Performance Monitoring and Contingency Plan

Off School Site
Playa Vista
Los Angeles, California

Prepared for:

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The information contained in the document titled "Performance Monitoring and Contingency Plan for Off School Site, Playa Vista, California" dated February 20, 2015, has received appropriate technical review and approval. The scope of work presented in this Plan was developed based upon findings from the prior investigations and sampling identified in this Plan and the interpretation of such data was based on our experience and background. This acknowledgement is made in lieu of all warranties, either expressed or implied.

The activities outlined in this Plan have been reviewed and approved by:

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Section 1
Introduction

CDM Smith Inc. (CDM Smith) has prepared this Performance Monitoring and Contingency Plan (PMCP) on behalf of Playa Capital Company, LLC (Playa) to describe performance monitoring during startup and operation of the remediation of chemicals of concern (COCs) in groundwater present below the Off-School Site Area (OSS) of the Playa Vista Development (Figure 1). This PMCP also presents a contingency plan that describes triggers and related response actions associated with issues not directly related to performance of the remedial systems. This PMCP was modeled after those submitted and approved by the California Regional Water Quality Control Board, Los Angeles Region (Regional Board) for other areas of the Playa Vista Development.

The remedial action for the OSS is described in the May 30, 2014 Remedial Action Plan (RAP) and October 16, 2014 RAP Addendum for the Off School Area (CDM Smith, 2014a and 2014b, respectively). The Regional Board conditionally approved the RAP and the RAP Addendum on December 19, 2014 (RAP Approval Letter; see Appendix A). The Department of Toxic Substances Control (DTSC) and Los Angeles Unified School District (LAUSD) comments to the RAP and Rap Addendum were attached to the RAP Approval Letter (Appendix A). This PCMC addresses Regional Board and DTSC comments, specifically related to the PMCP.

The overall objectives of this PMCP are four-fold. The first three listed below pertain to the performance monitoring component, and the last objective pertains to the contingency plan component.

1. Establish a database for optimizing the performance and efficiency of the remedial action.
2. Provide sufficient performance-monitoring data to adequately evaluate the ability of the remedial alternative to meet the OSS Remedial Objective (RO).
3. Evaluate shutdown criteria of the remedial action.
4. Ensure that human health and the environment remain protected during the implementation of the remedial action.

1.1 Project Description and Background

The OSS area is located along Bluff Creek Drive, proximal to the intersection with Playa Vista Drive (Figure 1). The Los Angeles Unified School District's Playa Vista Elementary School is immediately to the south of the OSS area, hereafter referred to as the "School Site". Although the School Site is not the subject of this remedial action, data derived from this area is summarized below given its proximity to the proposed remedial action.

Playa completed subsurface investigations from 2002 to 2007 in this general area, culminating with the preparation of a Preliminary Environmental Assessment report (CDM, 2007). In 2008, LAUSD completed a Supplemental Site Investigation (SSI) for the adjacent School Site. The SSI included collection of 152 soil samples; installation and sampling of 81 soil vapor probes; advancement of 17 hydropunch borings for groundwater sampling; and installation of eight groundwater monitoring wells. Data from these investigation points on the School Site showed low levels of vinyl chloride and

cis-1,2-dichloroethene (cis-1,2-DCE) in soils, with relatively higher levels of these two volatile organic compounds (VOCs) in selected soil vapor samples, and low levels of both compounds in groundwater. The soil and groundwater concentrations did not exceed the Health Based Remediation Goals (HBRGs) established for Playa Vista, but soil vapor HBRGs were exceeded on the School Site.

In 2009, LAUSD prepared a RAP for the School Site, which was subsequently approved by the DTSC on December 31, 2009. The remedy selected in the RAP included the excavation of soil in the northern/northwestern portion of the School Site where vinyl chloride-impacted soil and soil vapor were detected, and installation of a vertical soil vapor barrier along the northern boundary of the site. The RAP also recommended additional investigation, assumed to be under the direction of the Regional Board, to characterize the extent of VOC contamination to the immediate north of the School Site.

As a result, Playa submitted a work plan to the Regional Board in October of 2009 to characterize the soil, soil vapor, and groundwater in the area immediately to the north of the School Site, proximal to the intersection of Bluff Creek Drive and Playa Vista Drive (Figure 2). The Regional Board approved the work plan in December 2010. Playa initiated investigations in the OSS in January 2011. Soil and soil vapor samples were collected at five locations, designated as D-942 though D-946 (Figure 2). Chlorinated VOCs (including but not limited to vinyl chloride and cis-1,2-DCE) were not detected in any soil samples. Vinyl chloride was not detected at any of the five soil vapor sample locations,. Cis-1,2-DCE was detected in all soil vapor samples, at concentrations ranging from 5.4 micrograms per cubic meter (µg/m3) (D-945 at 5 ft bgs) to 150 µg/m3 (D-952 at 5 feet bgs). Tetrachloroethene (PCE) was also detected at concentrations ranging from 11 µg/m3 (D-945) to 37 µg/m3 (D-944), and trichloroethene (TCE) was detected at concentrations ranging from 8.3 µg/m3 (D-945) to 55 µg/m3 (D-944). The detected VOCs were at relatively low levels, all below Phase 1 Residential soil vapor HBRGs. and did not indicate any proximal soil contaminant source. The results of this investigation were submitted to the Regional Board on May 2, 2011 (CDM, 2011).

Groundwater samples were initially collected from temporary wells set at locations D-945, D-946, and D-952 (Figure 2). A summary of OSS groundwater data is included in Table 1. As a result of the detections of vinyl chloride and cis-1,2-DCE at D-952, a permanent monitoring well designated C-162 was installed at this location (Figure 2). Since that time, well C-162 has been sampled on a quarterly basis and concentrations have declined; the most recent results from November 2014 are 16 and 3.6 µg/L for cis-1,2-DCE and vinyl chloride, respectively (Table 1). No other VOCs were detected. Based on these sampling results, the COCs for this remedial action are cis-1,2-DCE and vinyl chloride.

1.1.1 Site Geology and Hydrogeology

The hydrogeology of the area has been well documented from numerous investigations completed at FSTA, the School Site, and adjacent areas. Groundwater is encountered at a depth of approximately 8 to 12 feet bgs within the fine-grained sediments consisting of interlayered silty sand, silt, and clay in the upper Bellflower aquitard. Underlying sediments in this area are predominately clay, clayey sand, and sandy clay in the lower Bellflower aquitard and the silty sands and gravels of the Ballona aquifer. Figure 3 provides a simplified cross-section of the site hydrogeology. The direction of groundwater flow in the Bellflower aquitard has been highly variable over time. Prior to remedial extraction at FSTA, flow was generally to the north, with inflections to the northwest and northeast. However, recent data at both FSTA and on the School Site demonstrate significantly different conditions. At FSTA, the flow in the Bellflower aquitard is largely radial toward extraction well EW-5, whereas flow on the School Site has generally been in a southerly direction (Figure 4).

1.2 Remediation Objective

The following is a summary of the site characteristics that are the basis of the RO for the OSS:

- The occurrence of vinyl chloride and cis-1,2-DCE in groundwater media is primarily centered around monitoring wells C-162 and MW-GW-2 (Figure 5).
- The Playa Vista Elementary School is the only building that may overlie the detected soil vapors and, because the school has a complete vapor barrier in place (the methane mitigation system, that also addresses chlorinated VOCs), no additional mitigation of vapors is required. LAUSD submits quarterly operation and maintenance reports to DTSC that document the effectiveness of the vapor barrier system and, hence, the absence of risk of vapor intrusion.
- The absence of detectable VOC contamination in soils in the OSS area, and relatively low vapor concentrations (below Phase 1 Residential HBRGs), indicate that the source of VOC contamination is either not within the immediate vicinity of monitoring well C-162, or was fully removed by the LAUSD excavation in 2009.
- Groundwater is not used anywhere on the Playa Vista site for drinking water purposes, so no potential human health impacts exist from the ingestion thereof.
- Concentrations of both cis-1,2-DCE and vinyl chloride in groundwater exceed HBRGs relative to volatilization, so remediation is appropriate.

Remediation, therefore, is focused on reducing groundwater concentrations to a level that minimizes the potential for volatilization. The RO for the OSS protective of the environment is to reduce the concentrations of vinyl chloride and cis-1,2-DCE in groundwater beneath both the OSS and the School Site to below both their respective HBRGs and below their respective California Title 22 maximum contaminant levels (MCLs) for drinking water. As stated above, there is no risk to human health from the impacted groundwater beneath both the School Site and OSS.

1.3 Health-Based Remediation Goals

HBRGs are concentrations of chemical contaminants in soil, groundwater, and soil gas that will protect the public from unacceptable exposures to these chemicals at the Playa Vista Site. Calculating these concentrations involved, in general terms, deciding how people might be exposed to Site contaminants, and then establishing levels of these contaminants that are sufficiently low to ensure that exposures would not represent threats to human health. The methodology for calculating HBRGs is the subject of considerable DTSC and USEPA guidance which was followed in developing the HBRGs.

HBRGs specific to portions of the Playa Vista property with planned commercial (i.e., Phase 1 Commercial; Campus Area) and residential use (i.e., Phase 1 Residential) (IESI, 2000; 2001a) were reviewed and approved for implementation by the Regional Board and the California Office of Environmental Health Hazard Assessment. Both the OSS and School Site are located in the Phase 1 residential area. The HBRGs are provided as Table 2.

1.4 Application of HBRGs

In the RAP, HBRGs were used to identify potential areas that require remediation. They are remediation triggers and may not be the final cleanup criteria. It should be noted that although the

OSS is open space, residential HBRGs are used to identify the OSS area requiring remediation since residential HBRGs are more stringent than recreational and commercial HBRGs.

Groundwater HBRGs are based on protection of human health by evaluation of the exposure pathway involving breathing COCs that have partitioned from groundwater. As a result, the HBRGs apply only to the upper-most groundwater, since that is the groundwater that is available for partitioning dissolved COCs to the vapor phase.

Section 2

Major Remedial System Components

As described in the RAP (CDM Smith, 2014a), the remediation of groundwater in the OSS area is proposed to be accomplished by groundwater extraction, piping the extracted groundwater to a treatment system, treatment of the extracted water as necessary, and discharge to the sewer system operated by the Los Angeles City Department of Public Works, Bureau of Sanitation (LADPW BOS) under an existing industrial waste discharge permit. A single extraction well (OSS-EW-1) has been installed in the sidewalk just to the north of the School Site property boundary between monitoring wells C-162 and MW-GW-2 (Figure 2). The extracted groundwater will be piped in an easterly direction to the treatment system (Figure 6). A treatment system will be constructed at the location shown on Figure 6, which will receive flow from the OSS extraction well OSS-EW-1 and the existing FSTA extraction well EW-5 (the current EW-5 treatment at the former Test Site 2 treatment unit will cease once that treatment unit is removed). Design drawings and specifications for the new treatment system are included as Appendix B. Treatment will be via liquid phase granulated activated carbon (LPGAC) and then the water will be discharged to the sanitary sewer under Playa's existing permit, which is included in Appendix C, and which will be modified to incorporate the process change.

Groundwater extraction well OSS-EW-1 was constructed in January 2015 with 6-inch diameter PVC casing with 15 feet (10 to 25 feet bgs) of 0.010-inch slot stainless steel screen. The extraction well was constructed with a similar screen depth as monitoring well MW-GW-2, located immediately south of OSS-EW-1 and the location of the highest concentrations of VOCs. The filter pack consisted of Lonestar #2/12 sand placed from the bottom of the borehole to 1 foot above the top of the screen. A 3-foot seal of uncoated bentonite pellets was placed above the filter pack and the remaining borehole was sealed with a mixture of Portland cement with approximately 5 percent bentonite. The well was completed with flush-grade, traffic-rated well box which will be removed and replaced with a flush-grade well vault at the time the conveyance lines are installed. The construction diagram for OSS-EW-1 is included in Appendix B.

Section 3
Performance Monitoring Locations and Frequencies

Performance monitoring will be performed in locations described in this section to assess the performance of the remedial system and its impact on surrounding groundwater. Monitoring frequencies are provided for each performance monitoring location. Table 3 presents a summary of monitoring objectives, parameters, locations, and frequencies.

3.1 Start-up Testing and Monitoring

3.1.1 Aquifer Testing

Prior to startup of the proposed remedial system, data will be collected to estimate hydraulic characteristics in the area of influence of extraction well OSS-EW-1. A constant-rate aquifer performance test will be performed to complete this estimation. Based on observations made during well development and sampling, the sustainable pumping rate at OSS-EW-1 is anticipated to be 0.25 gpm. Given the expected low yield of the extraction wells, owing to the very high silt/clay content of the formation, step-testing would be unlikely to yield useful data, and a constant rate test has been selected to maximize the value of the data. This short-term test is expected to provide sufficient data to estimate the hydraulic characteristics prior to start up. The hydraulic conductivity and transmissivity estimated from the short-term test will be used to estimate the drawdown and capture zone for the well. The capture zone, transmissivity, and horizontal hydraulic conductivities can be confirmed with piezometric monitoring over a longer period of time (over a week and/or month if needed) once the system becomes operational.

A constant-rate pumping and recovery test will be performed at extraction well OSS-EW-1. Prior to initiation of the pumping test, transducers will be installed in the extraction well and monitoring wells to record antecedent water levels for a 24-hour period. The test is anticipated to be a 4 to 6-hour pumping period at the target extraction rate of 0.25 gpm, followed by a recovery period of equivalent duration. It is anticipated that water levels in the extraction well will develop a stable trend during that time. To the extent possible, pumping will be maintained at a steady discharge rate for the duration of the test. Upon starting the pump, the pumping rate will be measured and adjusted to the target rate and be periodically checked by measuring the rate of time required to fill a known volume.

Changes in water level will be measured using a pressure transducer and data logger to the nearest 0.01 foot. Water level measurements will be recorded by the data logger on a set interval of once every 30 seconds. Manual measurement will be made using a water level indicator to calibrate and insure the accuracy of the transducer readings. Measurements of electrical conductivity, pH, and temperature of the discharge water will be recorded every 30 minutes in the field logbook.

The recovery test will begin immediately upon cessation of pumping. Water level readings will be collected for the recovery test according to the same procedure as for the pumping test, and will continue until water levels have returned to 95 percent of pre-test static levels.

Nearby wells to be monitored for water levels during the test are screened within the Bellflower aquitard and the Ballona aquifer, and are shown on Figure 7. At these wells and the extraction well OSS-MW-1, monitoring will be completed using a pressure transducer and data logger and checked periodically manually using a water level meter.

3.1.2 Aquifer Test Data Evaluation

The data collected from the constant-rate test will be analyzed to evaluate hydraulic conductivity and transmissivity using industry standard techniques. The results of the aquifer test will be included in the well completion report anticipated for submittal to the Regional Board in June 2015.

3.1.3 System Startup Testing

Startup of the treatment system will be performed in a methodical step-wise manner. Startup testing and evaluation will be conducted in three main phases. These phases of startup help organize the various tasks and tests that must be conducted before bringing the systems into operation. During each step, system performance will be compared to system design parameters. These three steps are:

- Functional testing: the equipment undergoes detailed mechanical and electrical checking, and system functions are tested while the system is offline.
- Simulation testing: process conditions are simulated with potable water, and system functionality is verified. Given the relative simplicity of this treatment system, this step will consist mainly of pressure testing and leak checking.
- Performance testing: equipment functionality and treatment effectiveness is verified under actual operation with extracted groundwater.

Additional testing will be required of system subcomponents prior to shipment to the site, including the system control panel and its contents. Additional checking of all process interlocks, instrumentation, remote access, and all other functionality will also be verified.

Sampling and analysis will be conducted to verify treatment. This will include analysis of process water by USEPA Method 8260B, as specified in Table 3, to confirm VOC removal by the LPGAC, and to verify compliance with all other permit requirements.

3.2 Monitoring Objectives During System Operation

There are three main monitoring objectives for groundwater extraction:

- Determine the radius of influence of the pumping well as indicated by water level measurements
- Document the change in COC mass removal rate at the extraction well
- Monitor changes in the distribution of contaminants in groundwater

Water level measurements will be made, and groundwater samples will be collected at all monitoring wells that are potentially within the potential radius of influence of the extraction well and that are screened in the Bellflower aquitard (Table 3). To determine contaminant mass removal rate trends,

groundwater samples and groundwater extraction rate measurements will be taken at the wellhead of extraction well OSS-EW-1.

The radius of influence will be initially estimated with the results of the pumping test discussed in the previous section. The initial estimate will be re-evaluated from water level measurements once the extraction well is fully operational.

The samples described above will be collected and measurements will be made quarterly to meet the objectives of monitoring groundwater extraction performance. Additional measurements may be made immediately following startup, or when considering a well for shutdown. Pending demonstration of system effectiveness, semiannually monitoring may be performed thereafter. See Section 4 for the criteria for determining effectiveness, the associated decision rules and contingencies to be used if the selected remedy is not effective.

3.3 Monitoring of Ex-Situ Groundwater Treatment

A listing of the treatment system sample locations, parameters, frequency, and objectives is provided in Table 3. A brief summary is described below.

3.3.1 Monitoring Objectives

The main objectives for monitoring the ex-situ groundwater treatment system are:

- Verify that the treatment system is meeting applicable discharge requirements (sewer discharge permit)
- Verify the functionality of system components
- Provide a basis for tracking system trends
- Provide a basis for system optimization

To meet the above objectives, water samples will be collected from the following locations:

- At the sample ports at each extraction well vault
- Downstream of the LPGAC vessels (i.e. the system effluent)

Collection of the extraction well samples will allow for understanding of VOC concentration trends. Comparison of the other samples listed above will allow for determination when LPGAC replacement is needed. Additional samples not specified in this PMCP may be collected as needed to assess and optimize the system.

Grab samples from the above locations will be analyzed at a minimum for VOCs by USEPA Method 8260B. Additional parameters may be analyzed as required for system optimization. For discharge permit monitoring, the parameters listed in Table 3 will be analyzed. Details of this requirement are provided in the permit that is attached as Appendix C.

Sampling frequencies will be determined primarily by discharge permit requirements and by operator-defined requirements for optimizing system operation. Table 3 provides the frequencies for sampling the system discharge.

Section 4

Remedial System Shutdown Criteria and Contingencies

Performance monitoring data collected in accordance with this PMCP will be evaluated to determine the effectiveness of individual components of the treatment system to meet the RO, and for terminating active remediation. The remedy's effectiveness will be first assessed after one year of operation. Due to the fine-grained nature of the Bellflower aquitard and the resulting expected low yield from extraction well OSS-EW-1, it is expected that mass removal will not occur at a rapid rate. Performance data will be collected and reported on a quarterly basis (see Section 5), and the remedy effectiveness will be evaluated annually.

While remedy effectiveness will be evaluated annually, no changes to the remedial system are expected to be made prior to a formal 5-year review. If these data indicate that the OSS RO has been achieved, then a closure plan will be prepared.

4.1 Shutdown Criteria

The criteria proposed for Regional Board approval for shutting down the groundwater extraction system are described below. It is anticipated that refinements to these criteria may be proposed for Regional Board approval after evaluation of initial remedial system operational data, as these data will provide valuable information about contaminant mass removal rate trends.

Consistent with the RO, groundwater remediation of the upper Bellflower aquitard will be undertaken with the goal of reaching MCLs unless impracticability can be demonstrated. At a minimum, groundwater extraction at OSS-EW-1 will continue until performance monitoring results indicate that all COC concentrations are below the Regional Board-approved HBRG values or no additional extraction is expected to yield material benefit. Once the concentration of all COCs fall below their respective HBRG, an assessment of the practicability of achieving MCLs will be performed. Groundwater extraction at OSS-EW-1 will continue until COC concentrations in the extraction well are equal to or less than their respective MCLs, or asymptotic conditions are reached relative to time versus COC concentrations.

4.2 Contingent Action

In the event that asymptotic conditions are observed relative to contaminant concentrations in OSS-EW-1, such that concentrations are above the RO and no longer declining, rebound testing will be performed. The well will be turned off for a specified period of time, and then restarted. The duration of the down time will be predicated on time vs. concentration curves that have been developed during the operational period for the well. The extraction well will be resampled within one week of the restart, and then again for two subsequent quarterly events. Depending on the results of this additional sampling, additional rebound periods may be implemented.

In the event that concentrations remain above the RO after rebound testing, other contingent actions will be considered. Such actions cannot be forecasted at this time, but may include redevelopment of the extraction well or installation of additional extraction wells.

Section 5
Reporting

Results from the monitoring program described in this PMCP will be documented in quarterly reports to the Regional Board for the first two years. At the end of this two-year period, a reduction in the frequency of reporting (e.g. to semi-annual or annual) may be proposed. These reports will also contain additional data that are collected as part of implementing the OM&M Plan for the remedial systems. The reports will provide the data collected during the prior three months and will include a brief narrative discussion of the progress of the OSS treatment system.

As described in Section 4, if COC concentrations are reduced to at or below the RO, extraction will be terminated and a rebound test initiated to confirm that concentrations remain below the RO. If such confirmation is achieved, a Closure Report will be submitted to the Regional Board. Conversely, if COC concentrations remain above the RO, consistent with remedial actions underway elsewhere at Playa Vista, a formal 5-year remedy evaluation will be performed. The 5-year review report will describe the effectiveness of the remedial system and, to the extent necessary and appropriate, recommend any contingent actions that may be feasible to enhance system performance.

Section 6

Revised Remedial Action Schedule

The following is a summary of completed tasks and future schedule for implementation of remedial action at the OSS area:

6.1 Completed Tasks

- May 30, 2014 – RAP was submitted to the Regional Board
- October 16, 2014 – RAP Addendum was submitted to the Regional Board to address comments to the RAP received in a telephone conversation between Maile Gee of the Regional Board and Barbara Wells of CDM Smith on September 4, 2014
- December 19, 2014 – Approval of the RAP and RAP Addendum received from the Regional Board
- January 8 and 9, 2015 – Extraction well OSS-EW-1 and monitoring wells C-189Be and C189Ba were installed
- January 17 and 19, 2015 – The newly installed extraction and monitoring wells were developed
- January 23, 2015 – Geotechnical evaluation of buried shoring wall on and by the extraction well was submitted to the Regional Board
- February 15 and 16, 2015 – The extraction and monitoring wells were sampled. The results of the sampling will be provided in the First Quarter 2015 Groundwater Monitoring Report
- February 20, 2015 – This PMCP was submitted to the Regional Board

6.2 Proposed schedule

- March 30 through April 3, 2015 - Start-up testing will commence with completion of the aquifer test during spring break for the neighboring elementary school, pending Regional Board approval
- April 2015 – Anticipated treatment unit construction start
- June 30, 2015 – A report summarizing the extraction and monitoring well installation, development results and recommendations will be submitted to the Regional Board
- June – July 2015 - Installation of the extraction well vault and conveyance pipeline, pending timely approval by LADBS and LADWP
- August 2015 – Completion of start-up testing and monitoring
- September 2015 – System start up for continuous treatment

Section 7
References

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IESI, 2001a. *Phase I Residential Health-Based Remediation Goals, Playa Vista, Los Angeles, California*. November.

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Section 8

Tables

Table 1
Off School Site Performance Monitoring and Contingency Plan
Summary of Groundwater Analytical Data - Volatile Organic Compounds (VOCs)
Playa Vista

Location ID	Ground Surface Elevation (feet MSL)	Sample Interval (feet bgs)	Screen Interval (feet MSL)	Aquifer	Sample Date	Sample Type		Benzene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride
							HBRG	233	6,840	8,840	1,820	26.5
							MCL	1	6	10	5	0.5
OSS Locations												
D-945	17.1	10 - 20	7.1 - -3.0	Upper Bellflower	01/21/11			0.5 U	14	1 U	1 U	0.5 U
D-946	16.6	10 - 20	6.6 - -3.5	Upper Bellflower	01/21/11			0.5 U	2.0	1 U	1 U	0.5 U
D-952	17.6	10 - 20	7.6 - -2.4	Upper Bellflower	01/21/11			1.1	31	1 U	1 U	4.6
C-162	17.7	10 - 20	7.6 - -2.4	Upper Bellflower	04/14/11			0.5 U	53	2.8	1 U	77
C-162	17.7	10 - 20	7.6 - -2.4	Upper Bellflower	07/22/11			0.5 U	27	0.8	0.5 U	47.4
C-162	17.7	10 - 20	7.6 - -2.4	Upper Bellflower	10/28/11			0.5 U	28	0.8	0.5 U	47.0
C-162	17.7	10 - 20	7.6 - -2.4	Upper Bellflower	01/10/12			0.5 U	24	0.5	0.5 U	23.0
C-162	17.7	10 - 20	7.6 - -2.4	Upper Bellflower	04/13/12			0.5 U	21	0.6	0.5 U	28.0
C-162	17.7	10 - 20	7.6 - -2.4	Upper Bellflower	07/20/12			0.5 U	25	0.7	1.0	27.0
C-162	17.7	10 - 20	7.6 - -2.4	Upper Bellflower	10/29/12			0.5 U	18	0.6	0.5 U	14.0
C-162	17.7	10 - 20	7.6 - -2.4	Upper Bellflower	01/31/13			0.5 U	20	0.5	0.5 U	12.0
C-162	17.7	10 - 20	7.6 - -2.4	Upper Bellflower	05/01/13			0.5 U	19	0.6	0.5 U	9.0
C-162	17.7	10 - 20	7.6 - -2.4	Upper Bellflower	07/24/13			0.5 U	19	0.5	0.5 U	6.7
C-162	17.7	10 - 20	7.6 - -2.4	Upper Bellflower	11/19/13			0.5 U	15	0.5 U	0.5 U	5.1
C-162	17.7	10 - 20	7.6 - -2.4	Upper Bellflower	02/07/14			0.5 U	16	0.5 U	0.5 U	6.5
C-162	17.7	10 - 20	7.6 - -2.4	Upper Bellflower	04/17/14			0.5 U	16	0.5 U	0.5 U	4.7
C-162	17.7	10 - 20	7.6 - -2.4	Upper Bellflower	08/05/14			0.5 U	15	0.5 U	0.5 U	3.3
C-162	17.7	10 - 20	7.6 - -2.4	Upper Bellflower	11/11/14			0.5 U	16	0.5 U	0.5 U	3.6
School Site Locations												
MW-GW-1	18.3	10 - 15	8.3 - 3.3	Upper Bellflower	05/08/12			1 U	5 U	5 U	5 U	5 U
MW-GW-1	18.3	10 - 15	8.3 - 3.3	Upper Bellflower	07/11/12			0.5 U	1.4	0.5 U	0.5 U	0.5 U
MW-GW-1	18.3	10 - 15	8.3 - 3.3	Upper Bellflower	10/13/12			0.5 U	1.5	0.5 U	0.5 U	0.5 U
MW-GW-1	18.3	10 - 15	8.3 - 3.3	Upper Bellflower	01/26/13			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-GW-1	18.3	10 - 15	8.3 - 3.3	Upper Bellflower	05/18/13			0.5 U	0.8	0.5 U	0.5 U	0.5 U
MW-GW-1	18.3	10 - 15	8.3 - 3.3	Upper Bellflower	05/18/13	K		0.5 U	1.0	0.5 U	0.5 U	0.5 U
MW-GW-1	18.3	10 - 15	8.3 - 3.3	Upper Bellflower	07/12/13			0.5 U	1.5	0.5 U	0.5 U	0.5 U
MW-GW-1	18.3	10 - 15	8.3 - 3.3	Upper Bellflower	01/20/14			0.5 U	1.9	0.5 U	0.5 U	0.5 U
MW-GW-1	18.3	10 - 15	8.3 - 3.3	Upper Bellflower	04/14/14			0.5 U	1.6	0.5 U	0.5 U	0.5 U
MW-GW-1	18.3	10 - 15	8.3 - 3.3	Upper Bellflower	08/23/14			0.5 U	2.0	0.5 U	0.5 U	0.5 U
MW-GW-1	18.3	10 - 15	8.3 - 3.3	Upper Bellflower	11/11/14			0.5 U	2.2	0.5 U	0.5 U	0.5 U
MW-GW-2	17.9	10 - 15	8.0 - 3.0	Upper Bellflower	05/08/12			1 U	370	5 U	5 U	34
MW-GW-2	17.9	10 - 15	8.0 - 3.0	Upper Bellflower	07/11/12			0.5	310	3.0	0.5 U	56
MW-GW-2	17.9	10 - 15	8.0 - 3.0	Upper Bellflower	07/11/12	K		0.6	300	5.0	0.5 U	59
MW-GW-2	17.9	10 - 15	8.0 - 3.0	Upper Bellflower	10/13/12			0.8	280	7.3	0.5 U	110
MW-GW-2	17.9	10 - 15	8.0 - 3.0	Upper Bellflower	01/26/13			0.5 U	200	6.8	0.5 U	140
MW-GW-2	17.9	10 - 15	8.0 - 3.0	Upper Bellflower	05/18/13			1.0	260	9.4	0.5 U	98
MW-GW-2	17.9	10 - 15	8.0 - 3.0	Upper Bellflower	07/12/13			0.5 U	180	3.6	0.5 U	77
MW-GW-2	17.9	10 - 15	8.0 - 3.0	Upper Bellflower	01/20/14			0.70	170	6.5	0.5 U	140
MW-GW-2	17.9	10 - 15	8.0 - 3.0	Upper Bellflower	04/14/14			0.70	160	8.0	0.5 U	160
MW-GW-2	17.9	10 - 15	8.0 - 3.0	Upper Bellflower	08/23/14			0.78	170	6.8	0.5 U	100
MW-GW-2	17.9	10 - 15	8.0 - 3.0	Upper Bellflower	11/11/14			0.80	160	7.9	0.5 U	150
MW-GW-3	16.5	10 - 15	6.6 - 1.6	Upper Bellflower	05/08/12			0.70	170	6.8	0.5 U	130
MW-GW-3	16.5	10 - 15	6.6 - 1.6	Upper Bellflower	07/11/12			1 U	18	5 U	5 U	5 U
MW-GW-3	16.5	10 - 15	6.6 - 1.6	Upper Bellflower	10/13/12			0.5 U	36	3.1	1.6	0.5 U
MW-GW-3	16.5	10 - 15	6.6 - 1.6	Upper Bellflower	01/26/13			0.5 U	30	4.5	0.6	8.1
MW-GW-3	16.5	10 - 15	6.6 - 1.6	Upper Bellflower	01/26/13	K		0.5 U	2.8	1.5	0.5 U	11
MW-GW-3	16.5	10 - 15	6.6 - 1.6	Upper Bellflower	05/18/13			0.5 U	2.9	1.4	0.5 U	10
MW-GW-3	16.5	10 - 15	6.6 - 1.6	Upper Bellflower	07/15/13			0.5 U	1.7	2.1	0.5 U	7.1
MW-GW-3	16.5	10 - 15	6.6 - 1.6	Upper Bellflower	01/20/14			0.5 U	83	14	0.5	12
MW-GW-3	16.5	10 - 15	6.6 - 1.6	Upper Bellflower	04/14/14			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-GW-3	16.5	10 - 15	6.6 - 1.6	Upper Bellflower	08/23/14			0.5 U	5.9	4.4	0.5 U	19
MW-GW-3	16.5	10 - 15	6.6 - 1.6	Upper Bellflower	11/11/14			0.5 U	1.7	2.3	0.5 U	6
MW-GW-4	17.2	10 - 15	7.3 - 2.3	Upper Bellflower	05/08/12			0.5 U	0.6	0.4 J	0.5 U	0.6
MW-GW-4	17.2	10 - 15	7.3 - 2.3	Upper Bellflower	07/11/12			1 U	5 U	5 U	5 U	5 U
MW-GW-4	17.2	10 - 15	7.3 - 2.3	Upper Bellflower	10/13/12			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-GW-4	17.2	10 - 15	7.3 - 2.3	Upper Bellflower	01/26/13			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-GW-4	17.2	10 - 15	7.3 - 2.3	Upper Bellflower	05/18/13			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-GW-4	17.2	10 - 15	7.3 - 2.3	Upper Bellflower	07/15/13			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-GW-4	17.2	10 - 15	7.3 - 2.3	Upper Bellflower	01/20/14			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-GW-4	17.2	10 - 15	7.3 - 2.3	Upper Bellflower	04/14/14			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-GW-4	17.2	10 - 15	7.3 - 2.3	Upper Bellflower	08/23/14			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-GW-4	17.2	10 - 15	7.3 - 2.3	Upper Bellflower	11/11/14			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-BA-1	18.2	40 - 50	-21.8 - -31.8	Ballona	05/08/12			1 U	5 U	5 U	5 U	5 U
MW-BA-1	18.2	40 - 50	-21.8 - -31.8	Ballona	07/11/12			0.5 U	1.3	0.5 U	0.5 U	0.5 U
MW-BA-1	18.2	40 - 50	-21.8 - -31.8	Ballona	10/13/12			0.5 U	1.0	0.5 U	0.5 U	0.5 U
MW-BA-1	18.2	40 - 50	-21.8 - -31.8	Ballona	01/26/13			0.5 U	0.9	0.5 U	0.5 U	0.5 U
MW-BA-1	18.2	40 - 50	-21.8 - -31.8	Ballona	05/18/13			0.5 U	0.8	0.5 U	0.5 U	0.5 U
MW-BA-1	18.2	40 - 50	-21.8 - -31.8	Ballona	07/12/13			0.5 U	0.9	0.5 U	0.5 U	0.5 U
MW-BA-1	18.2	40 - 50	-21.8 - -31.8	Ballona	01/20/14			0.5 U	0.7	0.5 U	0.5 U	0.5 U
MW-BA-1	18.2	40 - 50	-21.8 - -31.8	Ballona	04/14/14			0.5 U	0.7	0.5 U	0.5 U	0.5 U
MW-BA-1	18.2	40 - 50	-21.8 - -31.8	Ballona	08/23/14			0.5 U	0.54	0.5 U	0.5 U	0.5 U
MW-BA-1	18.2	40 - 50	-21.8 - -31.8	Ballona	11/11/14			0.5 U	0.44 J	0.5 U	0.5 U	0.5 U
MW-BA-2	18.0	39 - 49	-21.0 - -31.0	Ballona	05/08/12			1 U	13	5 U	5 U	5 U
MW-BA-2	18.0	39 - 49	-21.0 - -31.0	Ballona	05/08/12	K		1 U	11	5 U	5 U	5 U
MW-BA-2	18.0	39 - 49	-21.0 - -31.0	Ballona	07/11/12			0.5 U	6.3	0.5 U	0.5 U	0.5 U

Table 1

Off School Site Performance Monitoring and Contingency Plan

Summary of Groundwater Analytical Data - Volatile Organic Compounds (VOCs)

Playa Vista

Location ID	Ground Surface Elevation (feet MSL)	Sample Interval (feet bgs)	Screen Interval (feet MSL)	Aquifer	Sample Date	Sample Type		Benzene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride
							HBRG	233	6,840	8,840	1,820	26.5
							MCL	1	6	10	5	0.5
MW-BA-2	18.0	39 - 49	-21.0 - -31.0	Ballona	10/13/12			0.5 U	4.2	0.5 U	0.5 U	0.5 U
MW-BA-2	18.0	39 - 49	-21.0 - -31.0	Ballona	10/13/12	K		0.5 U	4.5	0.5 U	0.5 U	0.5 U
MW-BA-2	18.0	39 - 49	-21.0 - -31.0	Ballona	01/26/13			0.5 U	14	0.5 U	0.5 U	1.2
MW-BA-2	18.0	39 - 49	-21.0 - -31.0	Ballona	05/18/13			0.5 U	23	0.5 U	0.5 U	3.0
MW-BA-2	18.0	39 - 49	-21.0 - -31.0	Ballona	07/12/13			0.5 U	23	0.5 U	0.5 U	16
MW-BA-2	18.0	39 - 49	-21.0 - -31.0	Ballona	01/20/14			0.5 U	20	0.5 U	0.5 U	22
MW-BA-2	18.0	39 - 49	-21.0 - -31.0	Ballona	04/14/14			0.5 U	15	0.5 U	0.5 U	26
MW-BA-2	18.0	39 - 49	-21.0 - -31.0	Ballona	08/23/14			0.5 U	6	0.5 U	0.5 U	15
MW-BA-2	18.0	39 - 49	-21.0 - -31.0	Ballona	11/11/14			0.5 U	5.1	0.5 U	0.5 U	15
MW-BA-3	16.5	44 - 54	-27.5 - 37.5	Ballona	05/08/12			1 U	5 U	5 U	5 U	5 U
MW-BA-3	16.5	44 - 54	-27.5 - 37.5	Ballona	07/11/12			0.5 U	1	0.5 U	0.5 U	0.5 U
MW-BA-3	16.5	44 - 54	-27.5 - 37.5	Ballona	10/13/12			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-BA-3	16.5	44 - 54	-27.5 - 37.5	Ballona	01/26/13			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-BA-3	16.5	44 - 54	-27.5 - 37.5	Ballona	05/18/13			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-BA-3	16.5	44 - 54	-27.5 - 37.5	Ballona	07/15/13			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-BA-3	16.5	44 - 54	-27.5 - 37.5	Ballona	01/20/14			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-BA-3	16.5	44 - 54	-27.5 - 37.5	Ballona	04/14/14			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-BA-3	16.5	44 - 54	-27.5 - 37.5	Ballona	08/23/14			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-BA-3	16.5	44 - 54	-27.5 - 37.5	Ballona	11/11/14			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MW-BA-4	17.4	42 - 52	-24.6 - -34.6	Ballona	05/08/12			1 U	5 U	5 U	5 U	5 U
MW-BA-4	17.4	42 - 52	-24.6 - -34.6	Ballona	07/11/12			0.5 U	3	0.5 U	0.5 U	0.5 U
MW-BA-4	17.4	42 - 52	-24.6 - -34.6	Ballona	10/13/12			0.5 U	3	0.5 U	0.5 U	0.5 U
MW-BA-4	17.4	42 - 52	-24.6 - -34.6	Ballona	01/26/13			0.5 U	2	0.5 U	0.5 U	0.5 U
MW-BA-4	17.4	42 - 52	-24.6 - -34.6	Ballona	05/18/13			0.5 U	3	0.5 U	0.5 U	0.5 U
MW-BA-4	17.4	42 - 52	-24.6 - -34.6	Ballona	07/15/13			0.5 U	4	0.5 U	0.5 U	0.5 U
MW-BA-4	17.4	42 - 52	-24.6 - -34.6	Ballona	01/20/14			0.5 U	4	0.5 U	0.5 U	0.5 U
MW-BA-4	17.4	42 - 52	-24.6 - -34.6	Ballona	04/14/14			0.5 U	3	0.5 U	0.5 U	0.5 U
MW-BA-4	17.4	42 - 52	-24.6 - -34.6	Ballona	08/23/14			0.5 U	3	0.5 U	0.5 U	0.5 U
MW-BA-4	17.4	42 - 52	-24.6 - -34.6	Ballona	11/11/14			0.5 U	3.3	0.5 U	0.5 U	0.5 U

Notes:

bgs - below ground surface

MSL - mean sea level

All results are reported in micrograms per liter (ug/l)

Only analytes detected in one or more samples are shown

U - Not detected at a concentration greater than the reporting limit indicated

HBRG - Phase 1 Residential Health-Based Remediation Goal

MCL - California maximum contaminant level for drinking water

Sample type: K = Split (duplicate) groundwater sample

Table 2

Off School Site Performance Monitoring and Conttingency Plan

Chemicals of Concern and Remediation Criteria

Playa Vista

	Groundwater Remediation Criteria		Remediation Criteria Exceeded		
Chemical of Concern	Phase 1 Res GW HBRG	MCL	Phase 1 Res GW HBRG	GW MCL	CA Notification Level
BENZENE	233	1		X	
CIS-1,2-DICHLOROETHENE	6840	6		X	
TRANS-1,2-DICHLOROETHENE	8840	10		X	
TRICHLOROETHENE	1820	5		X	
VINYL CHLORIDE	26.5	0.5	X	X	

Notes and Abbreviations

res HBRG - Phase 1 residential groundwater site-specific health-based remediation goals for potential residential-use exposure scenarios

GW - Groundwater

MCL - California Maximum Contaminant Level

CA NL - California Drinking Water Notification Level

Table 3
Off School Site Performance Monitoring and Contigency Plan
Summary of Monitoring Activities
Playa Vista

System Component	Monitoring Objectives	Locations	Parameters	Frequency
Extraction Well	Estimate VOC mass removal	OSS-EW-1	VOCs	Quarterly Initially
Bellflower Monitoring Wells	Radius of Influence	C-168Be, C-162, MW-GW-2	Water levels	Quarterly Initially
	Concentration and composition changes of VOC plume	C-168Be, C-162, MW-GW-2, MW-GW-1, MW-GW-3, MW-GW-4	VOCs	Quarterly Initially
Ballona Monitoring Wells	Vertical head gradients and connectivity with Bellflower aquitard	C-168Ba, MW-BA-2	Water levels	Quarterly Initially
	Concentration and composition changes of VOC plume	C-168Ba, MW-BA-2, MW-BA-1, MW-BA-3, MW-BA-4	VOCs	Quarterly Initially
Treatment System	Evaluate performance of treatment system	Sample port at system influent line	VOCs	Weekly
	Assess the breakthrough of initial LPGAC unit	Sample port at the effluent of the lead LPGAC	VOCs	Monthly
	Evaluate performance of treatment system	Sample port at system outlet	VOCs	Monthly
	Documentation of compliance with discharge permit		VOCs	Semi-Annual
			SVOCS	
			pH	

Notes:
VOCs = volatile organic compounds
LPGAC = liquid-phase granular activated carbon
SVOCs = semi-volatile organic compounds

Section 9

Figures

Ballona Creek Channel

Phase I Project Area

OFF SCHOOL SITE AREA

Freshwater Marsh

Lincoln Boulevard

S. Crescent Parkway West

S. Crescent Parkway East

Playa Vista Drive

Bay Park Drive

Phase I Residential

Sea Walk Drive

W. Villosa Way

Pacific Promenade

W. Runway Road

S. Para Way

S. Celedon Creek

Discovery Creek

FORMER TEST SITE 3

FORMER TEST SITE 2

West Bluff Creek Drive

FORMER BULK FUEL STORAGE AREA

FORMER FIRE SAFETY TRAINING AREA

SCHOOL SITE

Jefferson Boulevard

Phase 2 Project Area, The Village at Playa Vista (Area D2)

S. Dawn Creek

McConnell Avenue

Village Lane

Village Drive

Millennium Drive

FORMER REMOTE TEST SITE

FORMER AIRCRAFT SERVICE AREA

FORMER SALVAGE YARD

FORMER FIRING RANGE

FORMER TEMPORARY DRUM STORAGE AREA

FORMER PURGED FUEL STORAGE AREA

Westlawn Avenue

S. Campus Center Drive

E. Waterfront Drive

Campus Area

Centinela Avenue

S. Artisans Way

S. Centinela Avenue

Inglewood Boulevard

SA-1

SA-2

SA-3

SA-4

SA-5

SA-6

SA-7

SA-8

SA-9

SA-10

SA-11

SA-12

West Bluff Creek Drive

1,000 500 0 1,000

Feet

1 inch = 700 feet

Figure 1
Off School Site Performance Monitoring and Contingency Plan
Site Area Location Map
Playa Vista

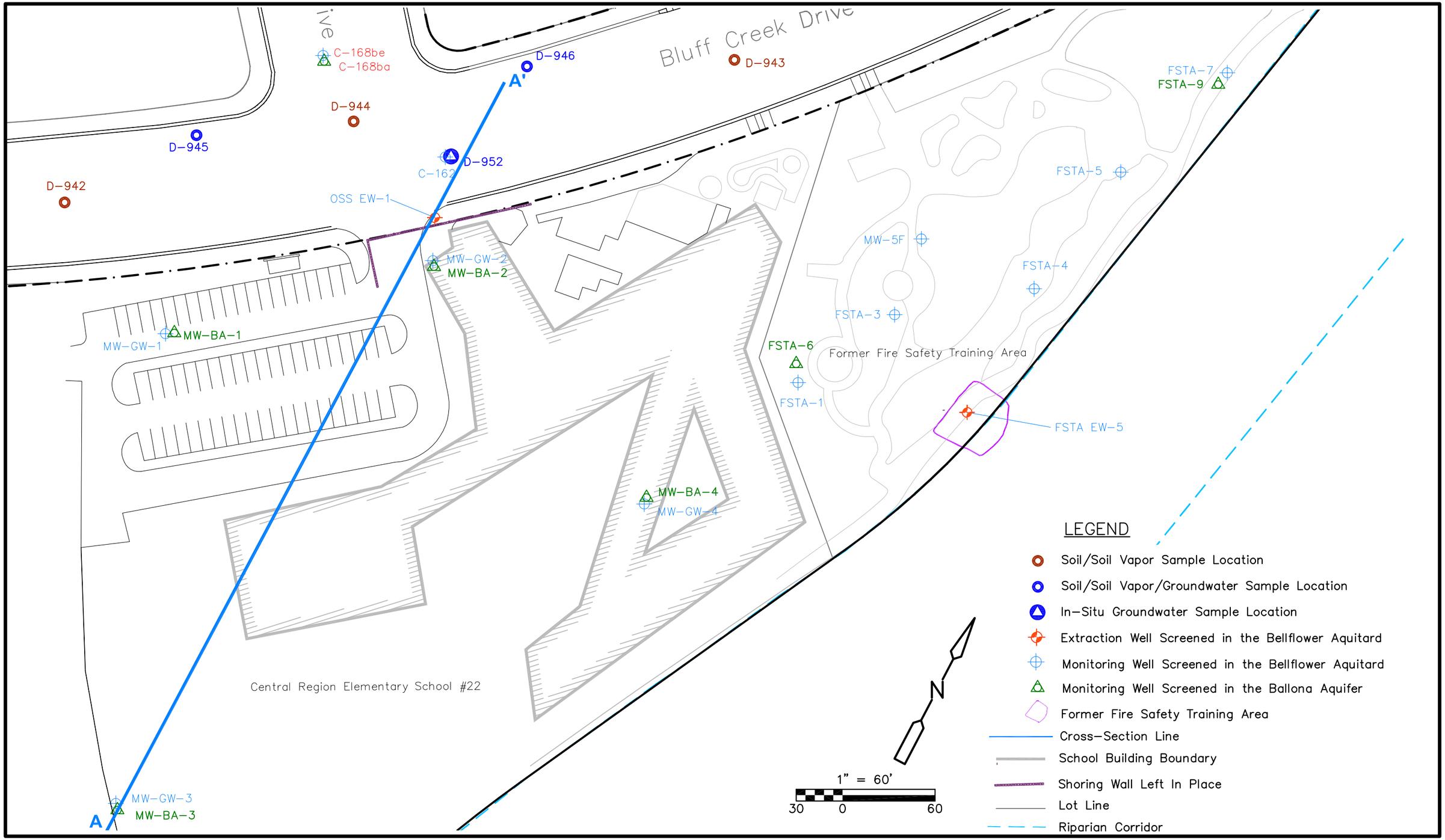
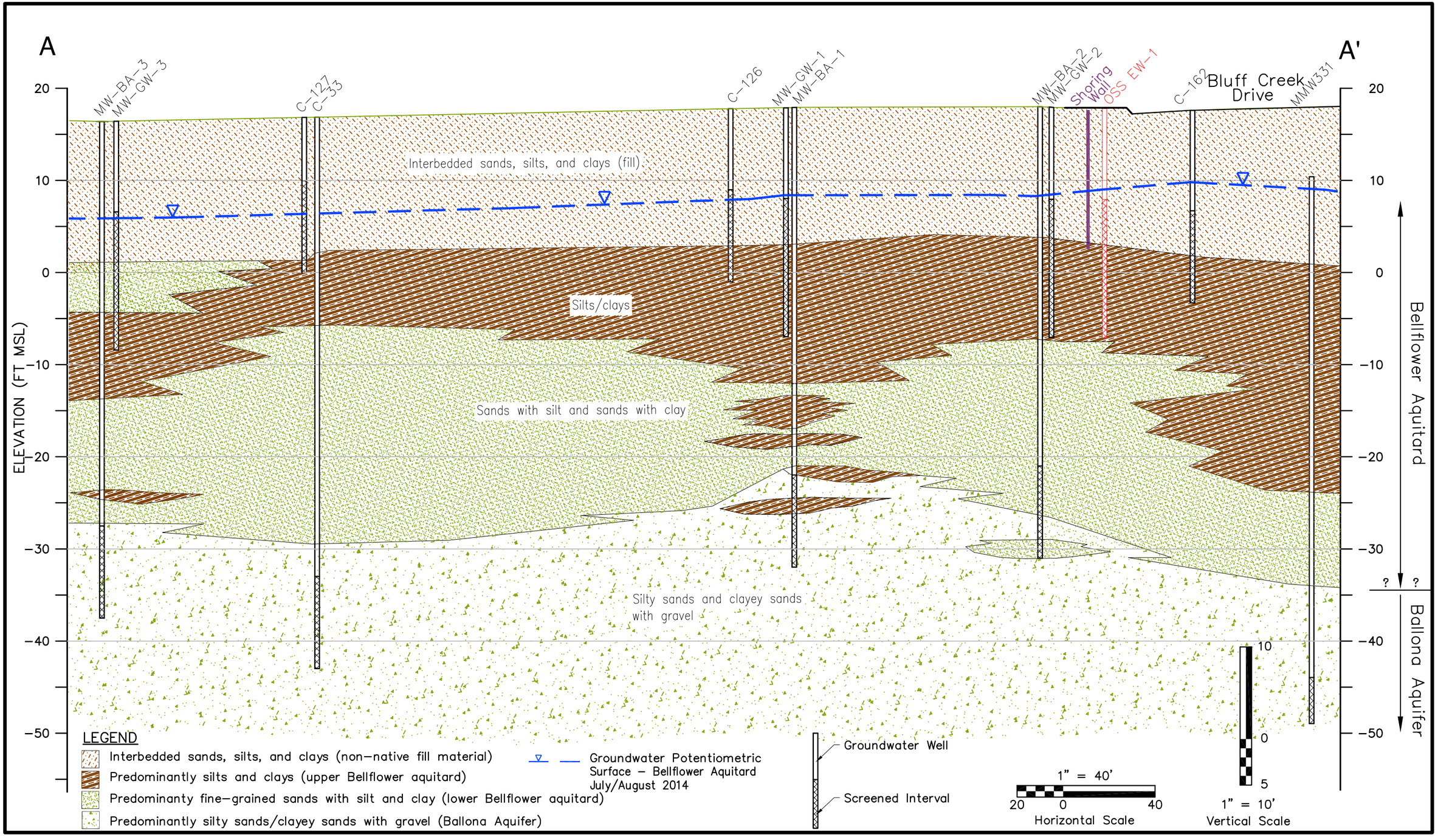


Figure 2
Off School Site Performance Monitoring and Contingency Plan
Sample Location Map
Playa Vista



CDM Smith

Figure 3
Off School Site Performance Monitoring and Contingency Plan
Geologic Cross-Section
Playa Vista

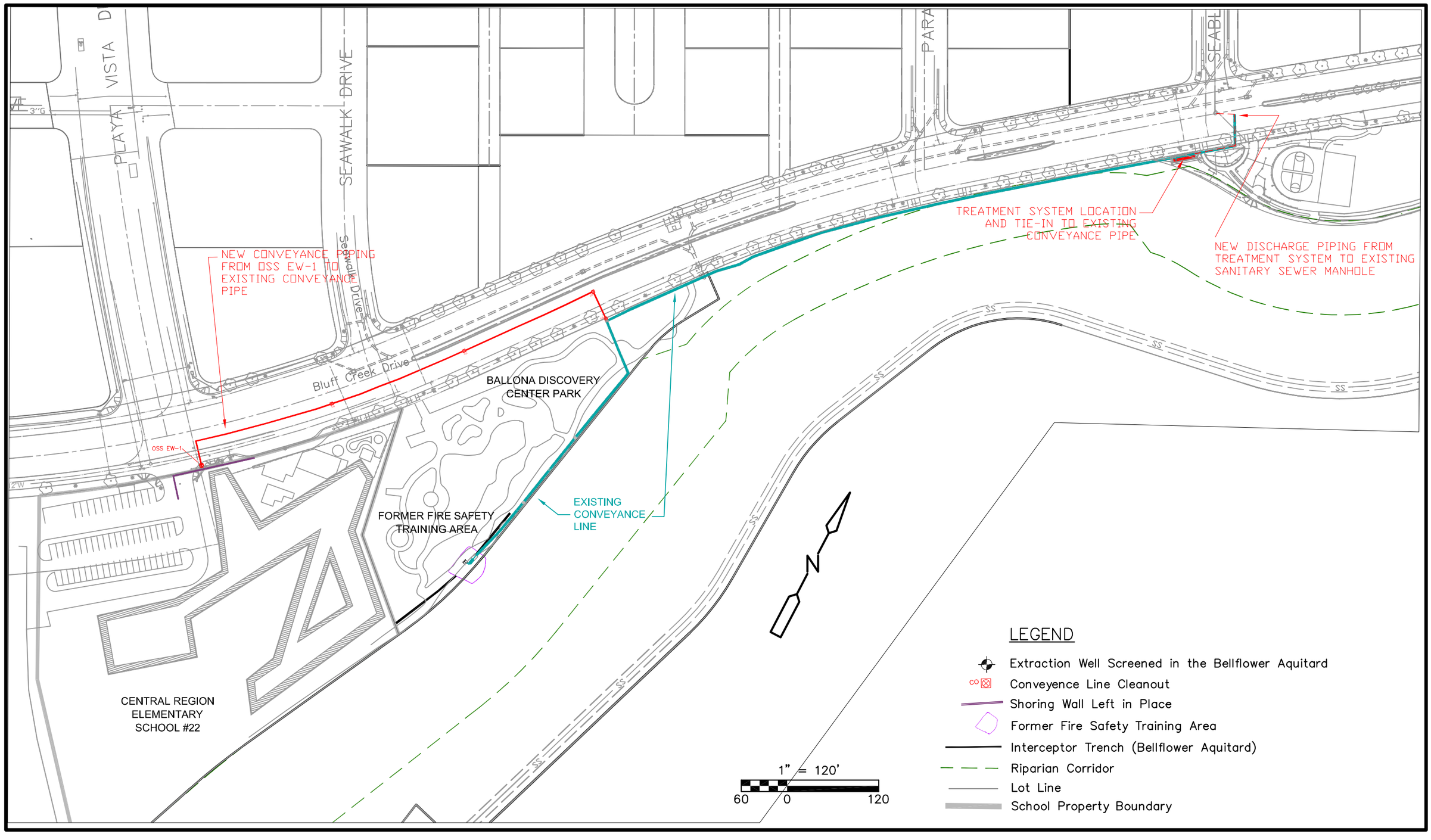


Figure 4
Off School SitePerformance Monitoring and Contingency Plan
Remedial Components Map
Playa Vista

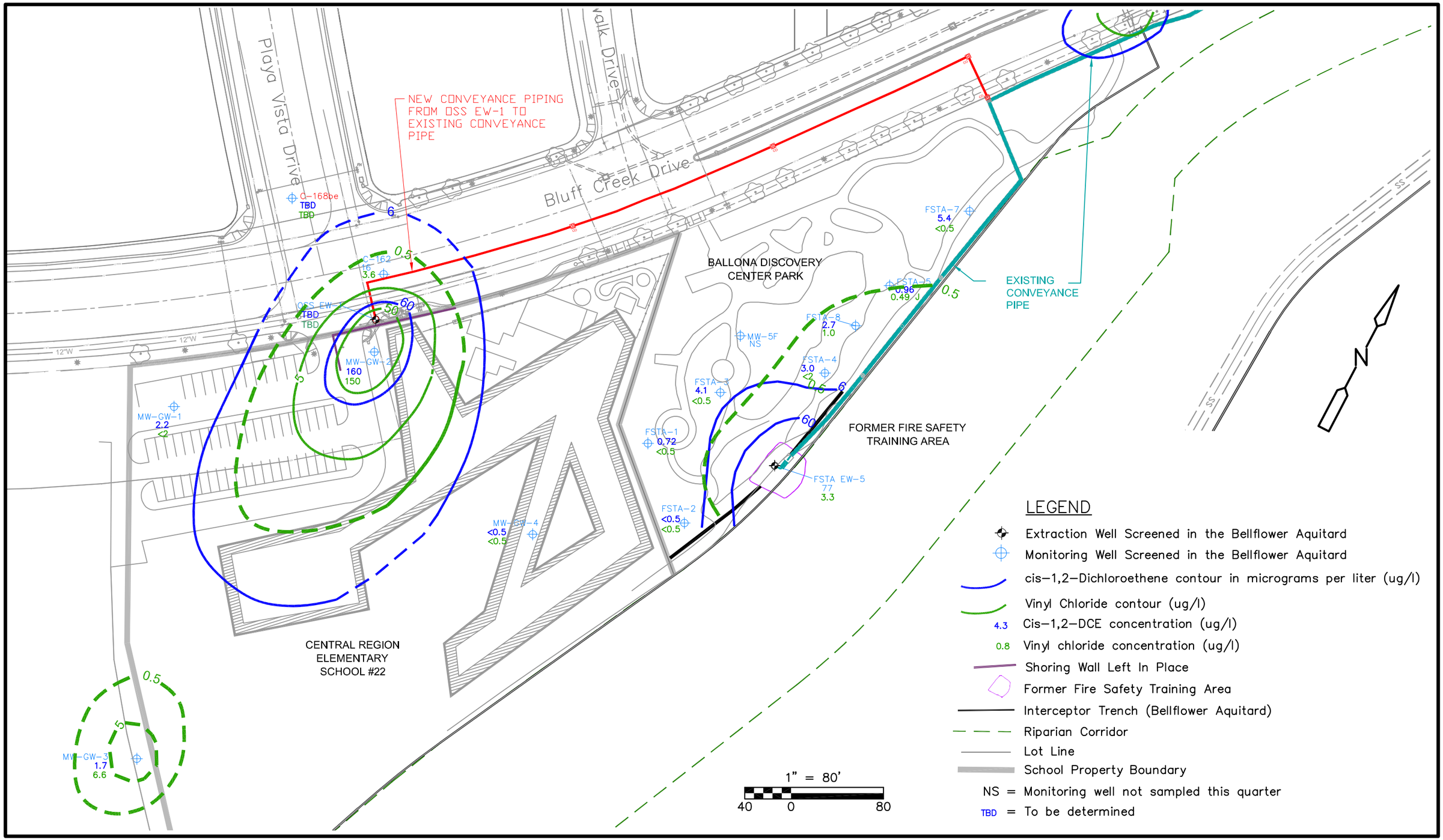
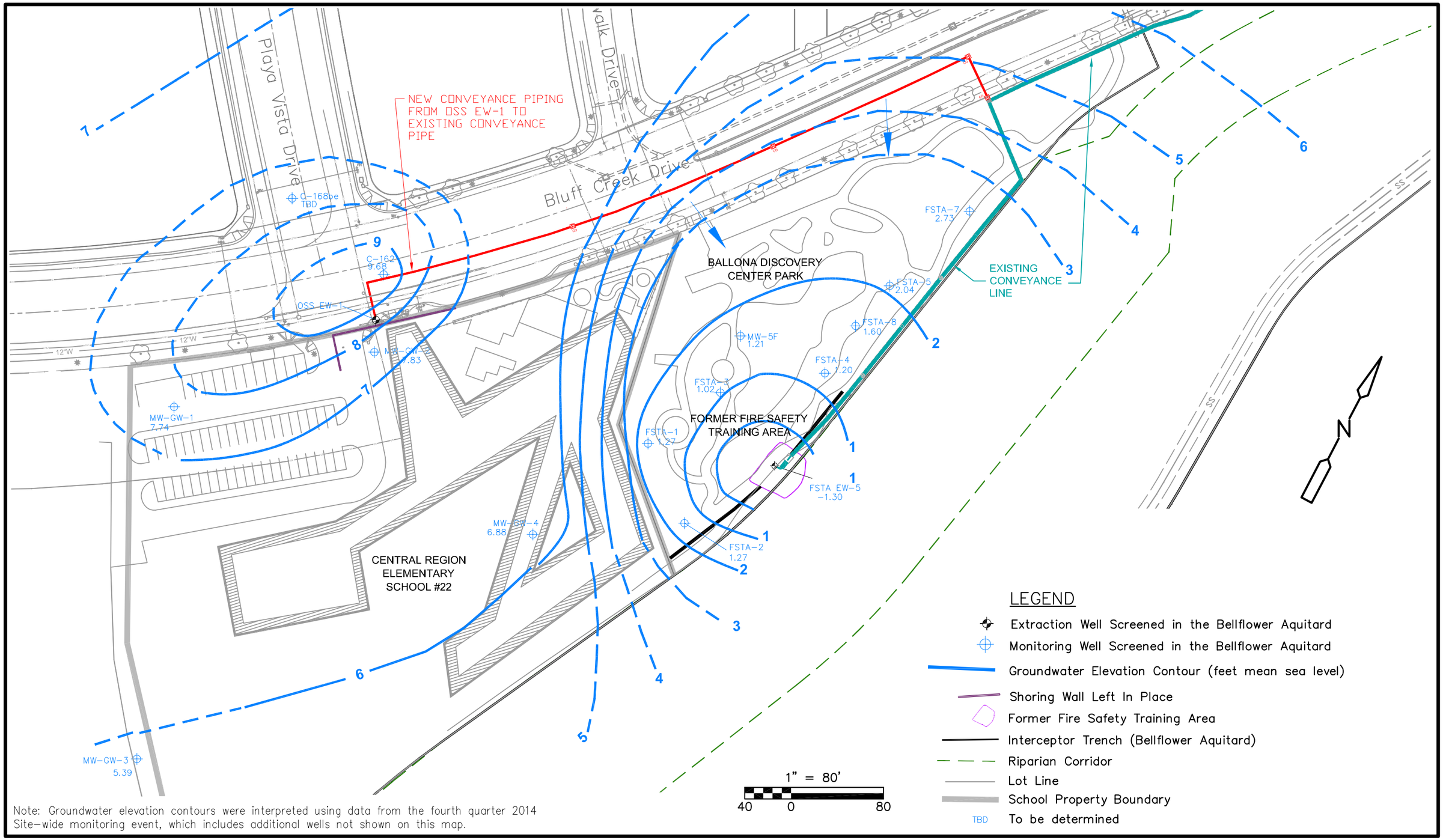


Figure 5
Off School Site Performance Monitoring and Contingency Plan
Isoconcentration Contour Map – Bellflower Aquitard – October/November 2014
Playa Vista



Note: Groundwater elevation contours were interpreted using data from the fourth quarter 2014 Site-wide monitoring event, which includes additional wells not shown on this map.

Figure 6
Off School Site Performance Monitoring and Contingency Plan
Potentiometric Surface Map – Bellflower Aquitard – October/November 2014
Playa Vista