impacts from the migration of VOCs in groundwater from source areas on Blocks 5 and 6.

Based upon the available information, including the current and contemplated land use, and with the provision that the information provided to this agency was accurate and representative of site conditions, no further action is required at Block 3 with respect to pollutant releases at the Sunnyvale Town Center site.

If you have any questions, please contact Nathan King of my staff at (510) 622-3966 [e-mail nking@waterboards.ca.gov].

Sincerely,

for

Digitally signed by Stephen Hill
Date: 2011.06.10 13:42:08
-07'00'

Bruce H. Wolfe
Executive Officer

Attachments: Case Closure Summary
Exhibit A: Figures Block 3
cc with attachments: Mailing List

Mailing List

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CASE CLOSURE SUMMARY

I. AGENCY INFORMATION

Date: June 10, 2011

Agency Name: SF Bay Regional Water Quality Control Board	Address: 1515 Clay Street, Suite 1400
City/State/Zip: Oakland, CA 94612	Phone: 510-622-2300
Responsible Staff Person: Nathan King	Title: Engineering Geologist

II. SITE INFORMATION

Site Facility Name: Former Sunnyvale Town Center Mall, Block 3		
Site Facility Address: Block 3 is bound by West Washington Avenue/ Taaffe Street /East McKinley Avenue / Murphy Avenue , Sunnyvale, Santa Clara County, CA Block 3 includes parcels 209-35-022, 209-35-023.		
RB Case No.: 43S1101	Local Case No.: N/A	Priority: N/A
Responsible Parties		
Gerald Hunt, As Receiver in Wachovia Bank v. Downtown Sunnyvale Residential, et al. c/o Quattro Reality Group, LLC 390 Railroad Ave, Ste. 200, Danville, CA 94526 Attn: Mike Parker (925) 314-2712		
City Of Sunnyvale Redevelopment Agency 456 West Olive Avenue Sunnyvale, CA 94086 Attn: Gary Luebbers		

III. RELEASE AND SITE CHARACTERIZATION INFORMATION

Cause and Type of Release: Operational releases from adjacent properties. See Section VI		
Site characterization complete? Yes	Date Approved by Oversight Agency: N/A	
Monitoring wells installed? Yes	Number: 1	Proper screened interval? Yes
Highest GW Depth Below Ground Surface: 29.39 ft	Lowest Depth: 35.24 ft	Flow Direction: North to Northeast
Most Sensitive Current Use: Commercial		
Most Sensitive Potential Use and Probability of Use: Residential		
Are drinking water wells affected? No	Aquifer Name: Santa Clara Valley Groundwater Basin	
Is surface water affected? No	Nearest surface water name: Stevens Creek, located 1.9 miles west of site.	
Off-Site Beneficial Use Impacts (Addresses/Locations): None		
Report(s) on file? Yes	Location of Reports: San Francisco Bay Regional Water Quality Control Board, GeoTracker and the Sunnyvale Public Library.	

MAXIMUM DOCUMENTED POLLUTANT CONCENTRATIONS—BEFORE AND AFTER CLEANUP

POLLUTANT	Soil (µg/kg)		Water (µg/L)		POLLUTANT				
	Before	After	Before	After					
TPHd	1.1[1]	-	<28[2]	-					
PCE	330[3]	-	1150[4]	780					
TCE	ND	-	<0.5	6.4[5]					

Comments:

1 = Highest concentration of TPHd detected in soil collected from soil boring TCM-10 at 29 feet bgs (T&R, 2008)
2 = Concentration of TPHg, TPHd or TPHmo reported in groundwater well MW-5, 1/22/07 (Golder Associates, 2007)
3 = Highest concentration of PCE detected in soil collected from boring MW-5 at depth of 5.5 bgs (T&R, 2008)
4 = Highest concentration of PCE detected in groundwater collected from well MW-5 on 01/22/2007 (Golder 2007)
5 = Highest concentration of TCE detected in groundwater collected from MW-5 on 04/02/2011 (T & R, August 2008)
Note: this is a daughter product from PCE breakdown induced by remedial action on Block 6.
TPHd = Total petroleum hydrocarbons as gasoline, diesel and motor oil
PCE = Tetrachloroethene
TCE = Trichloroethene
- = not resampled
ND = Not Detected above laboratory reporting limits
N/A = Not Applicable
bgs = feet below ground surface

IV. CLOSURE

Does completed corrective action protect existing beneficial uses per the Regional Board Basin Plan? No corrective action has occurred on Block 3.		
Does completed corrective action protect potential beneficial uses per the Regional Board Basin Plan? N/A		
Does corrective action protect public health for current land use? N/A		
Site Management Requirements: None		
Monitoring Wells Decommissioned: Yes	Number Decommissioned: 1	Number Retained: 1
List Enforcement Actions Taken: None		
List Enforcement Actions Rescinded: None		

V. TECHNICAL REPORTS, CORRESPONDENCE, ETC., THAT THIS CLOSURE RECOMMENDATION WAS BASED UPON

Groundwater Monitoring Well Abandonment (Treadwell & Rollo)	August 31, 2007
Revised Supplemental Site Investigation (Treadwell & Rollo)	June 3, 2008
Phase II Environmental Site Assessment (Golder Associates)	March, 5, 2007
Workplan For Additional Site Groundwater Assessment (Treadwell & Rollo)	February 2007
Letter Report Limited Phase II Environmental Investigation (URS)	February 28, 2007
Phase I Environmental Site Assessment (Golder Associates)	January 2007
Phase I Environmental Site Assessment (Golder Associates)	March 29, 2007
SVE System Interim Remedial Measure Installation and Startup Report	March 14, 2008
Groundwater Interim Remedial Measures Workplan (Treadwell & Rollo)	August 8, 2008

VI. ADDITIONAL COMMENTS, DATA, ETC.

This closure addresses the site investigation conducted between 2005 and 2008 in Block 3 of the STCM. Block 3 is located in the north central portion of the STCM (Figures 1 and 2, Exhibit A). Block 3 is comprised of two individual parcels:

- 209-35-022
- 209-35-023

Block 3 has been characterized by the results of soil and groundwater investigations conducted between 2005 and 2008. Exposure pathways, receptors and potential risks, threats and other environmental concerns were evaluated. The investigation of Block 3 consisted of the following:

- Phase I and II Environmental Site Assessments
- The advancement of one CPT/hydropunch
- The advancement of one Geoprobe soil boring
- The installation of two groundwater monitoring wells
- The advancement of twenty one soil gas borings

Between 2005 and 2008, multiple Phase I and Phase II Environmental Site Assessments were conducted on the whole of the STCM. In addition large scale vapor extraction was conducted on the eastern portion of the site (Blocks 5, 6 and a portion of Block 3) along with a groundwater remediation program consisting of zero valent iron injections and a vegetable oil bio-barrier for dechlorination of volatile organic compounds (VOCs) (shown on Figure 26, Exhibit A).

Figures depicting site features and sample locations are included in Exhibit A, and reports with the analytical results for samples collected on and near Block 3 are available on the Regional Water Board GeoTracker website at: https://geotracker.waterboards.ca.gov/.

Previous Investigations

Golder Associates

In November 2006, Golder Associates advanced Geoprobe boring TCM-10 along the eastern boundary of Block 3 to a depth of approximately 42 feet bgs (Figure 3). Golder collected both soil and groundwater grab samples from the boring which were analyzed for VOCs and total petroleum hydrocarbons as gasoline, diesel and motor oil (TPHg, TPHd and TPHmo). PCE was detected at maximum concentrations of 140 µg/kg, and TPHd at 1.1 µg/kg in soil samples collected from TCM-10.

PCE was detected in the groundwater grab sample collected from TCM-10 at 50 µg/L. No other analytes were detected.

Treadwell & Rollo

In 2007, Treadwell & Rollo collected grab groundwater samples from two hydropunch borings (TR-4 and TR-29) on the northeastern corner of Block 3 (Figure 3). The samples from TR-4 contained 1100 µg/L of PCE at approximately 32 feet below grade but decreased an order of magnitude in successive samples to 80 feet bgs. The two groundwater samples in TR-29 from 111 and 120 feet below grade were near or below the method detection limit for PCE of 0.5 µg/L. PCE was the only VOC detected in both of the Treadwell & Rollo hydropunch samples.

Treadwell & Rollo also advanced a soil boring (TR-SB-19) on Block 3 in 2007 (Figure 3), however it was installed solely for soil properties testing and no chemical sampling was performed.

URS

In January 2007, URS installed groundwater monitoring wells MW-4 and MW-5 on the northwestern and northeastern corners, respectively, of Block 3 (Figure 3). Soil and groundwater

samples were collected and analyzed for VOCs and total petroleum hydrocarbons as TPHg, TPHd and TPHmo. No analytes were detected in the soil or groundwater samples collected from MW-04, and the well was abandoned in August 2007. PCE was detected in soil samples collected from MW-05 at a maximum concentration of 330 µg/kg at 5.5 feet bgs and decreased with increasing depth.

PCE was initially detected in groundwater samples collected from MW-05 at a concentration of 1150 µg/L, but has been decreasing over time. In May 2008, TCE was detected in a water sample collected from well MW-5 for the first time at 3.5 µg/L. Analysis of the latest sample from MW-5 (April 2, 2011) detected 790 µg/L PCE and 6.4 µg/L TCE. Some small increases in TCE are anticipated as the breakdown of PCE is facilitated by the Zero Valent Iron injections which are part of the remedial action for VOCs migrating from source areas on the adjacent Block 6 (discussed below). No other analytes were detected in groundwater samples collected from well MW-05.

Soil Gas Investigation

Treadwell & Rollo advanced twenty one soil gas borings during two field events, in August/September of 2007 and March 2008 (Figure 3). Soil gas samples from both grab samples and permanent vapor monitoring wells were analyzed for VOCs. PCE was the only VOC to exceed the commercial ESL in the one-time soil gas sample borings, including one sample from the eastern side of Block 3 (570,000 µg/m^3) in boring TR-SG-04 in August, 2007. Boring TR-SG-04 was located about 20 feet inside the eastern boundary of Block 3 (figure 3). The closest permanent (reproducible) monitoring point to grab soil gas sampling point TR-SG-04 is NSV-2 (about 50 feet west of TR-SG-04, Figure 4). PCE vapor concentration in NSV-2, before operation of the northeastern SVE system, was 110,000 µg/m^3. However, since operation of the SVE system in this area the PCE concentrations have been consistently reduced by approximately 75%. The previous grab soil gas sample from TR-SG-04 is not considered representative of current conditions. For example, the most recent sample collected from NSV-2 in March 2011 was 28,000 µg/m^3 (after a 30 month rebound period).

Although elevated concentrations of PCE have historically been detected in Block 3 soil gas samples along the boundary with Block 6, they are due to lateral migration of PCE in soil vapor from the documented source areas (three former dry cleaning operations on the east side of Murphy Avenue) on Blocks 5 and 6. Historical investigation has shown no evidence of a source area of VOCs on Block 3. The northeastern vapor extraction system on Block 6, which includes wells NSV-2 and NSV-3 that are located on Block 3, has demonstrated the ability to lower concentrations dramatically in the eastern portion of Block 3 and is expected to mitigate potential impacts from the Block 6 and Block 5 sources to the east and southeast.

Murphy Avenue Sewer Line Investigation

Sixteen trench soil samples (Trench 1-16) and three pipe material samples (OSP-1 thru 3) were collected in January and February 2009 during the installation of the new Murphy Avenue sewer line which adjoins the eastern side of Block 3. All samples were analyzed for VOCs, and one trench sample (T- 13) and the three pipe material samples were analyzed for semi-VOCs, TPHg, TPHd, TPHmo, PCBs, and metals. PCE was only detected in one trench sample at 13 µg/kg.

Other analytes were not detected or were detected at very low concentrations. No analytes were detected above their respective RWQCB ESLs. The location of these samples is shown on Figure 4 (Sewer Trench Excavation Soil Sampling Locations).

Extent of Soil Gas and SVE

As noted above, the presence of elevated soil gas concentrations beneath Block 3 is due to lateral migration from source areas on Blocks 5 and 6. Numerous soil gas samples have been collected from the adjacent Block 6 property that have shown persistent high concentrations of VOCs, dominantly PCE, in the central portion of the Block near two former dry cleaning operations. In 2008 the northeastern and southeastern vapor extraction systems were installed and operated for one year to remediate soil vapor contamination related to releases from these former dry cleaners. A portion of the northeastern system (extraction wells NSV-2 and NSV-3) was located on Block 3 in order to mitigate soil gas moving from the source areas. These two wells, along with two vapor monitoring wells (NM-2 and NM-3) that were installed on Block 5 in 2008, are shown on Figure 5 of Exhibit A.

Soil gas samples collected from the vapor extraction and vapor monitoring wells located on Block 3 that are part of the Block 6 remediation activities have shown that operation of the SVE system for approximately 10 months reduced vapor concentrations in monitoring wells NM-2 and NM-3 by approximately 70-90 percent of their initial value as measured after a 27 month rebound. While the systems were operating, the PCE vapor concentrations remained much lower and were approaching ESLs. Figure 21 (Exhibit A) shows the PCE in soil gas at the site in January 2008, before any SVE operations had been conducted. Figure 25A shows the latest soil gas sampling results from the first quarter of 2011. These figures demonstrate the efficacy of the SVE system to reduce mass and control migration of PCE soil gas from the source areas on Blocks 5 and 6. It is believed that the continued operation of the SVE system on Blocks 5 and 6 will mitigate the migration of PCE in soil vapor beneath Block 3 and ultimately reduce levels to below ESLs.

Groundwater Remediation

As with PCE in soil gas beneath Block 3, dissolved PCE present in groundwater beneath Block 3 originated from source areas on Blocks 5 and 6. In 2008 an interim remedial action for groundwater was undertaken and a treatment system installed on Block 6, and a portion of Block 3, consisting of zero valent iron (ZVI) injections and the placement of a vegetable oil (VO) bio-barrier along Washington Avenue (Figure 26, Exhibit A). The results of this groundwater remediation have been to significantly reduce dissolved PCE concentrations in on-site wells, including well MW-5 on Block 3. As noted above, the PCE concentration in this well has dropped from a high of 1150 µg/L in the summer of 2007 to 790 µg/L of PCE in April 2011. Figure 22A (Exhibit A) shows isoconcentration lines for PCE in groundwater at the site in January 2008, before any remedial actions had been conducted. Figure 23A shows the latest groundwater sampling results for PCE from the first quarter 2011. These figures demonstrate the efficacy of the ZVI/VO Barrier system to reduce mass and limit migration of dissolved PCE in groundwater from the source areas on Block 6. It is expected that the continuing dechlorination

related to the ZVI injections will continue to remediate groundwater impacts beneath the eastern portion of Block 3.

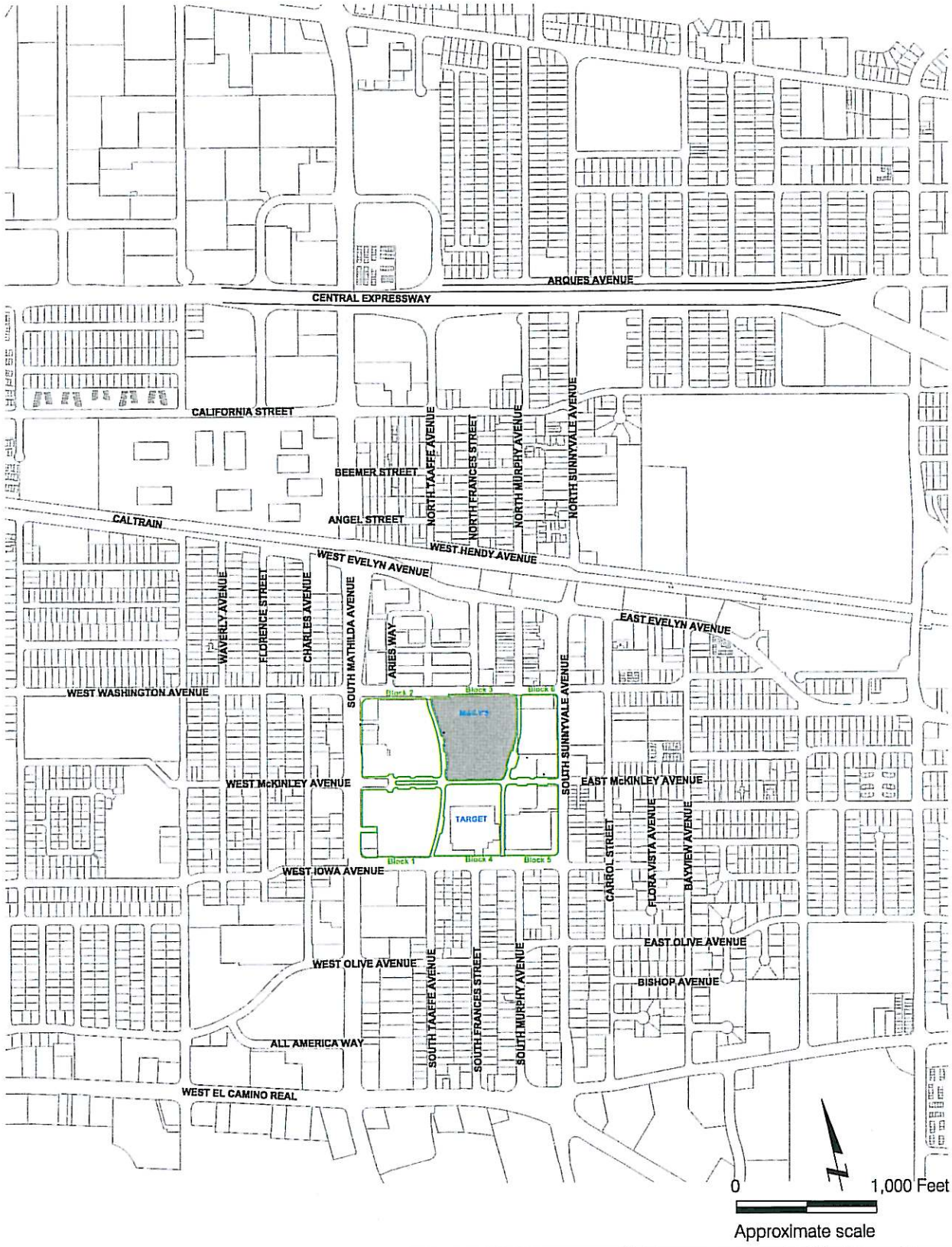
Conclusion

There are no indications that Block 3 has been, or is a source of the contaminants detected in soil gas and groundwater at the STCM. With the remedial activities proposed for Block 5 (to the southeast) and Block 6 (to the east), limiting the migration of soil gas and impacted groundwater from these Blocks onto Block 3, there are no unacceptable risks to human health, ecological health, and sensitive receptors, considering current and reasonable future land and water uses. There are also no unacceptable threats to groundwater and surface water resources, considering current and reasonable future beneficial uses. The Regional Water Board staff recommends this case for closure.

This document and the related CASE CLOSURE LETTER shall be retained by the lead agency as part of the official site file.

EXHIBIT A

FIGURES



SUNNYVALE TOWN CENTER MALL SITE
BLOCK 3
Sunnyvale, California

SITE LOCATION MAP

Ground Zero Analysis, Inc.

Date 05/01/11	Project No. 866	Figure 1

D:\Work\GZA\866\Sunnyvale Town Center NFA Reports\F1 – Site Location_Block 3.dwg 5/01/11

EXPLANATION

209-35-028 Parcel number

Block 1 Block number

0 200 Feet

Approximate Scale

SUNNYVALE TOWN CENTER MALL SITE
BLOCK 3
Sunnyvale, California

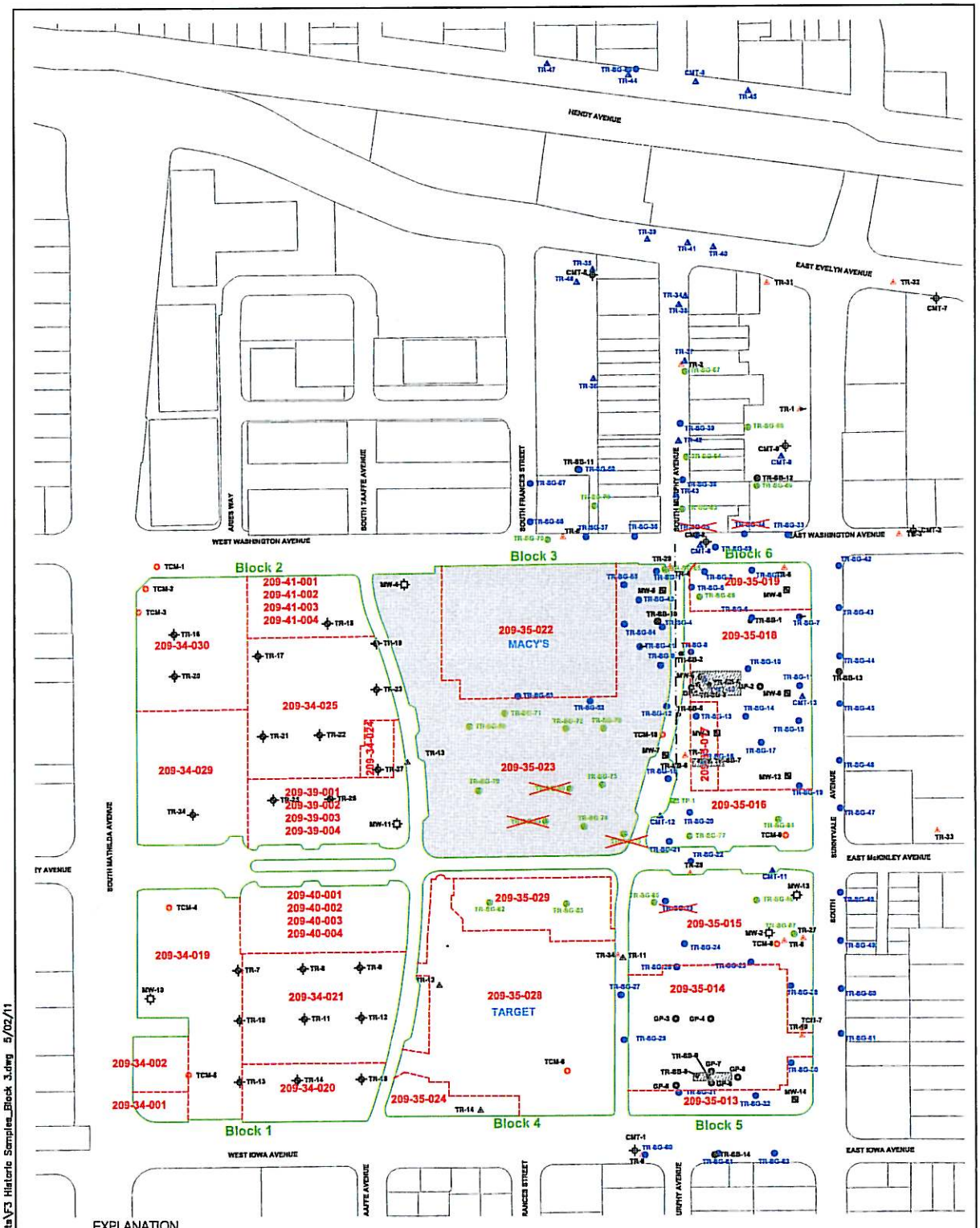
BLOCKS AND PARCELS

Date 05/01/11	Project No. 866	Figure 2

Ground Zero Analysis, Inc.

Modified from Treadwell & Rollo (10/11/10)

D:\Work\GZA\866\Sunnyvale Town Center NFA Reports\F2 Blocks-Parcels_Block 3.dwg 5/01/11



EXPLANATION

- TR-10 — Approximate location of Treadwell & Rollo, Inc. soil boring, 2007
- TR-5 — CPT/ Hydropunch, Shallow (35- 40 feet) and Deep (>45 feet), Treadwell & Rollo, Inc., 2007
- TR-11 — CPT/ Hydropunch, Shallow only, Treadwell & Rollo, Inc., 2007
- GP-4 — Geoprobe and soil-gas boring locations, URS, 2007
- TCM-4 — Geoprobe location, Golder, 2007
- MW-7 — Monitoring well locations, Golder, 2007
- Macy's MW-1 — Abandoned monitoring well
- Approximate location of former sewer line
- Approximate location of historical dry cleaner facility
- TR-SG-63 — Soil gas sample location (Treadwell & Rollo, 2005)
- TR-SG-1 — Soil gas sample location (Treadwell & Rollo, 2007)
- TR-SG-71 — Obstructed, sample not taken
- Phase I CPT and grab groundwater location, Treadwell & Rollo, Inc., 2008
- CMT well location
- TR-SB-10 — Soil boring for soil physical analyses
- TR-SB-1 — Soil sample location
- 209-35-028 — Soil sample location
- TR-SG-75 — Not sampled

0 200 Feet
Approximate scale

Modified from Treadwell & Rollo (10/11/10)

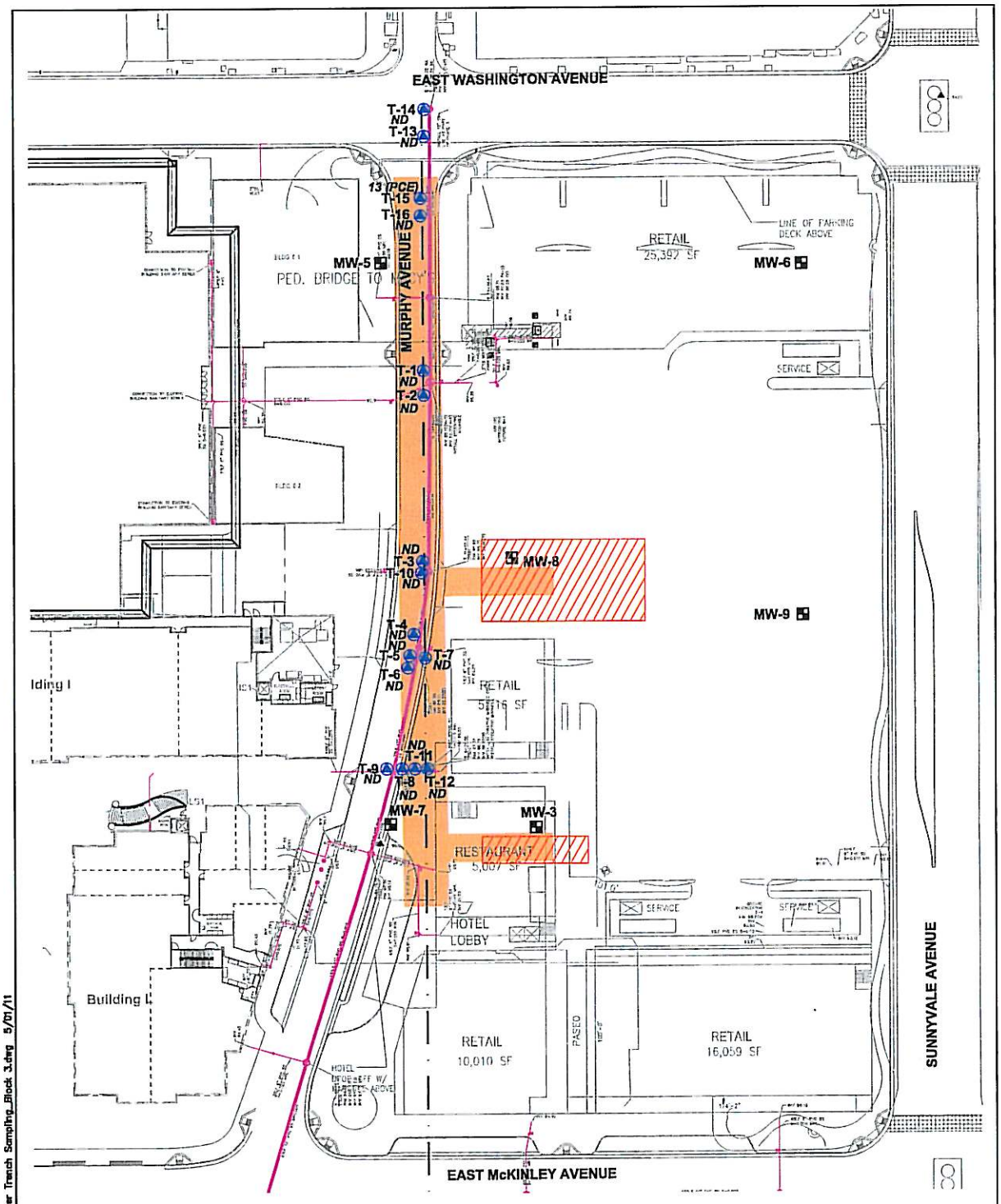
SUNNYVALE TOWN CENTER MALL SITE
BLOCK 3
Sunnyvale, California

HISTORIC INVESTIGATION SAMPLING LOCATIONS

Date 05/01/11	Project No. 866	Figure 3

Ground Zero Analysis, Inc.

D:\Work\GZA\864\Sunnyvale Town Center HFA Reports\F3 Historic Samples_Block 3.dwg 5/02/11



EXPLANATION

- 13 — VOC concentrations from January and February 2009
- New sewer line with manhole
- Trench soil sample
- Approximate location of historical dry cleaner facility
- MW-9 — Groundwater monitoring well
- Area of Potential Suspect Condition
- Former South Murphy sewer line

0 60 Feet

Approximate scale

Modified from Treadwell & Rollo (11/18/10)

Figure take from Supplemental Site Investigation Report, Sunnyvale Town Center Redevelopment, Sunnyvale, CA *in preparation.*

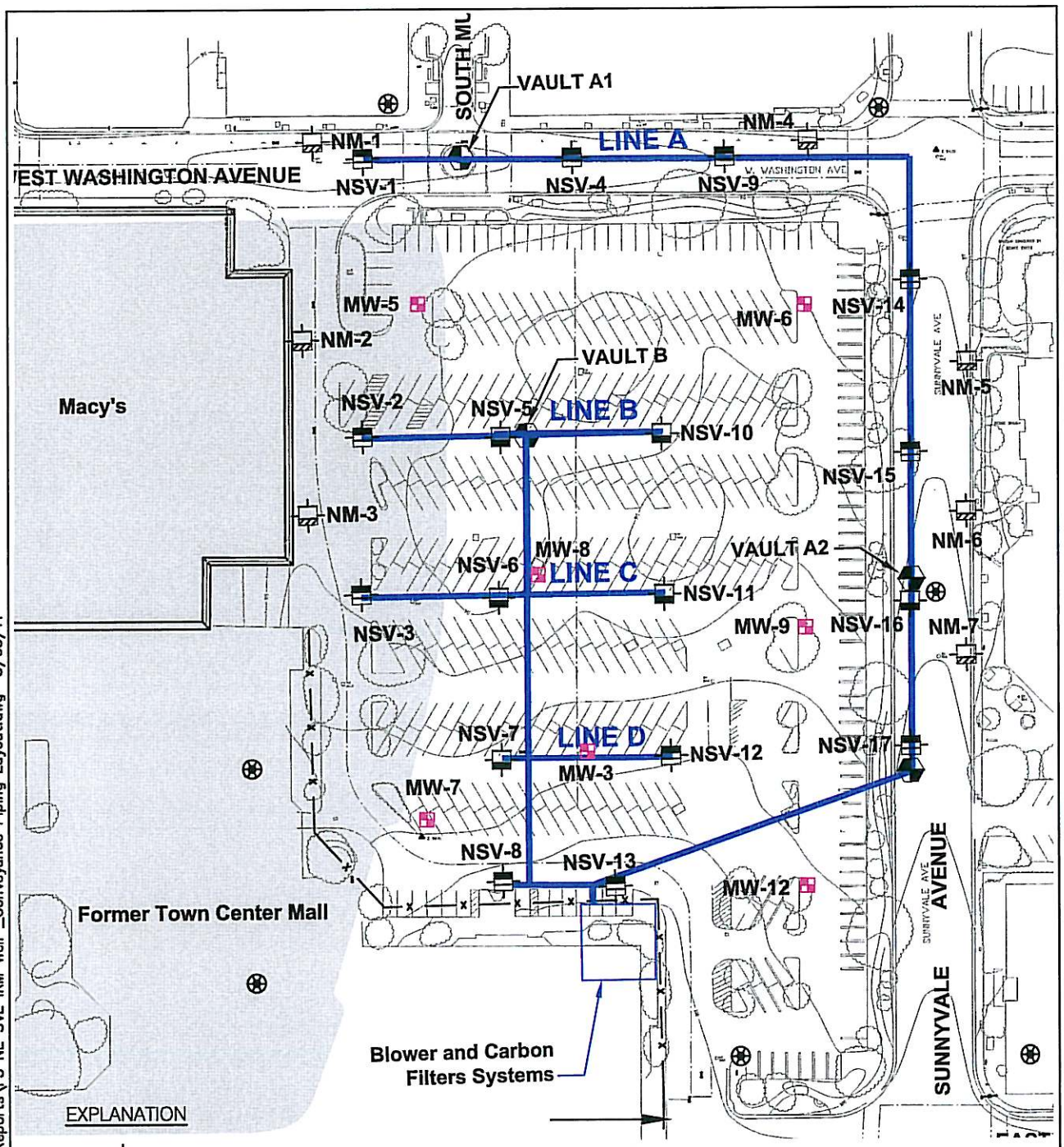
SUNNYVALE TOWN CENTER MALL SITE
BLOCK 3
Sunnyvale, California

SEWER TRENCH EXCAVATION SOIL SAMPLING LOCATIONS

Date 04/04/11	Project No. 866	Figure 4

Ground Zero Analysis, Inc.

D:\Work\GZA\864\Sunnyvale Town Center NFA Reports\F4 Sewer Trench Sampling_Block 3.dwg 5/01/11



Graphic from Treadwell & Rollo (08/11/10)

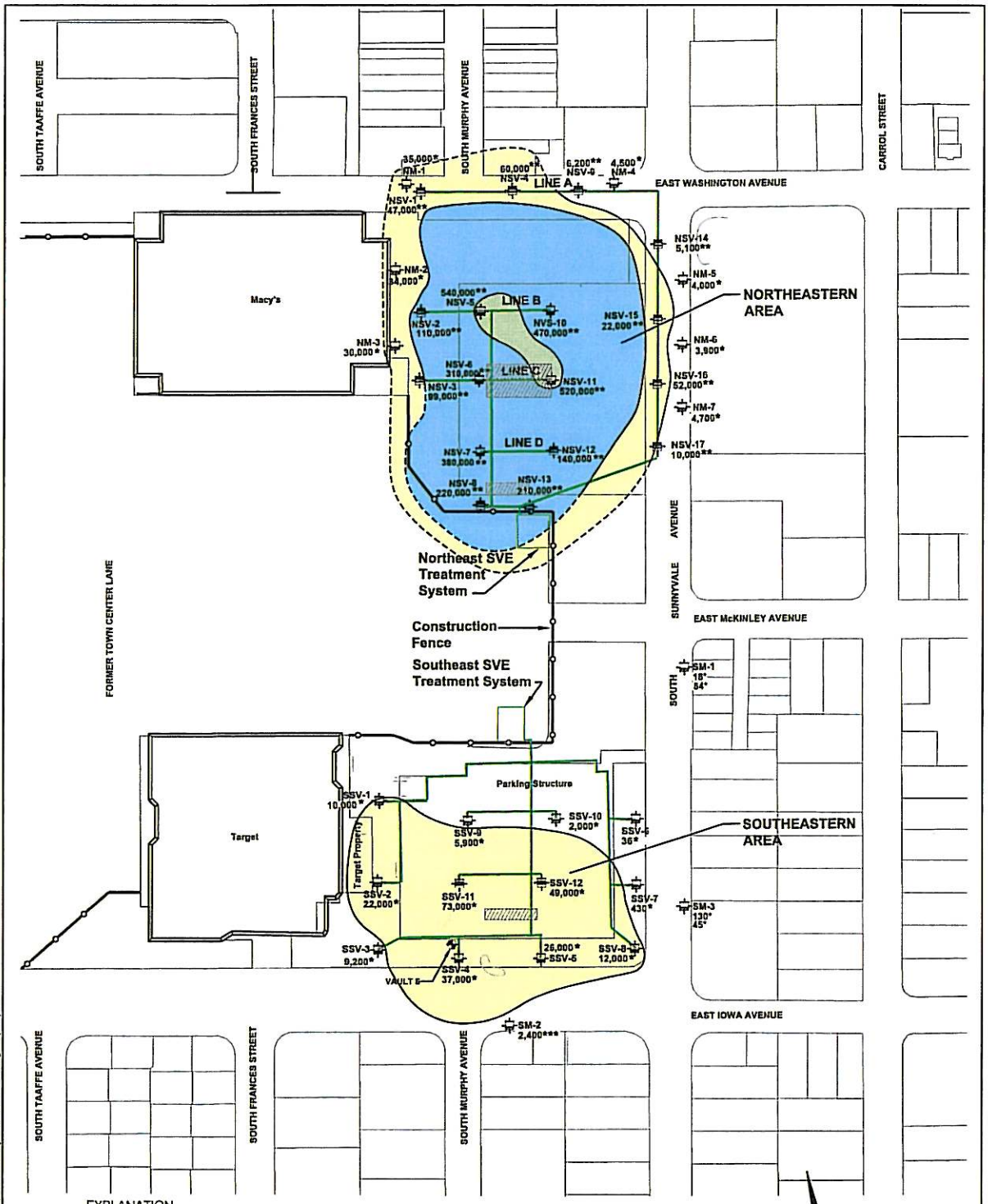
D:\Work\GZA\864\Sunnyvale Town Center NFA Reports\F5 NE SVE IRM Well _Conveyance Piping Layout.dwg 5/03/11

SUNNYVALE TOWN CENTER MALL SITE
BLOCK 3
Sunnyvale, California

NORTHEAST SVE IRM WELL AND CONVEYANCE PIPING LAYOUT

Ground Zero Analysis, Inc.

Date 05/03/11	Project No. 866	Figure 5



EXPLANATION

- Shallow SVE wells
- Basement SVE well
- Deep SVE well
- Vapor monitoring well
- Approximate location of historical dry cleaner facility
- Conveyance Piping

- PCE soil gas concentrations >10,000 (µg/m³)
- PCE soil gas concentrations >100,000 (µg/m³)
- PCE soil gas concentrations >500,000 (µg/m³)

Notes:

SVE systems shut down on 12 January 2010

Reported analytical results are PCE concentrations (µg/m³) using TO-15.

(µg/m³) - micrograms per cubic meter
* Denotes sample collected during 17 January 2008
** Denotes sample collected during 23 January 2008
*** Denotes sample collected during 9 January 2008

Graphic from Treadwell & Rollo (11/19/10)

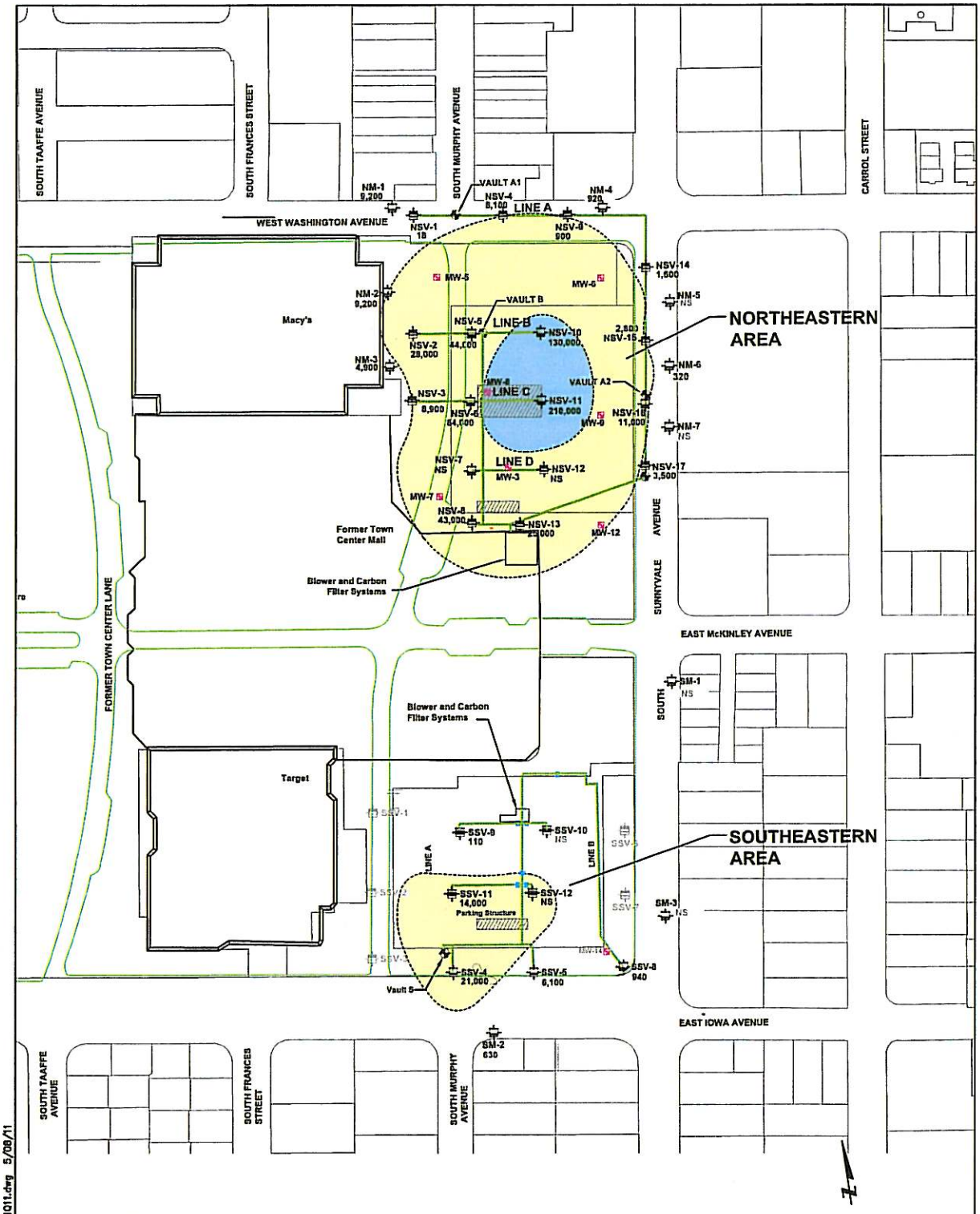
SUNNYVALE TOWN CENTER MALL SITE
Sunnyvale, California

PCE IN SOIL GAS AT START UP OF SVE SYSTEMS JANUARY 2008

Date 05/07/11	Project No. 864	Figure 21

Ground Zero Analysis, Inc.

D:\Work\GZA\864\RAP Report\F21 PCE in soil gas at start up of SVE Systems_Jan.08.dwg 5/06/11



EXPLANATION

- Shallow SVE well
- Deep SVE well
- Vapor monitoring well
- Abandoned shallow SVE well
- Traffic rated vault
- Conveyance Piping
- Groundwater monitoring well, Golder 2007
- Approximate location of historical dry cleaner facility

- Maximum extent of PCE soil gas concentration greater than 100,000 ($\mu g/m^3$) ($\mu g/m^3$) - micrograms per cubic meter
- Maximum extent of PCE soil gas concentration greater than 10,000 ($\mu g/m^3$) ($\mu g/m^3$) - micrograms per cubic meter
- **15,000** PCE soil vapor concentration ($\mu g/m^3$)
- NS Not Sampled

0 150 Feet
Approximate Scale

Modified from Treadwell & Rollo (11/19/10)

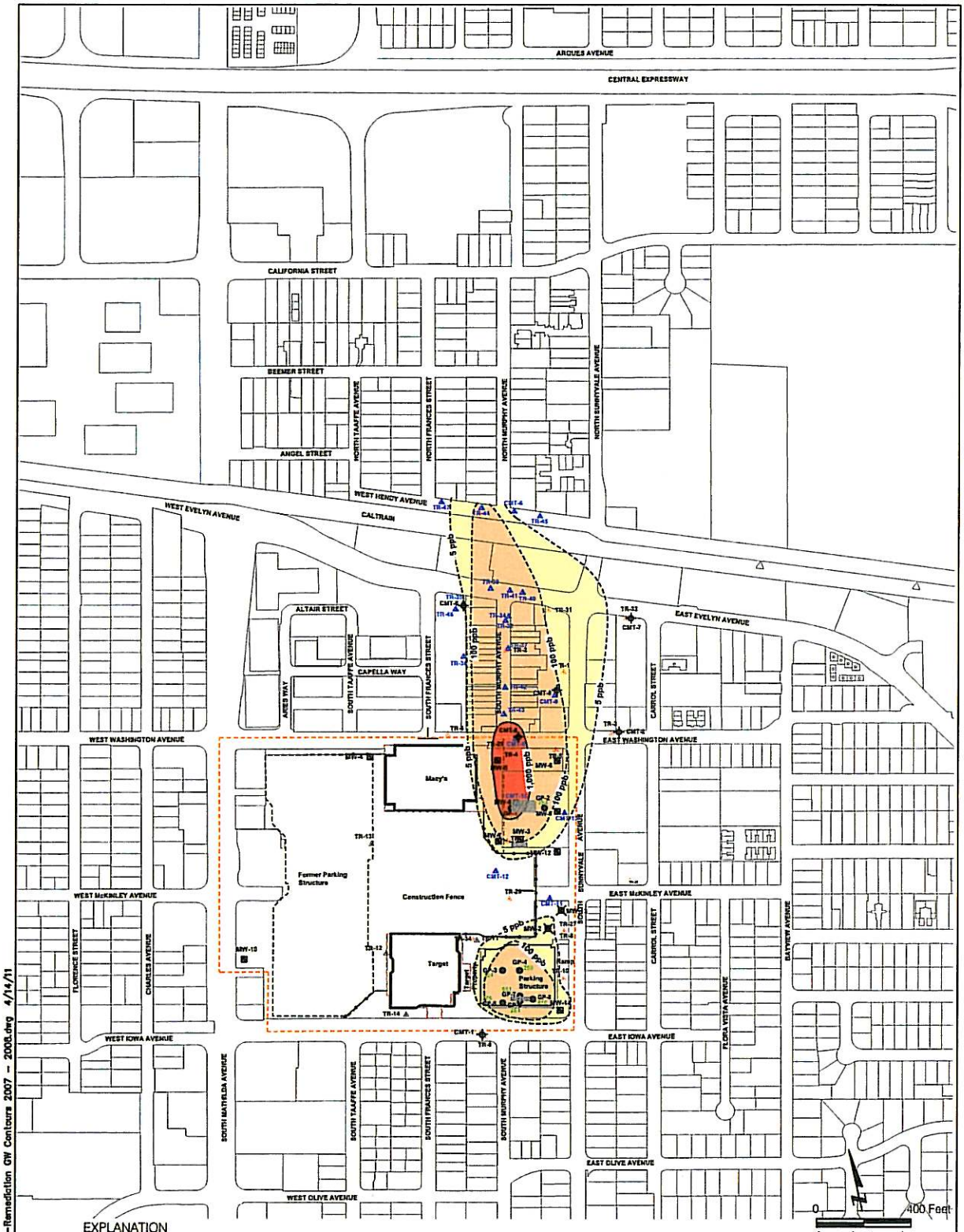
SUNNYVALE TOWN CENTER MALL SITE
Sunnyvale, California

PCE IN SOIL GAS
1ST QUARTER 2011

Date 05/08/11	Project No. 864	Figure 25A

Ground Zero Analysis, Inc.

D:\Work\GZA\864\RAP Report\F25A PCE in Soil Gas 1011.dwg 5/08/11



EXPLANATION

- MW-2 — Groundwater monitoring well location, Golder, 2007
- TR-5 / TR-11 — CPT/ Hydropunch, Deep, Treadwell & Rollo, Inc., 2007 / CPT/ Hydropunch, Shallow only, Treadwell & Rollo, Inc., 2007
- Approximate location of historical dry cleaner facility
- Pre-remediation PCE concentration in shallow groundwater contours (30 to 45 feet) (micrograms per liter [mg/L]) (2007-2008)
- Maximum extent of PCE concentration greater than 1000 ppb
- Maximum extent of PCE concentration greater than 100 ppb
- Maximum extent of PCE soil gas concentration greater than 5 ppb
- Phase I CPT and grab groundwater location, Treadwell & Rollo, Inc., 2008
- GP-4 — Previous PCE - 24' to 40', Golder, 2007
- CMT well location
- MW-2 — Abandoned shallow groundwater monitoring well

Note: Contours defined using grab groundwater & pre-IRM monitoring well data. Dashed contours are inferred.

Graphic from Treadwell & Rollo (11/19/10)

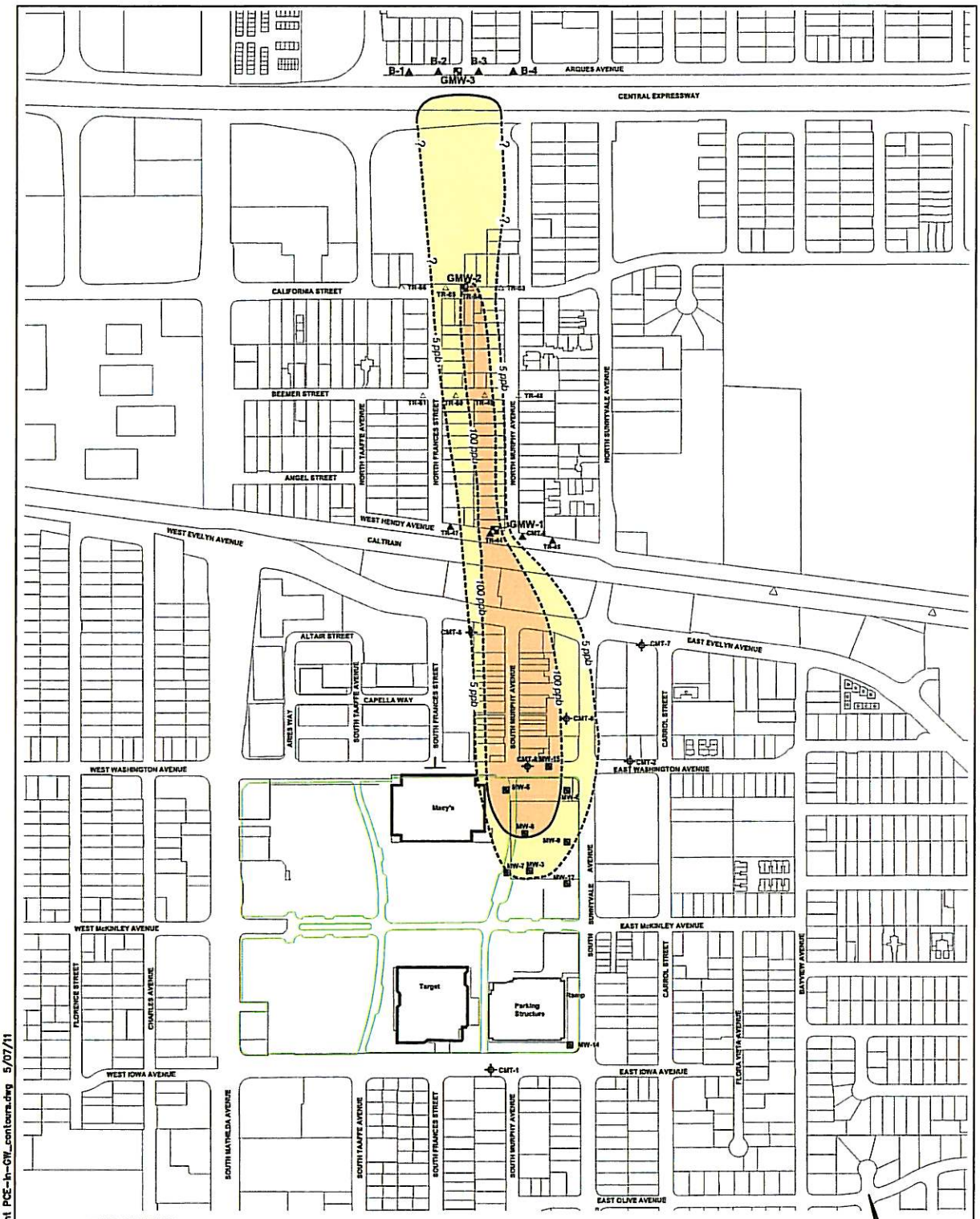
SUNNYVALE TOWN CENTER MALL SITE
Sunnyvale, California

PCE CONCENTRATIONS AND PRE-REMEDIATION GROUNDWATER CONTOURS 2007-2008

Date 04/13/11	Project No. 864	Figure 22A

Ground Zero Analysis, Inc.

D:\Work\GZA\864\RAP Report\F22A PCE Pre-Remediation GW Contours 2007 - 2008.dwg 4/14/11



EXPLANATION

- Shallow groundwater monitoring well
- Phase I CPT and grab groundwater location, Treadwell & Rollo, Inc., 2008
- Grab groundwater location, Treadwell & Rollo, Inc., November and December 2010
- GZA grab sample from 03/30/11
- CMT well location
- Estimated PCE contours, April 2011
- Maximum extent of PCE concentration greater than 100 ppb
- Maximum extent of PCE concentration greater than 5 ppb

0 400 Feet

Approximate scale

Modified from Treadwell & Rollo (12/02/10)

Note: Dashed contours are inferred.

SUNNYVALE TOWN CENTER MALL SITE
Sunnyvale, California

ESTIMATED CURRENT EXTENT OF PCE IMPACTS IN SHALLOW GROUNDWATER

Date 05/07/11	Project No. 864	Figure 23A

Ground Zero Analysis, Inc.

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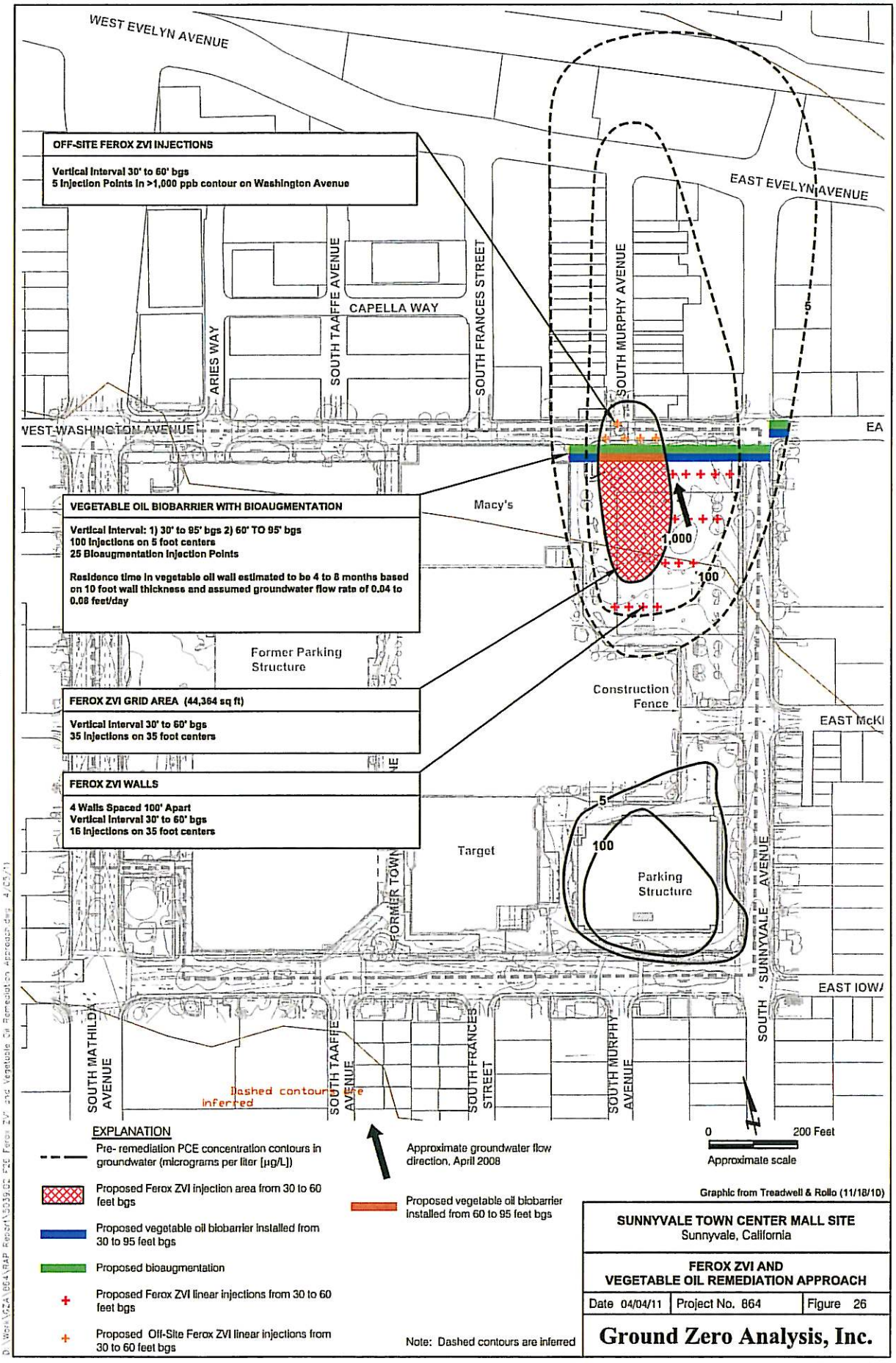
WEST EVELYN AVENUE
EAST EVELYN AVENUE
OFF-SITE FEROX ZVI INJECTIONS
Vertical Interval 30' to 60' bgs
5 Injection Points in >1,000 ppb contour on Washington Avenue
VEGETABLE OIL BIOBARRIER WITH BIOAUGMENTATION
Vertical Interval: 1) 30' to 95' bgs 2) 60' TO 95' bgs
100 Injections on 5 foot centers
25 Bioaugmentation Injection Points
Residence time in vegetable oil wall estimated to be 4 to 8 months based on 10 foot wall thickness and assumed groundwater flow rate of 0.04 to 0.08 feet/day
FEROX ZVI GRID AREA (44,364 sq ft)
Vertical Interval 30' to 60' bgs
35 Injections on 35 foot centers
FEROX ZVI WALLS
4 Walls Spaced 100' Apart
Vertical Interval 30' to 60' bgs
16 Injections on 35 foot centers
SOUTH TAAFFE AVENUE
CAPELLA WAY
ARIES WAY
SOUTH FRANCES STREET
SOUTH MURPHY AVENUE
VEST WASHINGTON AVENUE
Macy's
Former Parking Structure
Construction Fence
Target
Parking Structure
FORMER TOWN
SOUTH SUNNYVALE AVENUE
SOUTH MATHILDA AVENUE
EAST IOWA
1,000
100
5
Dashed contour inferred
EXPLANATION
Pre- remediation PCE concentration contours in groundwater (micrograms per liter [µg/L])
Proposed Ferox ZVI injection area from 30 to 60 feet bgs
Proposed vegetable oil biobarrier installed from 30 to 95 feet bgs
Proposed bioaugmentation
Proposed Ferox ZVI linear injections from 30 to 60 feet bgs
Proposed Off-Site Ferox ZVI linear injections from 30 to 60 feet bgs
Approximate groundwater flow direction, April 2008
Proposed vegetable oil biobarrier installed from 60 to 95 feet bgs
Note: Dashed contours are inferred
0
200 Feet
Approximate scale
Graphic from Treadwell & Rollo (11/18/10)
SUNNYVALE TOWN CENTER MALL SITE
Sunnyvale, California
FEROX ZVI AND VEGETABLE OIL REMEDIATION APPROACH
Date 04/04/11
Project No. 864
Figure 26
Ground Zero Analysis, Inc.