DRAFT
EXECUTIVE SUMMARY
REGARDING THE ENVIRONMENTAL REMEDIATION
OF THE HUNTERS POINT SHIPYARD

JULY 2013

Office of Community Investment
and Infrastructure
This executive summary has been prepared by the Office of Community Investment and Infrastructure (OCII), as the Successor to the San Francisco Redevelopment Agency, with technical support from the San Francisco Department of Public Health and Treadwell & Rollo, a Langan Company, an environmental consulting firm. The summary and attachments contained herein will provide the Hunters Point Shipyard Citizens Advisory Committee, the Commission on Community Investment and Infrastructure and the public with a comprehensive, accessible picture of the status of the environmental cleanup and transfer of Navy property at Hunters Point Shipyard to OCII in furtherance of the Hunters Point Shipyard development. The content and figures incorporated in this document will be updated and redistributed from time to time to ensure that area stakeholders are kept up to date on the Navy and City’s efforts. Additional information is available at any time by contacting:

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In the summer of 2010, after many, many years of community based planning, the City certified the Final Environmental Impact Report (FEIR) and approved redevelopment plans for Phase 2 of the Hunters Point Shipyard (Shipyard), together with Candlestick Point. For a detailed summary of the redevelopment plans for the Shipyard and Candlestick Point, and other related documents, please see http://sfredevelopment.org/. This Executive Summary Regarding Environmental Remediation is an update to a previous 2010 version. As described herein, the Navy has completed a tremendous amount of work in the last three years and portions of the Shipyard are almost ready to transfer. This update summarizes the Navy’s activities and provides updates to many related environmental issues.

Because the Shipyard is a Superfund Site within a community with long-standing environmental justice concerns, extraordinary measures have been taken over the last 22 years to (i) investigate the types of materials onsite that need to be remediated, (ii) fund and implement the cleanup, and (iii) establish procedures regarding construction on the Shipyard after the cleanup is complete. The purpose of this Executive Summary is to describe those measures, explain how the measures relate to the redevelopment plans for the property, and explain the land transfer process. Before the Navy can transfer any land, the state and federal regulatory agencies must each review and concur that the remediation has been completed to a standard which is protective of human health and the environment for the intended reuse of the land. Additionally, if further remedial action is found to be necessary, even after transfer of the property, the Navy remains responsible for completing any required cleanup.

This Executive Summary also includes a section answering “Frequently Asked Questions” about the Shipyard cleanup.
I. Regulatory Oversight of Navy’s Cleanup

For over 22 years, the Navy has been investigating and remediating contamination on the Shipyard. The cleanup work has been implemented in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA\(^1\)) which is commonly called Superfund. Superfund provides broad federal authority to clean up releases or threatened releases of hazardous substances that may endanger public health or the environment. The law authorized the United States Environmental Protection Agency (USEPA) to identify parties responsible for contamination of sites and compel the parties to clean up the sites.

Remediation of the Shipyard is subject to the oversight of the USEPA and two departments within the California Environmental Protection Agency (Cal-EPA): the Department of Toxics Substances Control (DTSC) and the San Francisco Bay Area Regional Water Quality Control Board (RWQCB). All three of these agencies work together on the Shipyard under the terms of a Federal Facilities Agreement (FFA) dated 1992. The City, through the San Francisco Department of Public Health (SFDPH) and its consultant, Treadwell & Rollo, also closely monitor the Navy cleanup. SFDPH and Treadwell & Rollo have presented detailed information about the Navy’s cleanup activities at many community meetings and workshops.

The San Francisco Redevelopment Agency along with all 400 redevelopment agencies in California, was dissolved on February 1, 2012, by order of the California Supreme Court in a decision issued on December 29, 2011 (California Redevelopment Association et al. v. Ana Matosantos). On June 27, 2012, the California Legislature passed and the Governor signed AB 1484, a bill making technical and substantive changes to AB 26, the dissolution bill that was found largely constitutional by the Supreme Court on December 29, 2011. In response to the requirements of AB 26 and AB 1484, the City and County of San Francisco (City) has created the Office of Community Investment and Infrastructure (OCII) as

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\(^1\) CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act, commonly known as Superfund, was enacted by Congress on December 11, 1980. This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment.
the Successor Agency to the San Francisco Redevelopment Agency (Successor Agency). Under AB 26 and AB 1484, the OCII is authorized to continue to implement three “Major Approved Development Projects”—Mission Bay, Transbay and the Shipyard/Candlestick Point development—along with other obligations that were previously administered by the former Redevelopment Agency such as regulating land use in certain former project areas, administering certain affordable housing obligations, disposing of assets, and managing debt.

Pursuant to state and local legislation, the OCII is governed by two bodies, the Oversight Board of the Successor Agency and the Commission on Community Investment and Infrastructure. The Commission on Community Investment and Infrastructure exercises land use, development and design approval authority for the Major Approved Development Projects, including the Shipyard and Candlestick Point, in place of the former Agency Commission. The Oversight Board of the Successor Agency oversees certain fiscal management of former Redevelopment Agency assets other than affordable housing assets.

As shown on Attachment 1, for cleanup purposes and to enable the phased development of the site, the Shipyard is currently divided into 13 parcels: A, B, C, D-1, D-2, E, E-2, F (offshore underwater area), G, IR7/18, UC-1, UC-2 and UC-3.

Under CERCLA and the 2004 Conveyance Agreement between the OCII and the Navy (the Conveyance Agreement), the Navy is required to complete the necessary remediation for each of these parcels given the intended reuse and to provide a warranty that the property has been cleaned to a level that is protective of human health and the environment. Prior to any transfer, USEPA, DTSC, and the RWQCB must concur in writing that sufficient remedial action has been taken to protect human health and the environment for the parcel’s intended future use. In addition, under applicable federal laws, if further remedial action is found to be necessary on account of unknown or newly discovered hazardous materials, the Navy remains responsible for completing the required cleanup even after transfer to the OCII or a developer and the Navy must indemnify subsequent owners for claims related to such hazardous materials.
Also, as was done in connection with the transfer of Parcel A to the OCII, the OCII will procure pollution legal liability insurance covering potential environmental claims related to construction and development on the Shipyard.

II. The Shipyard Cleanup has been Thoroughly Studied

One important advantage of the many and often overlapping regulatory jurisdictions overseeing the cleanup of the Shipyard is the knowledge that the scope of potential contamination at the Shipyard and the appropriateness of the proposed remedies have been very thoroughly studied. The scope of environmental sampling and characterization at the Shipyard is immense and thorough. As shown on the map in Attachment 2, over the last 22 years, more than 25,000 soil samples and 14,000 groundwater samples have been analyzed across the vast majority of all areas of the Shipyard.

The cleanup process mandated by CERCLA and the FFA requires the Navy to prepare an iterative series of reports documenting various investigation and remedial activities, and for the various regulatory agencies to review and approve those reports. Over the last 22 years, the Navy has completed numerous specific reports and analyses for areas of potential contamination on the Shipyard. Based on those reports, specific cleanup plans have been developed and, as described further below, in many cases already completed. After specific cleanup actions are finished, additional confirmatory testing is done to ensure the cleanup was effective and the property can be used safely. Every step of that process involves extensive public review and expert peer review. A more detailed description of the various steps in the CERCLA process is presented in Attachment 3.

In addition to the parcel-by-parcel reports and analyses described above, the Navy has conducted several basewide investigation and remediation programs for specific types of hazardous materials, including potential radiological contamination, asbestos in buildings, and underground storage tanks.

HOW DOES PROPOSITION P RELATE TO THE CLEANUP OF THE SHIPYARD?

On November 7, 2000, the voters of San Francisco voted to approve Proposition P which called upon the Navy to remediate the Shipyard to the highest levels practical to assure flexible reuse of the property. More details on Proposition P are included in Attachment 21. On July 30, 2001, the Board of Supervisors approved a resolution confirming as the policy of the City and County of San Francisco that the Hunters Point Naval Shipyard should be cleaned of toxic and hazardous pollution by the Navy to the highest practical level. In furtherance of Proposition P, in 2004, the City approved a Conveyance Agreement with the Navy that contemplated the phased transfer of parcels on the Shipyard provided that the regulators concur the property can safely be used for its intended use. That agreement and the processes set forth in it, together with applicable federal, state and local laws, will govern future transfers between the Navy and the OCII.
III. Status of the Navy’s Cleanup

To date, the Navy has spent or obligated over $850,000,000 on the cleanup of the Shipyard. About 90% of the necessary “removal actions” are done for the properties being transferred in the next two years and many of the other expected “removal actions” for the whole Shipyard are done or nearing completion. In addition, much of the regulatory paperwork and confirmatory testing necessary to transfer land is nearing completion for much of the developable land on the Shipyard. A more detailed, parcel-by-parcel status of the Shipyard cleanup is presented in Attachment 4.

The ultimate conclusions of the testing and analyses done on the Shipyard are twofold:

- First, in its current state, there are areas of the Shipyard that are cleaned up and ready for transfer and for the remaining parcels, testing has shown that the parcels do not present a threat or substantial risk to long-term existing tenants, the surrounding environment or the local community. In fact, for many years the various environmental regulatory agencies have approved a number of long-standing leaseholds on the Shipyard, by the San Francisco Police Department, hundreds of artists and many others, all in close proximity to various active remediation sites.

- Second, while the remaining Shipyard parcels do not present a health risk in their current state, extensive cleanup is required to allow the type of subsurface construction necessary to implement the community’s long-standing vision for redevelopment of the site. Under the Conveyance Agreement, the Navy is obligated to clean up the Shipyard to levels consistent with the City’s reuse plans. With the substantial support of the City’s congressional delegation, the Navy has been extraordinarily successful in securing funds for the Navy cleanup. In fact, over the last several years the Navy has spent more money on the cleanup of the Shipyard than any other closed base in the country.
IV. Nature of the Navy’s Cleanup

As a general matter, the Navy is required to physically remove anything that may pose a threat to human health or the environment if left in the ground. Low-level contaminants, commonly found in urban areas, may remain in the ground so long as they meet USEPA and DTSC “risk ranges” (i.e., will not pose a significant hazard to residents, workers, tenants, visitors neighbors or the environment) and so long as appropriate use restrictions and physical covers are put in place. As described further below, in many cases the physical covers are the buildings, streets, sidewalks or new parks created by the development.

Groundwater plumes are saturated subsurface areas that contain contaminants in solution. In the case of groundwater plumes in areas like the Shipyard, where the groundwater is not used for drinking water, the groundwater plumes are treated and monitored. When very low levels of residual groundwater contaminants are too difficult to completely remove from the groundwater, natural treatment processes are used over several years and are monitored to verify that the levels are decreasing. While the building construction itself acts as a barrier to residual contamination, the installation of vapor barriers to completely cut off exposure of building occupants to certain types of residual groundwater contamination is the usual regulatory requirement for these areas to ensure that occupants are completely safe.

A summary of the strategies for dealing with specific types of contamination and other environmental information are presented in Attachments 5 through 17 including: groundwater and volatile organic compounds (VOCs), the Parcel E-2 landfill, cleanup strategies, low-level radiological materials, naturally occurring asbestos, abrasive blast material, naturally occurring metals, lead-based paint (LBP), pile driving through contaminated soil, public participation and notification requirements, monitoring and enforcement of environmental restrictions, asbestos containing materials (ACM), and Superfund and Brownfields sites.

The cleanup approach described above is very common in the development of properties known as “Brownfields.” Brownfield redevelopment typically
Risk to public health from chemical contaminants is determined after extensive scientific evaluation including review of human and animal studies. This field of scientific study has established the level of risks associated with various levels of contaminants. At each step of the evaluation, safety factors are used when there is uncertainty in the calculations. These safety factors result, in most cases, in a slight overestimation of the risk for the average person, in order to protect the most vulnerable members of the population.

Since some substances, like metals, which occur naturally in the soil and rock represent a background risk, risk ranges are calculated to take into account what is “the ideal” meaning negligible risk versus what is practical and reasonable. For instance, arsenic is a naturally occurring metal in the bedrock at the Shipyard but it also is a chemical that might have been used in pesticides or in some industrial processes. The cancer risk from a lifetime of exposure to the arsenic in the naturally occurring rock is calculated to be above the ideal risk range of one in a million. So a risk range is used to protect against the levels that are above the naturally occurring risk but still within the risk range.

WHAT ARE “RISK RANGES”?

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Many industrial areas within cities are Brownfields and many have been successfully cleaned up and reused for mixed-use developments. In fact, Brownfield development or land recycling is one of the most environmentally sound ways of addressing regional growth (as opposed to paving over “green fields”). Brownfield redevelopment is very common and is proven to provide significant economic, environmental and public health benefits.

In fact, much of downtown San Francisco and the eastern neighborhoods on the Bay from Mission Bay down through Islais creek have been Brownfields since the 1906 earthquake when these neighborhoods were created by filling in the Bay with earthquake rubble. The fact that this rubble contained chemical contamination was recognized long before the word “Brownfields” became fashionable. The SFDPH established the “Maher” ordinance in 1986 (now Article 22A of the Health Code) to deal with these fill areas and the contamination associated with them. Once the Navy has prepared land at the Shipyard for transfer, the condition of the land and the engineering or institutional controls there will be very similar to other Brownfields in the Bay Area like Mission Bay, Emeryville, the America Center in San Jose, Mandela Gateway in Oakland, Oyster

2 The Maher Ordinance does not specifically apply to the Shipyard site. However, the Maher Ordinance requirements were incorporated into the Health Code Article 31 requirements (described in this document) and are designed to comprehensively address the contamination issues at this site.
Brownfields are not unique to the Bay Area. Almost all major cities have similar sites, often located along the waterfront where the first industrial uses were located that are in the process of being cleaned up for residential, commercial and open space reuse. Although there is no comprehensive national data that represent the full breadth of Brownfields redevelopment activity, in the US Conference of Mayors 2008 National Report on Brownfield’s Redevelopment, 150 cities reported success with 75 cities reporting that over 180,000 jobs, millions of homes and thousands of acres open space had been created.

http://usmayors.org/brownfields/library/brownfieldSURVEY08.pdf

Mission Bay and Emeryville are particularly relevant examples. Mission Bay is a typical urban Brownfields site. It was an area of Bay fill that was used for rail yards, warehousing and miscellaneous dumping. After extensive testing, the City decided to redevelop the site, but to prevent exposure to contaminants, gardens must be in raised boxes (example of an institutional control) and there is a requirement for the final end use to require a durable cover or clean topsoil (example of an engineering control). Additionally, due to organic material in the Bay fill and underlying organic-rich native material around Mission Bay, methane is sometimes detected in soil gas and if present above action levels, methane gas mitigation systems must be designed and installed during building construction. The barriers (or "covers") between the widespread but low level contamination across Mission Bay that are provided by the building pads, parks and streets of the development itself are the most important element of the final environmental remedy for Mission Bay.

Much of Emeryville is also a good example of Brownfields development. Emeryville was a former hub of industrial activity. As industrial activities began to contract and relocate to other cities in the 1970s, they left behind properties with contaminants that had to be cleaned up before new development could happen. Many properties in Emeryville have been redeveloped using the Brownfields model of evaluating risk and implementing engineering controls (ECs) like "caps" and "covers" and institutional controls like deed restrictions prohibiting gardens at grade. Like the Shipyard, much of the redevelopment in Emeryville has focused on housing, commercial, retail and park uses, and Emeryville is rapidly redeveloping into a commercial and residential community with a diverse population that has been growing at a rate more than twice the rate of surrounding Alameda County.

V. Regulatory Oversight during Construction

After the concurrence of the various regulatory agencies that the property can be safely used for its intended uses under the City’s redevelopment plan, the
Navy will transfer land at the Shipyard to the OCII. Once transferred, construction on the Shipyard must comply with a variety of applicable federal, state and local environmental laws. These laws will be enforced both through provisions in those laws and through mitigation measures that are part of the Mitigation Monitoring and Reporting Program (MMRP) that were adopted as part of the findings during the California Environmental Quality Act (CEQA) approvals in the summer of 2010. The mitigation measures related to the issues discussed in this summary and the applicable portions of the MMRP are presented in Attachment 18.

To ensure that all environmental restrictions are complied with, the MMRP requires any builder working on the Shipyard, before obtaining any permits for construction, to provide documentation to the SFDPH that the work will comply with all environmental restrictions imposed on the property through the CERCLA process, or a separate process that the RWQCB is overseeing to address petroleum contamination. Further, under a pre-existing Memorandum of Understanding between the Navy and DTSC, DTSC will have authority in perpetuity to enforce all land use restrictions that the Navy has imposed on the property through deed restrictions.

Other hazardous materials laws will also control construction activities at the Shipyard. For example, if soil or groundwater containing hazardous materials must be disposed of off-site, the handling and disposal will be subject to an array of state and federal laws. Also, if buildings contain asbestos or LBP, these materials will be removed and abated pursuant to special laws governing their handling administered by the Bay Area Air Quality Management District (BAAQMD), the California Occupational Safety and Health Administration (Cal OSHA) and the San

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**WHAT IS THE DIFFERENCE BETWEEN A CAP AND A COVER?**

Both “caps” and “covers” are typical of Brownfields development. The term “cover” refers to a remedy requiring that physical barriers be installed (or remain in place) to support the development (e.g., building slabs, pavement for roads, concrete for sidewalks, clean soil in parks), meet certain specifications of thickness and be maintained to minimize breaches except during approved activities. The controls imposed in conjunction with cover remedies include an operation and maintenance plan and generally contemplate that breaches of the cover will be allowed with the approval of the regulatory agency as part of maintenance and redevelopment activities and will require specific construction practices (e.g., dust control) during construction and replacement of the cover after the activity. In addition, cracks or potholes due to weathering or as a result of earthquakes will require repair within a specified time period.

The term “cap” refers to a remedy requiring the installation of a surface specifically engineered to be placed on top of an area of known or suspected residual contamination (typically a landfill). The surface may be asphalt, concrete, or soil, but is generally more robust than a “cover” remedy; includes a “demarcation layer” of some sort; usually includes monitoring; and, requires more intensive operation and maintenance than a “cover” remedy. The controls imposed in conjunction with cap remedies generally make it more difficult to secure approval for a breach of the cap than the controls for a cover remedy.
Francisco Building Department through the City’s Building Code Chapter 34.

In addition to federal and state regulatory oversight, the City will oversee a number of activities related to construction on the Shipyard, including the removal of underground storage tanks and the handling of LBP on buildings during demolition. A section of the San Francisco Health Code, Article 31, specifically applies to construction on the Shipyard. Article 31 requires that prior to receiving permit approval for excavating or grading, a builder must submit the following plans to ensure safe work practices and environmental protection during construction: a Dust Control Plan (DCP); an Unknown Contaminant Contingency Plan; a Disposal Plan (if applicable); a Site Specific Health and Safety Plan (HASP); a Soil Importation Plan (if applicable); a Serpentinite Cover Plan (if applicable); a Foundation Support Pile Installation Plan (if applicable), and a Closure Report. The builder must comply with all institutional controls on the property. The builder must also evaluate any areas within 1,000 feet of the landfill for landfill gas issues. Lastly, prior to receiving permission to occupy a newly constructed building the builder must submit a closure report verifying that all plans were properly implemented. These Article 31 requirements and other information about City Permitting are described in Attachment 19.

VI. Construction Dust

One of the most widely discussed issues regarding construction at the Shipyard has concerned construction dust. As with any large site, construction activities at the Shipyard will generate dust. The entire site will be subject to BAAQMD regulations and the SFDPH controls on dust through SF Health Code Article 22B and Article 31. To assure compliance with these requirements, the MMRP requires builders to obtain approval of an Asbestos Dust Mitigation Plan (ADMP) from BAAQMD for areas over one acre that contain or might contain naturally occurring asbestos and approval of a DCP from SFDPH for all areas of the Shipyard. The purpose of these monitoring and control requirements is to trigger health protective actions such as increased dust control or temporary health protective shut downs of the dust generating activities.
The levels of dust or naturally occurring asbestos that trigger action are set at levels well below any level of health concern so that if there are any issues with the monitoring or control there will not be any long term health effects.

BAAQMD is the lead regulatory agency for air quality in the Bay Area. BAAQMD has enacted specific regulations for construction impacts related to the disturbance of serpentine rock. Prior to commencing construction on Parcel A, Lennar, the Shipyard master developer, was required to obtain BAAQMD’s approval of an ADMP. In granting that approval, BAAQMD went beyond the minimum requirements of the regulations and required Lennar to prepare an air monitoring plan and establish a network of airborne asbestos monitoring stations at different locations on the perimeter of the site. In addition, Cal OSHA reviewed and approved a site-specific plan for grading to ensure that workers were protected from potential exposure to naturally-occurring asbestos. The regulatory agencies review of the potential impacts of construction dust at the Shipyard also considered hazardous substances, other than serpentine rock, that may be present in the soil that could have been released into the air during construction. Their conclusion was that Parcel A could be used for unrestricted residential use and that there would not be an unacceptable hazard from the construction dust.

A detailed summary of prior issues concerning construction dust at the Shipyard is attached as Attachment 20. As explained in the attachment, despite numerous past allegations, thorough studies by SFDPH, the BAAQMD, the California Department of Public Health (CDPH), the US Agency for Toxic Substances and Disease Registry (ATSDR) and the USEPA have been undertaken and none recommended shutting down construction or concluded that prior grading or excavation work created a substantial or long-term health risk. SFDPH has and will continue to work with BAAQMD and other regulatory agencies overseeing the site to assure that any recommended improvements to dust monitoring and control are implemented in conjunction with future construction activities.

With the grading of the hilltop site on the Shipyard in 2005, several concerns were raised by the community about the impact of dust. In response, an extensive investigation was conducted by DPH with extensive oversight from BAAQMD, CDPH, ATSDR, and the USEPA. The investigation concluded that the grading and excavation work was properly executed and did not present a long-term health risk to nearby residents. Nevertheless, a variety of additional measures have been taken to ensure that dust on the site is minimized. More information on this program is included in Attachment 20.
VII. Frequently Asked Questions

What are some of the tools available to ensure that the development will comply with restrictions on property and that public health will be protected?

As described in Attachments 14 and 19, provisions in the deeds and covenants to restrict use of the property will be enforceable by the Navy, USEPA and/or DTSC. In addition, the City has many enforcement tools available to ensure that public health is protected. Under Article 31 of the Health Code, the developer must submit a number of required plans to SFDPH, including a DCP, and receive approval of those plans prior to receiving a permit to begin construction. Construction will not begin until SFDPH is assured that all aspects of the construction will be health protective. During construction, SFDPH can inspect to ensure implementation of the approved plans and enforce any of the institutional controls that were put in place during the property transfer. In addition to responding to complaints and conducting inspections, SFDPH can issue Notices of Violation, require the Applicant to stop work for a specified period of time, require the Applicant to attend a Director’s Hearing, issue cleanup and abatement orders, impose administrative civil penalties or ask the City Attorney to pursue injunctive relief.

Where will residential use be allowed at the Shipyard?

The remedy requirements chosen for the Shipyard include physical barriers (e.g. covers consisting of a building, street, sidewalk or two feet of clean soil in parks) on top of existing soil and, in some small areas of residual groundwater contamination, special foundations for buildings. These two requirements will be the same and will look the same in both residential and commercial areas of the site as presented in the table in Attachment 22.

In the dark green areas of the map in Attachment 22, cleanup to residential use standards has already been approved by the Regulatory Agencies or is expected to be approved in the next year and a half. Many of the light green areas are currently planned for non-residential uses (e.g. open space, industrial, commercial, research and development) however the remedy requirements are the same or are anticipated to be the same as residential areas – physical barriers for soil and small areas with special building foundations for groundwater. Therefore, it is anticipated that these areas can be used for residential use if additional approvals are obtained from Regulatory Agencies. The additional regulatory approval would consist of a review of existing soil and groundwater data, at the time that the approval is sought, and an assessment of whether any further soil or groundwater evaluation is required.

How can we be certain that the Shipyard will be suitable for redevelopment when it is transferred?

CERCLA requires that, prior to real property conveyance, the Navy must remediate hazardous substances to a level consistent with the protection of human health and the environment; or, if conveying property before completion of remediation,
the Navy must ensure that the property is suitable for conveyance for the use intended and that the intended use is consistent with the protection of human health and the environment. There are two ways in which the Navy can transfer title to the Shipyard: (1) after complete remediation of a parcel (e.g., the approach taken with Parcel A) or (2) as an early transfer before remediation is completed. The City has decided to accept transfer only after the Navy has completed remediation at the Shipyard property.

In conveying property that is remediated, the Navy documents its findings in a Finding of Suitability for Transfer (FOST). The FOST documents environmental findings regarding the proposed transfer, summarizes the environmental condition of the property and, where appropriate, identifies any environmental conditions that would pose constraints to activities or uses of the property. At the time of transfer, the Navy is required to covenant that all required remediation has been completed and that if additional remedial action is needed with respect to contaminants on the property at the time of transfer, further cleanup will be the Navy’s responsibility. The Conveyance Agreement for the Shipyard also requires federal and state environmental regulator concurrence prior to conveyance of a parcel by FOST.

**How is potential sea level rise being addressed and what does it mean for the cleanup?**

There has been a concern expressed that sea level rise (SLR) due to climate change could potentially cause flooding of the redevelopment area, causing migration of contaminants or an increase in liquefaction potential. More details about SLR are included in Attachment 23. The Navy is assuming three feet (36 inches) of SLR in the design of Navy required shoreline protection structures. The approach to addressing SLR has been closely integrated with the physical barriers that will be on the site to ensure that the site is safe for people and the environment. In addition, the Shipyard and Candlestick Point project is taking several measures to address SLR including: setting back development at least 100 feet from the shoreline, raising the occupied floors of the development to 55 inches above the 100 year flood level and ensuring the adoption of adaptive management strategies such as landscaped berms or seawalls at the shoreline that would prevent wave over-topping in the event that SLR exceeds current projections. In addition, the physical barriers that will be on the Shipyard along with the proposed SLR strategies are also illustrated.

**Will sea level rise affect residual soil contamination?**

The groundwater levels under the Shipyard have gone up and down over time, as much as eight feet or more in some areas of the site, depending on the amount of rainfall in the winter. These varying groundwater levels have been considered in the Navy’s chosen remedies for contamination at the site. When the sea level rises, groundwater levels near the shore will also rise. Residual chemicals in the soil largely consist of metals that are associated with the rock and soil that were historically used to fill in the Bay. These metals are not part of a spill of chemicals but rather reflect metals concentrations normally associated with Franciscan Formation bedrock. These metals are predominantly immobile and do not dissolve in groundwater and are not associated with any existing groundwater contamination. Thus, a rise in the groundwater level caused by a rise in sea level will not mobilize these metals. As an added precaution, these metals will be under a physical barrier (e.g., soil cover, pavement, sidewalk,
concrete building foundation) that will reduce human exposure to these residual metals in the soil.

**Will sea level rise affect vapor mitigation systems or residual groundwater contamination?**

After remediation is complete there may still be low levels of residual chemicals in groundwater in a few known areas (see map in Attachment 5) that could result in vapors accumulating under buildings constructed over these areas. Subsurface soil vapor sampling will be conducted to refine the boundary of these small areas. If needed, a vapor mitigation system (thick plastic sheeting and vent pipes) will be constructed within and underneath building foundations. These vapor mitigation systems are common, well-tested, and protective of building occupants, be they residential or commercial occupants. All soil vapor sampling programs, definition of areas requiring vapor controls, and the design and installation of vapor mitigation systems will be overseen and approved by the regulators (USEPA, DTSC, and RWQCB). Furthermore, any soil vapor mitigation system will be subject to periodic inspection and maintenance to ensure proper operation. In addition, if the sea level rises so that the near-shore groundwater rises close to the surface, then vapors would no longer accumulate in soil under buildings because the soil would be saturated with groundwater and could no longer contain vapors. If the groundwater, in the few small, well-defined areas, rises to the surface prior to the completion of residual remediation, then current laws will require the reevaluation of the groundwater hazard to human health or the environment. Additionally, the institutional controls placed on areas with residual chemicals would force action to maintain protection to the environment and prevent human exposure.

**Was sea level rise considered for the Parcel E-2 remedy?**

The Navy also considered SLR for the Parcel E-2 landfill when designing the remedy that was selected by the USEPA and the Navy in their 2012 Record of Decision (ROD). Some groundwater results show that leaching from the landfill has the potential to impact to the Bay. The Parcel E-2 ROD has identified remedies to mitigate these potential impacts through containment, monitoring, and removal. During the design of the engineered cap that the Navy will construct on top of the E-2 landfill, they will evaluate and make sure that the design will contain the waste in the landfill even if the groundwater in the landfill rises as a result of SLR.

Additionally, emergency response plans will be carried out following major flooding and seismic events, at which time the landfill engineered cap, if chosen as the remedy, will be investigated for potential breaches and repaired.

**What happens if there is a large earthquake?**

Given the Shipyard’s proximity to major area faults and the subsurface conditions present, seismic hazards (earthquakes) and liquefaction (a situation in which the strength and stiffness of a soil is reduced by earthquake shaking) could occur, but would be unlikely to result in health and safety concerns greater than other areas of the City built on landfill (such as the Marina, large parts of downtown San Francisco and South of Market) and would not uncover toxics that could expose the public or the environment
to unacceptable levels of hazardous materials. More details about seismic hazards and liquefaction issues are included in Attachment 24.

The Seismic Hazard Mapping Act was passed in 1990 following the Loma Prieta earthquake. The Act was designed to reduce threats to public health and safety and to minimize property damage caused by earthquakes. This Act is considered in all new designs for structures at the Shipyard. Based on existing data and Navy studies of the site, there is little risk of large ground movements at the site as a result of liquefaction, except deep under the landfill (see below). To further investigate liquefaction and earthquake hazards, site-specific geotechnical and seismic studies will be required for the project prior to issuance of any building permits. Seismic mitigation measures will include structural measures (specific structural design) and possible ground improvement methods (e.g. over-excavation, compaction). These measures will be determined by a site-specific seismic analysis. These studies will provide ground improvement/mitigation recommendations to address potential liquefaction-related ground hazards, should they exist.

**Will earthquakes affect residual soil contamination?**

Residual chemicals in soil largely consist of metals that are associated with the rock and soil that were historically used to fill in the Bay. The residual metals are only a concern for health after a lifetime of significant daily exposure. Exposure to a small amount of dust is not a health concern. To prevent long-term exposure, these residual metals will be under a physical barrier (e.g. soil cover, pavement, sidewalk, concrete building foundation) that will reduce human exposure to the metals in the soil. Operation and maintenance plans for these physical barriers will be carried out to periodically monitor and repair any cracks. If cracks do occur after an earthquake, the cracks will be discovered during the required post-earthquake inspections and will be repaired.

**Will earthquakes affect vapor mitigation systems?**

After remediation is complete there may still be low levels of residual chemicals in groundwater in a few known small areas (see figure in Attachment 5). If the subsurface vapor sampling predicts a problem with vapors from these small groundwater areas accumulating under a building, the building is designed with a vapor mitigation system (thick plastic sheeting and vent pipes) to vent the vapors to the atmosphere. This vapor mitigation system and the building are designed to withstand shaking during an earthquake and continue operating as designed after an earthquake.

**Were earthquakes and potential liquefaction considered for the Parcel E-2 remedy?**

The ROD evaluated all aspects of the chosen remedy and included a liquefaction and slope stability evaluation. The evaluation concluded that, for soil layers that could liquefy during the largest potential earthquakes, lateral movement of soil below the waste might be as much as 4 to 5 feet. Further technical review and reports may refine this estimate. Settlement of liquefiable soil below the waste may be up to 10 inches. The USEPA and the Navy selected a remedy in the Parcel E-2 ROD that includes an engineered cap on top of the landfill. Site-specific geotechnical studies will be used in the design of the engineered cap to minimize potential breaks during earthquakes. The cap would limit exposure and protect humans from long-term health risks even if breaks
in the cap temporarily occur. Operation and maintenance plans for the engineered cap will be carried out to monitor and repair potential breaks. Therefore, if ground rupture were to occur, contaminants should not be released at levels presenting a concern to human or ecological health.

An interim landfill gas collection system was installed along the northern edge of the landfill in 2002; the design intent of this system was to cut off the migration of landfill gas onto the adjacent UCSF property. Methane is the primary component of landfill gas. Methane is non-toxic and vented to the atmosphere through the collection system. The landfill gas has been tested for other chemicals of concern and none have been found at a level of concern. After an earthquake, the landfill gas collection system would be checked and repaired if there were any problems found. The ROD for Parcel E-2 includes installation of a full-scale landfill gas control system for the entire landfill.

Emergency response plans will be carried out following major flooding and seismic events, at which time the landfill engineered cap will be investigated for potential breaches and repaired.
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Exhibit 20-1  Informational Memorandum to SFRA regarding Monitoring the Enforcement of Dust Control Measures and the Evaluation of Health Concerns Related to Phase I Construction, from SFDPH, February 2007

Exhibit 20-2  Memorandum to All Interested Parties regarding Assessment of Exposure to Airborne Asbestos at Parcel A, from SFDPH, February 2007

Exhibit 20-3  Letter to SFDPH from ATSDR, September 2007, and Letter to ATSDR from CDPH, September 2007, regarding Recommendations Related to Parcel A Development Activities

Exhibit 20-4  Letter to SFDPH regarding Tests for Asbestos Exposure, from ATSDR, June 2007

Exhibit 20-5  BAAQMD Presentation – Lennar Bay View Hunters Point, Parcel A, Naturally Occurring Asbestos, Asbestos Dust Mitigation Plan, October 2007

Exhibit 20-6  Letter to the Bayview-Hunters Point Community Regarding Assessment of Health Issues Related to Construction Activities at Parcel A, from John R. Balmes, MD, Professor of Medicine at University of California, San Francisco, and Chief of Occupational and Environmental Medicine at San Francisco General Hospital, September 2007

Exhibit 20-7  Letter to CDPH in response to Recommendations for Asbestos and Nuisance Dust Control at Parcel A, from SFDPH, October 2007

Exhibit 20-8  USEPA Review of Dust/Naturally Occurring Asbestos Control Measures and Air Monitoring at the Former Shipyard, June 2010

Exhibit 20-9  Letter to San Francisco Board of Education regarding Health Concerns Related to the Asbestos and Dust Control Program at the Shipyard, from Mayor’s Shipyard Citizen’s Advisory Committee, October 2007
Attachment 1

Parcel Map of the Hunters Point Shipyard
Legend
Parcel Transfer Date
- Transferred (2004)
- 2013
- 2014
- 2016
- After 2017

Notes:
1. Parcels boundaries are considered to be approximate; updated December 2012.
2. Data and information provided by San Francisco Department of Public Health and Kleinfelder.
Attachment 2

Soil and Groundwater Sampling Locations
- Over 25,000 soil samples
- Over 14,000 groundwater samples

Legend:
- Soil Sampling Location
- Monitoring Well
- Fuel Line (removed or in place)
- Sanitary Sewer Line/Storm Line (removed or in place)
- Building Footprint
- Extent of Landfill
- Parcel Boundary
- Non-Navy Property

Notes:
1. Sampling locations are to be considered approximate. Completeness and accuracy not guaranteed.
2. Data and information provided by Kleinfelder.
Attachment 3

Steps in the CERCLA Process and Public Participation
The CERCLA process is defined in general terms below. A summary of the steps in the CERCLA process is described here and is illustrated on the Status of CERCLA Process Figure 3-1. The relevant environmental regulatory agencies would require performance of the remedial activities that the Navy is undertaking regardless of whether any redevelopment projects were proceeding. Potential environmental effects of the remedial activities (i.e., of soil excavation, soil transport, and operation of treatment systems) have been, and will continue to be, evaluated by the Navy and regulatory agencies in conjunction with the approval process for specific remedial actions. Appropriate environmental controls have been, and will continue to be, incorporated into the design and implementation of those remedial actions.

Summary of Navy Cleanup Process

The Navy is carrying out each step in the CERCLA process listed below for each parcel at the Shipyard. Each step results in the preparation of a document which is available to the public at the official document repository which the Navy is required to maintain for the project (located at the San Francisco Public Library located at 100 Larkin Street, San Francisco, California). In addition, recent documents are made available at a local repository at the Shipyard Site Office, 690 Hudson Ave, SF, CA 94124, 415-822-4622 and on-line at http://www.bracpmo.navy.mil/basepage.aspx?baseid=45. Many of these documents (e.g., the Feasibility Study (FS) and Proposed Plan) are made available in draft form for public review and comment before they are finalized. Pursuant to the Community Involvement Plan (2011) implemented by the Navy and approved by the regulatory agencies, various types of community outreach activities are conducted in association with each of these steps.

1. **Preliminary Assessment/Site Inspection** — An initial review of the site, including review of historic records and visual inspections. Sampling and analysis of soil, surface water, and/or groundwater may occur to evaluate whether the site needs to move to the next phase for further investigations.

2. **Remedial Investigation (RI)** — A closer look including collecting and analyzing samples to assess risk to human health and the environment. Treatability studies may occur in conjunction with or alongside physical investigation and alternative evaluation. A Removal Action may also be performed at this point.

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1 CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act, commonly known as Superfund, was enacted by Congress on December 11, 1980. This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment.
3. **Removal Action** — An early cleanup action that is implemented before a ROD and involves actions to contain, collect, or treat hazardous wastes to protect human health and the environment.

4. **Feasibility Study** — Results of the risk assessment, along with other data collected during the Remedial Investigation, are used to evaluate cleanup alternatives that have been screened for effectiveness, implementability, and cost.

5. **Proposed Plan** — A fact sheet that describes cleanup alternatives evaluated in the FS and explains the preferred alternative. This step requires a meeting to be held to provide information to the public and allow the public to comment on the preferred cleanup alternative.

6. **Record of Decision** — The selected cleanup alternative is documented and publicized in this document. A summary and responses to all comments on the Proposed Plan are included in this document.

7. **Remedial Design** — A design for implementing the selected cleanup alternative is prepared. A fact sheet is sent to the public before the Navy begins work on the cleanup.

8. **Remedial Action** — The cleanup remedy is carried out and the public is kept informed.

Site completion is achieved when all response actions have been completed consistent with CERCLA, the ROD and all institutional controls are in place and documented in a Completion Report:

9. **Completion Report** — This document describes how the cleanup was accomplished and provides the overall technical justification for site completion.

USEPA, DTSC, and RWQCB, and for radiological remedies, CDPH, review and comment on the completion report and the Navy is required to resolve all their concerns.

10. **Transfer** — The Navy prepares a Finding of Suitability to Transfer (FOST) that summarizes the Navy’s cleanup and completion process, all remaining environmental conditions on the property and specifies the notices that will be included in the deed(s) about any restrictions remaining on the property. The USEPA, DTSC and RWQCB review and comment on the FOST and when all comments are resolved provide written concurrence that the property is suitable for its intended use.
**Public Participation**

Community outreach activities are conducted in association with each CERCLA cleanup and closeout step, as designated in the updated Community Involvement Plan, which was finalized in May 2011. More information on public participation in this process is included in Attachment 13.
Attachment 4

Parcel-By-Parcel Summary and Expected Transfer Dates
Attachment 4
Parcel-By-Parcel Summary and Expected Transfer Dates

Parcel D-2 is ready for transfer in 2013. There are other areas of the Shipyard that will be ready for transfer next year (all cleanup has been completed) that are awaiting final paperwork approvals and final transfer documents (e.g. property surveys, deeds, etc.). These parcels include Parcels IR7/18, UC-1 and UC-2. Several other parcels, Parcels B, G and UC-3 will be ready for transfer sometime next year. The figure presented in Attachment 3 shows the current stage of the CERCLA process for each parcel. The current expected transfer dates are shown in Attachment 1 and reiterated at the end of this section.

Parcel A: Transferred

In 2004, eighty-eight acres of the Shipyard known as Parcel A was transferred from the Navy to the Agency. Parcel A is currently under construction. (Please note: The Agency was dissolved in February 2012 and in June 2012 changes were made to the dissolution bill allowing the OCII to continue to implement the Shipyard Redevelopment Project, including Parcel A. The OCII is governed by the Oversight Board of the Successor Agency and the Commission on Community Investment and Infrastructure.)

Parcel B: Implementing Remedy

The Navy has completed the preliminary investigation, site inspection, RI, FS, proposed plan, and ROD for Parcel B. The Navy issued an initial ROD in 1997, prepared a remedial design, and proceeded with remedial action implementation. After a decade of work and additional study, it developed a revised remedy. The Navy issued an amended ROD in 2009. Since then, the Navy issued a Remedial Design (2010) and Remedial Action Work Plan (2012) and has been implementing the remedy. In addition, the Navy has been implementing a remedy for petroleum compounds pursuant to the petroleum Corrective Action Plan (CAP). The petroleum CAP is a cleanup plan that includes remedies like those in the ROD designed specifically for petroleum compounds. This implementation, for areas excluding IR7/18 (which is described separately below), has included or will include the following:

- Removal and off-site disposal of radiological contamination identified in buildings, former building sites, sewer lines, and other areas affected by radiological sources.
- Removal and off-site disposal of excavated soil in areas where known concentrations of organic chemicals and some metals above cleanup goals.
- Installation of durable covers over the entire Parcel to minimize contact with residual ubiquitous metals. A durable cover is defined in the Amended ROD and Remedial Design as hardscape (e.g., asphalt, buildings, sidewalks, etc.) or a minimum of two feet of clean imported fill.
- Installation of a revetment wall along portions of the Parcel B shoreline to cover and prevent access to shoreline sediments.
• Operation of a SVE system to remove and treat VOCs in soil.

• Treatment of groundwater to reduce the contaminant concentrations to or near the cleanup goals defined in the Amended ROD and CAP.

• Implementation of a groundwater monitoring program to verify that remediation efforts continue to meet the cleanup goals defined in the Amended ROD and CAP.

• Use of land use and activity restrictions to prevent or minimize exposure to contaminated soil, and soil vapor, and to prevent or minimize exposure to contaminated groundwater by restricting activities related to groundwater.

Some of the completion paperwork for this work has already been submitted by the Navy and approved by the Regulatory Agencies. The completion reports are called Removal Action and Remedial Action Completion Reports. An additional Remedial Action Completion Report to document the remaining work, mostly the groundwater treatment, SVE, and the durable cover construction will be submitted to and approved by the Regulatory Agencies prior to transfer. In addition, the Regulatory Agencies will approve and provide concurrence on a Finding of Suitability to Transfer. As described in the ROD and the Remedial Design, as long as protocols (e.g. dust control and annual inspection and reporting) written in a RMP are followed, the buildings, pavement and imported soil (the durable cover) may be temporarily removed once the property is transferred and the new development can be built in its place.

Parcel B IR 7/18: Finalizing closure and transfer paperwork

IR 7/18, an area that is currently a part of Parcel B, has all cleanup work completed including the installation of a demarcation layer over a portion of the site and a protective revetment along the shoreline. The site has received Regulatory Agency approval and sign-off that all remedial action has been completed. The final FOST was issued and received concurrence from the Regulatory Agencies in February 2013. This property will be ready for transfer in 2014. Once transferred, the demarcation layer area will require submittal and approval of work plans prior to constructing the planned park.

Parcel C: Implementing Remedy

The Navy has completed the preliminary investigation, site inspection, RI, FS, proposed plan, and the ROD for Parcel C. The ROD was finished in 2010, the Remedial Design was finished in 2012, and some of the Remedial Action Work Plans have been written. The Navy has also been implementing a remedy for petroleum compounds pursuant to the petroleum CAP. Implementation of the remedy has included or will include the following:

• Removal and off-site disposal of radiological contamination identified in buildings, former building sites, sewer lines, and other areas affected by radiological sources.

• Removal and off-site disposal of excavated soil in areas where known concentrations of organic chemicals and some metals are above cleanup goals.
• Installation of durable covers over the entire Parcel to minimize contact with residual ubiquitous metals. A durable cover is defined in the Remedial Design as hardscape (e.g., asphalt, buildings, sidewalks, etc.) or a minimum of two feet of clean imported fill.

• Operation of a SVE system to remove and treat VOCs in soil.

• Treatment of groundwater to reduce the contaminant concentrations to or near the cleanup goals defined in the ROD and CAP. Studies to evaluate various treatment options will be conducted as part of the treatment.

• Implementation of a groundwater monitoring program to verify that remediation efforts continue to meet the cleanup goals defined in the ROD and CAP.

• Use of land use and activity restrictions to prevent or minimize exposure to contaminated soil, and soil vapor, and to prevent or minimize exposure to contaminated groundwater by restricting activities related to groundwater.

In addition, the Regulatory Agencies will approve and provide concurrence on a Finding of Suitability to Transfer. As described in the ROD and the Remedial Design, as long as protocols (e.g. dust control and annual inspection and reporting) written in a RMP are followed, the buildings, pavement and imported soil (the durable cover) may be temporarily removed once the property is transferred and the new development can be built in its place.

**Parcels D-1, D-2, G and UC-1 (formerly Parcel D)**

The original Parcel D consisted of 101 acres of the southeast-central portion of the Shipyard. After completing the preliminary investigation/site assessment, RI, and FS for Parcel D, the Navy prepared a Proposed Plan that presented a proposal for remedial action to be selected in the ROD for the entire Parcel. Although the Proposed Plan covered all of Parcel D, for final remedy selection the Navy divided Parcel D into four new parcels: Parcels D-1, D-2, G, and UC-1 ("UC" stands for Utility Corridor). One combined ROD for Parcels D-1 and UC-1 was issued and separate RODs were prepared for Parcel D-2 and Parcel G.

• **Parcel D-1: Implementing Remedy** — The Final Parcel D-1 ROD was issued in 2009. The Remedial Design was finished in 2011 and the Remedial Action Work Plan is expected to be completed in early 2014. The Navy has also been implementing a remedy for petroleum compounds pursuant to the petroleum CAP. Implementation of the remedy has included or will include the following:

  o Removal and off-site disposal of radiological contamination identified in buildings, former building sites, sewer lines, and other areas affected by radiological sources.

  o Removal and off-site disposal of excavated soil in areas where known concentrations of organic chemicals and some metals are above cleanup goals.

  o Installation of durable covers over the entire Parcel to minimize contact with residual ubiquitous metals. A durable cover is defined in the ROD and Remedial Design as
hardscape (e.g., asphalt, buildings, sidewalks, etc.) or a minimum of two feet of clean imported fill.

- Installation of a rip-rap stabilization in one area of the Parcel D-1 shoreline to cover and prevent access to shoreline sediments.

- Treatment of groundwater to reduce the contaminant concentrations to or near the cleanup goals defined in the ROD and CAP.

- Implementation of a groundwater monitoring program to verify that remediation efforts continue to meet the cleanup goals defined in the ROD and CAP.

- Use of land use and activity restrictions to prevent or minimize exposure to contaminated soil, and soil vapor, and to prevent or minimize exposure to contaminated groundwater by restricting activities related to groundwater.

In addition, the Regulatory Agencies must approve and provide concurrence on a Finding of Suitability to Transfer. As described in the ROD and the Remedial Design, as long as protocols (e.g. dust control and annual inspection and reporting) written in a RMP are followed, the buildings, pavement and imported soil (the durable cover) may be temporarily removed once the property is transferred and the new development can be built in its place.

- **Parcel D-2: Ready for transfer** — The final “No Further Action” ROD for Parcel D-2 was issued in 2010. The Finding of Suitability to Transfer was issued in April 2012 and the Regulatory Agencies issued concurrence letters in May 2012. The final real estate paperwork is being prepared for OCII approval so that the parcel can be transferred in 2013.

- **Parcel G: Implementing Remedy** — The Navy issued a final ROD for Parcel G in February 2009, a final Remedial Design document in October 2010, and a Remedial Action Work Plan in December 2012. The Navy has also been implementing a remedy for petroleum compounds pursuant to the petroleum CAP. Implementation of the remedy has included or will include the following:
  
  - Removal and offsite disposal of radiological contamination identified in buildings, former building sites, sewer lines, and other areas affected by radiological sources.
  
  - Removal and off-site disposal of excavated soil in areas where known concentrations of organic chemicals and some metals are above cleanup goals.
  
  - Installation of durable covers over the entire Parcel to minimize contact with residual ubiquitous metals. A durable cover is defined in the ROD and Remedial Design as hardscape (e.g., asphalt, buildings, sidewalks, etc.) or a minimum of two feet of clean imported fill.
  
  - Treatment of groundwater to reduce the contaminant concentrations to or near the cleanup goals defined in the ROD and CAP.
Implementation of a groundwater monitoring program to verify that remediation efforts continue to meet the cleanup goals defined in the ROD and CAP.

Implementation of land use and activity restrictions to prevent or minimize exposure to contaminated soil, and soil vapor, and to prevent or minimize exposure to contaminated groundwater by restricting activities related to groundwater.

In addition, the Regulatory Agencies will approve and provide concurrence on a Finding of Suitability to Transfer. As described in the ROD and the Remedial Design, as long as protocols (e.g. dust control and annual inspection and reporting) written in a RMP are followed, the buildings, pavement and imported soil (the durable cover) may be temporarily removed once the property is transferred and the new development can be built in its place.

• Parcel UC-1: **Writing FOST** — see discussion under “Parcels UC-1 and UC-2” below.

**Parcel E: Writing Record of Decision**

The Navy has completed the preliminary investigation, site inspection, RI, FS and the Proposed Plan for Parcel E. The Proposed Plan for Parcel E was issued in February 2013. The Navy has also been implementing a remedy for petroleum compounds pursuant to the petroleum CAP. If the remedies listed in the Proposed Plan are chosen in the ROD, then implementation of the remedy will include the following:

• Removal and off-site disposal of radiological contamination identified in buildings, former building sites, sewer lines, and other areas affected by radiological sources.
• Removal and off-site disposal of excavated soil in selected areas.
• Removal or treatment of contaminated material at the Former Oily Waste Ponds.
• Operation of a SVE system to remove and treat VOCs in soil.
• Installation of durable covers over the entire Parcel to minimize contact with residual ubiquitous metals and chemical or radiological contamination.
• In the open space area along the shoreline, a demarcation layer will be installed to identify the areas where digging will only be allowed with submittal and approval of work plans.
• Installation of a revetment wall along portions of the Parcel E shoreline to cover and prevent access to shoreline sediments.
• Installation of rock under-armoring along portions of the Parcel E shoreline to cover and prevent access to shoreline sediments.
• Treatment of groundwater to reduce the contaminant concentrations to or near the cleanup goals.
• Implementation of a groundwater monitoring program to verify that remediation efforts continue to meet the cleanup goals, and that chemicals in groundwater do not affect San Francisco Bay.
• Use of land use and activity restrictions to prevent or minimize exposure to contaminated soil, and soil vapor, and to prevent or minimize exposure to contaminated groundwater by restricting activities related to groundwater.

The Navy predicts that the ROD will be signed in 2013.

Parcel E-2: Writing Remedial Design

Parcel E-2 is the landfill parcel. The Navy has completed the preliminary investigation, site inspection, RI, FS, proposed plan, and ROD for Parcel E-2. The remedies in the ROD were selected through a lengthy publicly reviewed process that included reviews not only by the EPA, DTSC, RWQCB and CDPH but numerous other government agencies and many interested citizens and non-profit environmental groups. The final ROD includes 110 pages of comments and responses on the final document in addition to responses on the draft and draft final versions of the document. The ROD was completed in 2012. The Navy has also been implementing a remedy for petroleum compounds pursuant to the petroleum CAP. Implementation of the remedy has included or will include the following:

• Removal and offsite disposal of radiological contamination identified in buildings, former building sites, sewer lines, and other areas affected by radiological sources.
• Removal and off-site disposal of excavated soil in areas where known concentrations of organic chemicals and some metals are above cleanup goals.
• Installation of a cap over the entire Parcel to prevent contact with residual contaminants. The cap will include a protective liner (except for beneath the new wetlands area) and several feet of soil. Digging will only be allowed with submittal and approval of work plans.
• Installation of tidal and freshwater wetlands.
• Installation of a revetment wall along portions of the Parcel E-2 shoreline to cover and prevent access to shoreline sediments.
• Removal and treatment of landfill gas and monitoring of landfill gas.
• Installation of underground barriers to prevent flow of contaminated groundwater to the Bay.
• Installation of underground barriers and drain to divert flow of groundwater to the landfill.
• Implementation of long term monitoring for groundwater, storm water, and landfill gas to assess whether chemicals are migrating and to monitor changes in ambient conditions.
• Use of land use and activity restrictions to prevent or minimize exposure to contaminated soil, and soil vapor, and to prevent or minimize exposure to contaminated groundwater by restricting activities related to groundwater.
Parcel F: Feasibility Study done

Parcel F is approximately 460 underwater acres surrounding the Shipyard. The Navy has completed the preliminary assessment/site investigation and a combined RI/FS, as well an updated FS. A Proposed Plan is expected to be issued in 2014. The ROD is predicted to be finished in 2015.

Parcels UC-1 and UC-2: Writing FOST

The RODs for Parcels UC-1 and UC-2 were completed in 2009. All sewer, storm drains and any residual contamination have been removed and durable covers were installed. The Remedial Action Closeout Report was finalized in February 2013. The FOST is anticipated in summer 2013 and the property is anticipated to be ready for transfer in 2014.

As described in the ROD and the Remedial Design, as long as protocols (e.g. dust control and annual inspection and reporting) written in a RMP are followed, the buildings, pavement and imported soil (the durable cover) may be temporarily removed once the property is transferred and the new development can be built in its place.

Parcel UC-3: Writing ROD

Parcel UC-3, formerly a part of Parcel E, consists of Crisp Road and a railroad right of way that extends into the adjacent industrial area. The Proposed Plan was issued in February 2013 and a ROD is expected to be issued by the end of this year. The Navy completed digging up the sewer and storm drains in Crisp Road and removing residual radiological contamination in 2010. The Regulatory Agencies have concurred on the Removal Action Completion Report (RACR) for this work. Once the ROD is issued, a few small excavations will need to be conducted prior to regulatory closure and transfer. If the remedies listed in the Proposed Plan are chosen in the ROD, then implementation of the remedy will include the following:

- Removal and disposal of contaminated soil in selected areas.
- Installation of durable covers (in a portion of Crisp Road) to minimize contact with chemicals in soil.
- Treatment of groundwater to reduce the contaminant concentrations to or near the preliminary remediation goals.
- Monitor groundwater to verify that cleanup efforts meet the preliminary remediation goals.
- Use of land use and activity restrictions to prevent or minimize exposure to contaminated soil, and soil vapor, and to prevent or minimize exposure to contaminated groundwater by restricting activities related to groundwater.

As described in the ROD and the Remedial Design, as long as protocols (e.g. dust control and annual inspection and reporting) written in a RMP are followed, the buildings, pavement and imported soil (the durable cover) may be temporarily removed once the property is transferred and the new development can be built in its place.
Timeline for Transfers

Expected parcel transfer dates are shown on the parcel map of the Shipyard in Attachment 1 and listed below.

- Parcel D-2 is expected to transfer in 2013.
- Parcels IR7/18, UC-1 and UC-2 are expected to transfer in 2014.
- Parcels B, G and UC-3 are expected to transfer near the end of 2014.
- Parcel C and D-1 are expected to transfer in 2016.
- Parcels E, E-2 and F are expected to transfer after 2017.
Attachment 5

Groundwater and Volatile Organic Compounds
Groundwater contamination in areas like the Shipyard, where the groundwater is not used for drinking water, is typically treated and monitored. Groundwater contamination at the Shipyard dates back to the time when the area was an active shipyard. Chemicals were used to clean metal ship parts in partially buried pits. These pits were often made of concrete and in some areas the chemicals leaked through the concrete into the soil and groundwater. Today, some of those remaining chemicals are still in the groundwater and the theoretical concern is that the chemicals – referred to as VOCs – might form vapors underground and then the vapors might possibly leak into new buildings. As described in this attachment, modern design standards require systems to cut off exposure to any residual vapors so that occupants are protected. The Navy is required to treat the groundwater as much as possible to reduce the potential for vapors.

Primary treatment at the Shipyard usually consists of injection of zero-valent iron (ZVI) – a form of iron metal that can react with VOCs in the groundwater – or injection of compounds that can rapidly enhance biodegradation. Other primary treatments can include extraction of soil vapors or chemicals from groundwater. Once this primary treatment is done very low levels of residual VOCs are sometimes too difficult to completely remove from the groundwater. Post-treatment the enhanced natural processes, from residual ZVI that remains or from the increase in naturally occurring bacteria during the biodegradation process, that takes place over several years’ time can be monitored to verify that the levels are decreasing. The installation of vapor barriers to completely cut off exposure of building occupants to the residual volatile vapors is a typical regulatory requirement for these areas. Typically the building foundation (i.e., concrete slab) itself would act as a barrier to residual vapors, and the requirement for vapor barriers is an extra level of protection that ensures that occupants are safe. This section discusses the areas of the Shipyard and residual VOCs in groundwater in each of those areas as shown on the Figure 5-1.

**Parcels B and G**

VOCs have been detected in the subsurface on Parcels B and G. VOCs are currently present in Parcel B soil vapor and groundwater associated with a plume at Building 123 or IR-10. Soil vapor associated with this groundwater plume has been extracted for treatment and groundwater has been treated in situ through injection of reagents into the subsurface. Additional groundwater remediation is currently being implemented by the Navy. The Navy has treated groundwater plumes impacted by VOCs as part of a Treatability Study conducted on Parcels D-1 and G in 2008 and 2009. The treatment has been successful in reducing VOC concentrations to below groundwater remediation goals. Soil vapor sampling conducted as part of the Treatability Study indicates that VOC concentrations in soil vapor do not exceed health risk standards. Additional soil
HUNTERS POINT SHIPYARD
San Francisco, California

GROUNDWATER DETECTIONS

Date 7/1/2013  Project 730384802  Figure 5-1

Notes:
1. Parcels boundaries are considered to be approximate; updated December 2012.
2. Data and information provided by San Francisco Department of Public Health and Kleinfelder.
vapor and groundwater sampling will be conducted in this area to confirm that the VOC levels continue to remain below levels of concern.

As described above, even after groundwater treatment some residual chemicals may remain and degrade slowly over time. To protect future building occupants, the Navy has conducted soil gas sampling on Parcels B and G to assess potential health risks from vapor intrusion and designate the Areas Requiring Institutional Controls (ARICs) for VOCs. As described in the deeds and transfer documents, these ARICs for VOCs will require additional sampling and documentation in the future to prove that chemicals have degraded over time or the construction of passive vapor mitigation systems for new buildings (described further below). The Navy documented their approach for soil gas sampling and comparison of results against current risk standards. They have also issued a report documenting the sampling results and designating the ARICs for VOCs for Parcels B and G.

Based on the above, the VOCs are being treated and monitored on Parcel B and have been treated and continue to be monitored on Parcel G; thus, VOCs on Parcels B and G will not pose a risk to the health and safety of future owners, residents or visitors to Parcels B and G because for any area in which an ARIC for VOCs remains, there will be requirements to conduct additional sampling and document that chemicals have degraded over time or to construct special foundations under buildings. These special foundations are expected to include passive vapor mitigation systems. These vapor mitigation systems typically require a gravel layer with embedded vent pipes under the buildings as well as a thick plastic barrier beneath the foundation slab. This type of vapor mitigation system will prohibit residual VOCs under the building from migrating into the building.

Parcels C, D-1, and E

VOCs have also been detected in groundwater on Parcels C, D-1, and E. There are four groundwater plumes on Parcel C. Soil vapor associated with these groundwater plumes has been extracted for treatment and groundwater has also been extracted or treated at three of these plumes. Additional treatment is being conducted by the Navy at all four plumes located on Parcel C. VOCs in groundwater on Parcel D-1 have been treated by the Navy as part of the Parcels D-1 and G groundwater treatability study.

Minor levels of VOCs have been detected under Crisp Avenue on Parcel E. The source of these VOC detections may have been associated with sewers and storm drains, which have since been removed as part of the radiological investigation. The Navy, the regulators, including the California Department of Resources Recycling and Recovery

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(formerly the California Integrated Waste Management Board) and the City’s independent consultant, Treadwell & Rollo, have investigated these potential concerns and agree that VOC levels that were detected on Crisp Avenue are well below any level that would cause an unacceptable risk to human health in the areas adjacent to Crisp Avenue. Nine groundwater plumes exist on Parcel E and are part of current groundwater treatability studies by the Navy designed to reduce VOC, metals, and TPH concentrations. The Navy’s work on these parcels will determine whether future actions will need to be taken or whether vapor mitigation systems will be required for any residual VOCs.

**Parcel E-2**

Low levels of VOCs have also been detected in the groundwater in some areas of the landfill on Parcel E-2. Some VOCs on the border between Parcel E-2 and Parcel E are expected to be treated as part of the Parcel E remedial actions to prevent migration of the VOCs onto Parcel E. The Navy will construct a landfill cap on the majority of Parcel E-2, and the area will be developed into open space after transfer.
Attachment 6

Parcel E-2 Landfill Cleanup Strategies
Attachment 6
Parcel E-2 Landfill Cleanup Strategies

The existence of a landfill on a Brownfields site is a common scenario. Some notable Brownfields that contain landfills that have been successfully redeveloped include Shoreline Amphitheater in Mountain View, America Center in San Jose, Oyster Point in South San Francisco, Seal Point in San Mateo, and Sierra Point in Brisbane. All of these sites were developed into commercial or recreational uses with buildings and facilities on top or immediately adjacent to the landfill. Parcel E-2 is proposed for open space.

The Shipyard landfill was used to dispose of all the Shipyard garbage. In addition, construction debris was also dumped in the landfill. There is also evidence that chemicals were dumped in the landfill. Because there were no accurate records kept of the disposal activities, it is not possible to know the exact extent of chemicals dumped in the landfill; however, it is possible to measure the extent of any possible impact to human health and the environment from the landfill.

On August 16, 2000, a brush fire burned approximately 45 percent of the landfill surface area; small subsurface areas continued to burn for approximately one month after the surface fire was extinguished. An interim cap was constructed over the majority of the landfill in order to extinguish the fire and prevent future fires until the chosen remedy could be implemented. The interim cap covers approximately 14.5 acres and effectively limited air intrusion into the landfill, thus smothering any smoldering subsurface areas remaining from the fire. In addition, the interim cap significantly reduced storm water infiltration through the landfill, thereby reducing the potential for hazardous substances to leach out from the landfill. The interim cap has been vegetated to stabilize surface soils and limit erosion. Additional information on construction of the interim cap is provided in the Final Removal Action Landfill Cap Closeout Report.

Soil Vapor

Measurements have been made of the vapors from the landfill. Typical of all landfills, landfill gas is being generated by breakdown (decomposition) of the organic materials disposed in the landfill. Methane and carbon dioxide are the two main components of landfill gas. Methane is non-toxic but it can create a potential explosion hazard if it collects inside of a structure. In 2002, the Navy installed, on the north side of the landfill, and between the landfill and Parcel A, a gas control system, which includes a subsurface gas cutoff wall, landfill gas extraction wells, and three tiers of gas monitoring probes (GMPs) that are sampled monthly with results reported quarterly. The three tiers of GMPs primarily detect whether the gas is migrating beyond the boundaries of the landfill.

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the landfill and onto the immediately adjacent UCSF property. If gas (VOCs or methane) is detected above the trigger levels in the GMPs, the Navy promptly activates its mobile extraction system to remove the gas from the subsurface. The Navy has a detailed Landfill Gas Monitoring and Control Plan in place, which includes steps for notifying the relevant regulators. There are 13 GMPs located on Crisp Avenue north of the landfill which are monitored for methane. To date these GMPs have each been sampled 50 to 100 times, and there have been no detections of methane or landfill gases in the Crisp Avenue probes. In addition, in 2002, the Navy conducted an ambient air survey across the landfill and within 300 feet of the landfill perimeter. Results indicated that landfill gas was not in the breathing zone across the landfill, within 300 feet of the landfill perimeter, or within assessable buildings surveyed outside the 300 foot perimeter.6

**Groundwater**

The groundwater flowing out of the landfill has been tested and monitored for almost 20 years. The groundwater is slowly flowing into the Bay. In a few areas on the east side of the landfill that contain volatile chemicals in groundwater, the concentrations of chemicals are a potential concern for human exposure if they migrate onto adjacent Parcel E, because models predict indoor air problems if new buildings were to be constructed without proper mitigation systems. These areas of volatile chemicals will be treated over the next few years (similar to the treatment of volatile chemicals on Parcels B, C, D-1, and G).

The other main chemical found in the groundwater effluent from the landfill is PCBs. This PCB contamination is of concern for small aquatic organisms in the Bay. It is also a concern because it is possible that it will contribute to the PCBs in the fish that visit the South Basin area at the Shipyard. Due to these concerns, the Navy is conducting extensive cleanup of PCBs in the downgradient shoreline area of the landfill parcel. The Navy’s selected long-term remedy will control groundwater migration from the landfill and protect human health and the environment from any further contamination.

**Radiological Issues**

Sampling and analysis results indicate that concentrations of radioactive chemicals in surface soil pose a potential unacceptable risk to future site users, and the remedy selected in the ROD address these potential risks. The remedy for radiological materials in the E-2 landfill is to:

- Survey structures, former building sites, and radiologically impacted areas.
- Decontaminate buildings.
- Excavate storm drain and sanitary sewer lines.
- Dispose of excavated materials and soils at off-site facilities.

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• Conduct surveys to ensure that sites are safe.

Once this work is done, the engineered cap will be built on the Parcel to protect future users from remaining buried fill material that might contain sand-blast grit used in decontaminating ships that participated in atomic weapons testing and radioluminescent dials and gauges buried in the landfill. In addition, administrative and/or legal controls will be put in place to restrict access to the area and prevent certain activities, such as excavation beneath the clean imported fill material.

Groundwater does not appear to have been impacted by radionuclides. However, non-radioactive chemicals in groundwater within and in close proximity to the landfill area will be addressed by the installation of an underground barrier along the shoreline.

Removal Actions

The Navy has performed removal actions at Parcel E-2 that have involved excavation and offsite disposal of low-level radioactive waste. At the Metal Slag Area, the Navy removed and disposed of off-site approximately 8,200 cubic yards of soil, metal slag, and debris; of this removed material, approximately 74 cubic yards of the soil was identified as radiologically impacted. The Navy also removed and disposed of off-site 32 radiological devices, 15 cubic yards of radiological debris (primarily fire bricks), and approximately 30 cubic yards of metal debris. At the PCB Hot Spot Area, the Navy removed and disposed of off-site, approximately 86,650 cubic yards of soil and debris; 533 cubic yards of the removed soil and fire brick debris was identified as radiologically impacted as well as 40 radiological devices, 78 cubic yards of metal debris, and 56 pieces of other radioactively contaminated debris and two drums of mixed waste.

The CERCLA process (see Attachment 3), which governs the environmental investigation, risk assessment, evaluation of remediation alternatives, and selection and design of a remedy, is ongoing at Parcel E-2. The City and County of San Francisco regularly reviews and comments on Navy documents related to the CERCLA process. The Navy published the ROD for Parcel E-2 outlining the selected remedy in November 2012. The remedies in the ROD were selected through a lengthy publicly reviewed process that included reviews not only by the EPA, DTSC, RWQCB and CDPH but numerous other government agencies and many interested citizens and non-profit environmental groups. In addition, the EPA’s Technical Assistance Grant recipient, ARC Ecology, conducted an intensive detailed review of the ROD including hiring three independent technical experts who reported on their findings concerning radiological issues, the landfill cleanup strategies and risk assessments. ARC Ecology held two well attended public meetings where the public were able to express their concerns and talk with the independent technical reviewers. Their report was thoroughly evaluated and discussed in the Navy’s responsive summary included in the final ROD (see Exhibit 6-1).

As noted in Attachment 4, Parcel by Parcel Summary and Expected Transfer Dates, the Navy published the Parcel E-2 ROD in November 2012. The Navy’s remedial objective is to prevent exposure to contaminants at levels exceeding remediation goals. The Navy
proposes the following actions to address hazardous substances in soil, shoreline sediment, landfill gas, and groundwater at Parcel E-2:

- Remove and dispose of contaminated soil in selected areas.
- Separate and dispose of materials and soil with radiological contamination.
- Install a protective liner and soil cover over all of Parcel E-2.
- Install a below-ground vertical barrier (cutoff wall or similar) to limit groundwater flow from the landfill to San Francisco Bay and conduct groundwater monitoring.
- Remove and treat landfill gas to prevent it from moving beyond the Parcel E-2 boundary.
- Build a shoreline revetment.
- Build new wetlands.
- Monitor and maintain the different parts of the preferred alternative (soil cover, shoreline revetment, wetlands, etc.) to ensure they are working properly.
- Restrict specific land uses and activities on parcel E-2

Specific radiological control procedures to properly screen, segregate, characterize, and dispose of radioactive materials will be part of this work.

Because of the extensive knowledge that we have about the landfill, the redevelopment of the area is designated for open space and recreational uses as the most easily implemented and most protective end use. The Navy has selected an engineered cap remedy for the E-2 landfill that includes several feet of clean soil and other protective layers. Since the Navy has already conducted surveys that found no hazardous vapors in ambient air on top of the landfill, the extra layers of soil will provide an added measure of protection to allow for recreational uses on top of the engineered cap. This is a common solution for new development built on top of landfill.

The USEPA must supervise remedy implementation, and must then concur that the Navy has fully implemented the remedy. The Navy, USEPA, DTSC, RWQCB, and CDPH will require that before any development activity occurs at the Parcel E-2, appropriate and legally enforceable environmental restrictions on uses and activities at Parcel E-2 be in place and applicable to that activity, whether in the form of a recorded covenant, deed provision, easement, or lease term. The restrictions will be sufficient under CERCLA and other applicable laws to ensure protection of human health and the environment during and after the development activity process and will identify the specific mechanisms to be used to implement and enforce the restrictions.
Exhibit 6-1

Fact Sheet
Draft Parcel E-2 Record of Decision
and
Summary of Responses to Community
April 2012
The purpose of this fact sheet is to provide a summary of questions and comments submitted by the community on the Proposed Plan for Parcel E-2, which was available for public review and comment in fall 2011. This fact sheet also presents the Navy’s responses to the questions and comments that are presented in the Draft Parcel E-2 Record of Decision (ROD) released in March 2012.

Overview of Proposed Plan to Clean Up Parcel E-2

In September 2011, the Navy published the Hunters Point Naval Shipyard (HPNS) Proposed Plan for Parcel E-2, which summarized the cleanup choices evaluated by the Navy and explained the reasons for choosing the specific cleanup solution to address remaining contamination in Parcel E-2.

During the Public Comment Period for the Proposed Plan for Parcel E-2 (September 7, 2011 through November 21, 2011), the Navy received comments from 13 individuals or groups about the Navy’s proposed cleanup solution for Parcel E-2.

The Navy reviewed each comment and found that there were six primary themes expressed by community members. This fact sheet discusses these themes and the Navy’s responses.

Additional information can be found on the Navy’s website at www.bracpmo.navy.mil, or in the Draft ROD and Proposed Plan for Parcel E-2 that are available at the Information Repository locations (see Page 2). The cleanup team appreciates the feedback they received and looks forward to completing cleanup on HPNS in anticipation of transfer of the property to the City and County of San Francisco (City) for redevelopment.

The HPNS Cleanup Team includes:

- Base Realignment and Closure Program (BRAC)
  Department of the Navy
  www.bracpmo.navy.mil

- United States Environmental Protection Agency (USEPA)
  www.usepa.gov

- California Department of Toxic Substances Control (DTSC)
  www.dtsc.ca.gov

- San Francisco Bay Regional Water Quality Control Board
  www.swrcb.ca.gov

What is a ROD?

A Record of Decision (ROD) is a public document that explains which cleanup solution has been chosen to clean up a site. It contains background information on the site, community participation, enforcement activities, the contaminants present, and the selected cleanup solution. The ROD also presents responses to public comments received during the public comment period for the Proposed Plan. This part of the ROD is referred to as the Responsiveness Summary.
Summary of Community Feedback

Six primary themes were identified when the Navy reviewed community feedback on the Proposed Plan for Parcel E-2. These themes, and the Navy’s responses to them, are summarized below.

Theme 1: Does the Navy know enough about the Parcel E-2 Landfill to select a remedy?

Yes. The Navy has worked closely with the United States Environmental Protection Agency (USEPA), California Department of Toxic Substances Control (DTSC), San Francisco Bay Regional Water Quality Control Board (Water Board), City of San Francisco, Department of Public Health (DPH), and other interested groups for more than 20 years to gather and evaluate data from the Parcel E-2 Landfill. Results from many previous investigations provided data for the regulatory agencies to support the Navy’s cleanup solution for Parcel E-2.

Theme 2: Why was Alternative 5 selected instead of Alternative 2?

The Navy acknowledges the input from many community members expressing their support for Cleanup Alternative 2 instead of Cleanup Alternative 5. Cleanup Alternative 5 was selected because it will remove significant amounts of contaminants and safely contain the remaining material while preventing unacceptable exposure to humans and wildlife during current and future use of the site. Cleanup Alternative 5 provides the best balance of tradeoffs (e.g. effectiveness, ease to implement, time to cleanup, expense) used to weigh the benefits and limitations among the alternatives, including Alternative 2. The Navy worked with the regulatory agencies and the HPNS community represented by the San Francisco Redevelopment Agency (SFRA), the Mayor’s Hunters Point Shipyard Citizens Advisory Committee, and several residents near HPNS who have concurred with the cleanup solution.

Theme 3: How are Environmental Justice principles considered in the remedy selection process?

On February 11, 1994, the President of the United States issued Executive Order 12898 which outlined federal actions to address environmental justice in minority and low-income populations. The Navy and the regulatory agencies involved in cleanup work at HPNS have worked together to achieve the environmental justice goals of fully protective cleanup actions, fair and equal treatment, and meaningful involvement for all people in the Bayview-Hunters Point community. These goals and objectives are described in detail in the May 2011 HPNS Community Involvement Plan (CIP) which is available on the Navy’s website listed below.

In summary, the substantial regulatory review and oversight of all Navy cleanup activities at HPNS in conjunction with the significant financial contribution by the Navy, as much as $716 million over the past 20 years, provides the groundwork for an effective cleanup of HPNS. Community involvement through federal grants available to interested community members and the outreach plan described in the CIP ensures that local residents are involved in the cleanup process. In addition, Navy contractors hire local community members and contract with local businesses to promote the revitalization of the greater HPNS community.

Theme 4: How is Alternative 5 consistent with City and County of San Francisco Proposition P?

Proposition P, per the Board of Supervisors Resolution 634-01 in August 2001, expresses a recommendation from the Hunters Point-Bayview community to clean up HPNS to a level allowing unrestricted use of the property in a manner that does not rely on future owners to maintain protective barriers, unless other remedies are technically not possible. The proposition was later addressed in a Conveyance Agreement between the Navy and SFRA in March 2004, which restated community support for cleanup to the highest level practical.

The cleanup solution for Parcel E-2 meets the planned reuse outlined in the 2010 SFRA redevelopment plan that was issued 9 years after Proposition P.

Theme 5: How will the Navy involve the community during the design of the selected remedy?

Upon final approval of the Parcel E-2 ROD, the Navy will develop a written plan to identify what is necessary to accomplish the selected cleanup solution. This plan, known as a Remedial Design, will be available for public comment, and the Navy will hold Community Meetings to discuss the document with interested community members.

Theme 6: How will the Navy ensure that the selected remedy will protect people and wildlife in the long-term?

Cleanup Alternative 5 includes several monitoring and maintenance activities that will be in effect to protect human health and the environment. Every year, inspections will be made to ensure that the solutions are working properly. In addition, the Navy is required to conduct reviews every five years to evaluate the performance of the entire remedy.

To view the complete Responsiveness Summary included in the Draft ROD, visit one of the Information Repositories or the HPNS website listed below.

Information Repositories

<table>
<thead>
<tr>
<th>City of San Francisco Main Library</th>
<th>Hunters Point Naval Shipyard Site Trailer</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Larkin St, 5th Floor Gov’t Info Ctr.</td>
<td>(near HPNS security entrance)</td>
</tr>
<tr>
<td>San Francisco, CA 94102</td>
<td>690 Hudson Avenue</td>
</tr>
<tr>
<td>(415) 557-4400</td>
<td>San Francisco, CA 94124</td>
</tr>
<tr>
<td>Navy Website</td>
<td><a href="http://www.bracpmo.navy.mil">www.bracpmo.navy.mil</a></td>
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</table>

Program Contacts

<table>
<thead>
<tr>
<th>Matt Robinson</th>
<th>Keith Forman</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPNS Community Involvement Manager</td>
<td>BRAC Environmental Coordinator</td>
</tr>
<tr>
<td>(415) 295-4645</td>
<td>(415) 308-1458</td>
</tr>
<tr>
<td><a href="mailto:info@sfhpns.com">info@sfhpns.com</a></td>
<td><a href="mailto:keith.s.forman@navy.mil">keith.s.forman@navy.mil</a></td>
</tr>
</tbody>
</table>

HNPS Info Hotline: (415) 295-4742
Attachment 7

Low-level Radiological Materials Cleanup
Attachment 7
Low-level Radiological Materials Cleanup

The radiological contamination at the Shipyard has been extensively studied for over 10 years. The Final Historical Radiological Assessment (HRA)\textsuperscript{7} documented the history of the use of radioisotopes and radiological contamination. The Navy is currently remediating all radiologically impacted structures and radiological contamination associated with the sewer and storm drain system. The Navy is disposing of radiologically impacted soil and materials off-site and is in the process of seeking an unrestricted use designation for structures and areas where it has completed radiological remediation associated with the sewer and storm drain system. The Agency will not accept property for transfer until the Navy has completed radiological surveys, investigations, and radiological cleanup as approved by Federal and State regulatory agencies.

This radiological history is not typical at most Brownfields sites, however the levels of radiological contamination that have been found in the investigations and testing are at low levels despite this unique history. Since the publication of the HRA, the Navy has spent over $200 million dollars on radiological surveys, removing the sewers and storm drains, and removing residual radiological contamination. They have also spent over $20 million dollars excavating the shoreline areas of Parcel E-2. The testing protocols have involved spreading out the excavated soil and testing it in six-inch lifts – a depth to which the radiation detectors can easily scan the soil. In addition, they confirm the scans by taking soil samples and testing them for radiation in the on-site laboratory with quality control samples analyzed at an off-site laboratory. All sewer and storm drain areas that may have been radiologically impacted have been or will be removed by the Navy.

In addition to the storm drain and sewer system and structures identified as radiologically impacted, there are areas containing fill that the Navy has identified as containing or potentially containing radionuclides in soil. These areas are in Parcel B in the IR 7/18 areas, in the shoreline area of Parcels E and the majority of Parcel E-2.

For IR7/18, soil samples did not identify any radioactive contamination. However, because the Navy cannot prove that there is no radiological contamination, they must conservatively assume that some contamination remains. The Navy has scanned the surface of this area to verify that there is no radiological contamination at or near the surface that could injure humans. Once these scans were complete, the site was determined to be safe for future residents and workers. However, to further ensure undetected subsurface contamination is not someday unearthed through excavation, the Navy installed a demarcation layer beneath three feet of clean soil and will require deed restrictions that will not allow digging below the demarcation layer in this area unless detailed work plans are submitted and approved by the Navy, USEPA, DTSC, RWQCB,

and CDPH. These deed restrictions will be monitored by the SFDPH and the Regulatory Agencies. The CDPH has scanned the surface following cover placement to verify that health risks have been mitigated. The cover will be monitored as required by an Operation and Maintenance Plan and groundwater will be monitored to verify that radionuclides are not present. The IR-7/18 area is designated as open space and no pile-supported structures will be built within this area. A revetment wall was also constructed along the shoreline to prevent any erosion of IR-7/18 fill materials into the Bay; the revetment wall design took into account projected SLR.

For the E-2 landfill and the shoreline areas of Parcel E (see yellow areas on Figure 22-1, in Attachment 22), it is not feasible to remove all the small amounts of suspected contamination that may remain in the subsurface. These areas mostly contain contamination from radium painted (glow-in-the-dark) dials. These dials were buried in the shoreline area of Parcel E and are also suspected to be scattered in the landfill. The Navy will scan the surface of all these areas to verify that there is no radiological contamination at or near the surface that could injure humans. Once these scans are completed, the surface will be safe from radiological contamination and will be safe for residents and workers to walk on top of. However, to be absolutely sure that no one will accidentally dig up any buried contamination (that is not detectable at the surface and is not currently impacting the surface), the Navy will build a cap of several feet of clean soil and several protective layers (e.g. geotextiles and liners). They will also have deed restrictions for not digging, and these deed restrictions will be monitored by the San Francisco Health Department and the Regulatory Agencies. The end result will be an area that will be suitable for open space and recreational uses.

So while the history for these areas is unique, the end result for the areas cleaned of all radiological contamination is similar to other Brownfields sites with only residual chemical contamination (or no contamination for clean areas). For the IR7/18, Parcel E-2 landfill and Parcel E shoreline areas that will require an engineering cap, these areas are similar to Brownfields that are built on top of landfills and the deed restrictions related to the engineered cap. These areas will be suitable for their intended use as parks and recreational area.
Attachment 8

Naturally Occurring Asbestos
The area surrounding the Shipyard contains serpentine, chert, and basalt bedrock typical of the Franciscan Complex. Serpentine, which is the state rock and located in 44 of the 58 of counties, can contain naturally occurring asbestos, which is identified as a potential health hazard requiring control measures. Serpentine bedrock is present in Parcel A, Parcel B, a portion of Parcel C, and a small area of Parcel G. Many other areas of the Shipyard are known to contain some serpentine because material used to fill in the Bay to create the Shipyard included serpentine bedrock cut from the hill.

Due to the health concerns surrounding naturally occurring asbestos, the vicinity of Parcel A was monitored for asbestos that may have become airborne due to soil-disturbing activities (e.g., grading and infrastructure installation) from August 2006 through August 2012. This monitoring program was carried out in accordance with an ADMP, which was approved by the BAAQMD, and a DCP, which was approved, and compliance monitored by SFDPH. During redevelopment of areas that contain naturally occurring asbestos, dust control and monitoring programs will be implemented in accordance with the DCP.
Attachment 9

Abrasive Blast Material
ABM, also referred to as sandblast grit (ABM), was historically used at the Shipyard to prepare ship hulls for repainting and other repairs. Wet sandblasting is also specifically mentioned as a method used for decontamination of irradiated ships involved in Operation Crossroads in the late 1940s and early 1950s, as documented in the HRA (see Attachment 7).

The ABM used to sandblast a ship is generally a non-cohesive, granular material and typically may have a characteristic green or black color. Granulated ABM made by all manufacturers is chemically inert; therefore, it does not have hazardous waste characteristics of flammability, corrosivity, or reactivity. Historically, silica sands were commonly used as ABM. Other common ABMs used at Naval facilities included Green Diamond®, a ferro-nickel slag produced as a byproduct of nickel production from lateritic ore, and Black Beauty®, a coal slag abrasive.

Historically, after a sandblasting operation, there was a large quantity of used ABM. This used material was sometimes stockpiled and then reused. Anecdotal evidence suggests that ABM was sometimes used at the Shipyard as bedding, aggregate, or backfill material (e.g., for pipelines, former fill areas, roadways, and driveways). Typically, the Navy did not keep records documenting the placement locations, so the exact locations and quantities of ABM are not known. However, ABM has been encountered during site characterization and remediation activities.

As indicated by the activities described above, three types of contamination issues arise from reuse of spent ABM. First, ABM can contain elevated levels of metals from the paint on ships, particularly lead, chromium, copper, nickel, and zinc. Second, the coal slag that is used to manufacture ABM sometimes contains low levels of naturally-occurring radionuclides (radium and its daughter products), which may be concentrated during the ABM manufacturing process. Third, spent ABM may be associated with the decontamination of ships used during atomic weapons testing in the South Pacific. Issues two and three may have resulted in ABM with elevated radiation levels.

Fortunately, ABM is readily distinguishable from natural soils or other backfill used at the Shipyard. ABM materials have specific physical characteristics such as grain size, uniformity of material, and color. These characteristics allow visual observations to be used to determine when the ABM is encountered in the subsurface.

Limited quantities of buried ABM have been removed from Parcels B and G. Remedial actions have removed ABM identified in portions of Parcel B. Between 1991 and 1995, approximately 90 tons of ABM was removed from IR Site 44 in Parcel G (formerly Parcel D) and recycled.

Despite these discoveries, there is no evidence that backfilling with spent ABM was a routine practice at the Shipyard and the regulatory agencies have required no further
investigation of this issue. Though there is no reason to suspect a significant amount of ABM at the Shipyard, there is a possibility that it, like other unknowns, might be found. Under federal law, the Navy has provided the CERCLA Covenant that any additional remedial action found to be necessary after the date of transfer shall be conducted by the United States.

Because it specifically requires protocols for unknowns, such as ABM, Article 31 will provide an added level of protection. Contractors will be required, under Article 31, to submit an unknown contaminant contingency plan to address ABM and other potential contaminants. Thus, if ABM is disturbed during construction activities, it will be properly identified and handled.
Attachment 10

Naturally Occurring Metals
Concerns have been raised regarding naturally occurring metals in soils. Much of the land that the City and County of San Francisco occupies, including part of the Shipyard, and in particular the Parcel A hill, contains serpentinite, chert and basalt bedrock typical of the Franciscan Complex. The Franciscan Complex is the predominant bedrock unit in the California Coast Ranges. Elevated levels of arsenic, iron, manganese and nickel are naturally found in these rock formations, and therefore found in soil in any area of the City that overlays these rock formations. Since there are no known man-made sources of these metals on Parcels B and G or these sources have been remediated, the Navy and regulators have concluded that elevated detections of these metals that the Navy found and any similar levels found in the future are most likely due to these natural rock sources being cut for use as fill material and therefore may remain. These metals are not part of a “spill” or “release” of contaminants, but rather reflect metals concentrations normally associated with Franciscan Formation bedrock and/or reflect metals concentrations normally associated with the type and quality of soil used during the period the Shipyard was filled. Because of the ubiquitous or ambient nature of these metals and their various concentrations, based on the risk evaluation conducted by the Navy, the regulators concluded that potential risks associated with slightly-elevated metals should be managed by minimizing exposure through placing and maintaining covers. These covers (i.e. physical barriers) will be placed over existing soil through the use of new building foundations, roads, sidewalks, parking lots and/or placement of clean soil in open space areas.
Attachment 11

Lead-Based Paint
Attachment 11
Lead-Based Paint

As with the majority of pre-1978 buildings, a number of buildings at the Shipyard were painted with LBP. It is anticipated that the deeds for future transfers of land at the Shipyard will contain a deed notice and restriction concerning LBP, just as they did for the transfer of Parcel A. The LBP notice will provide information about the hazards of lead paint on residential dwellings built before 1978 and notice that lead poisoning is a particular risk for young children and pregnant women. It is anticipated that the LBP restriction will ban the reuse of existing structures with LBP for residential use and occupancy of new residential structures until soil assessment, and if needed, soil abatement is complete and, as a result, these populations will not be exposed. The notice further provides that any subsequent owner of the property will be responsible for managing LBP in compliance with all applicable federal, state, and local laws and regulations.

San Francisco Building Code, Chapter 34, Section 3407, establishes requirements for projects that disturb LBP on the exterior of buildings or steel structures. It is implemented by the Department of Building Inspection (DBI). The ordinance contains performance standards, including a requirement to establish containment barriers during disturbance of LBP that are at least as effective at protecting human health and the environment as those in the most recent Guidelines for Evaluation and Control of Lead-Based Paint Hazards promulgated by the US Department of Housing and Urban Development.

For Hilltop and Hillside areas of Parcel A, under the requirements of San Francisco Health Code Article 31, all LBP in soil hazards were assessed and remediated prior to, during and after demolition of the Navy structures so there are no further LBP hazards on those parcels. For the remaining Parcel A buildings and, once transferred, the building on Parcel D-2, the OCII is and will be required to follow all applicable laws for managing LBP hazards in the buildings as prescribed in the deed restrictions. If it is necessary to demolish these buildings in the future, the LBP in soil hazards will need to be assessed under the requirements in Article 31. This assessment could include submittal of a LBP in Soil Sampling Report to analyze and, if found above action levels, remediate LBP in soil.

It is anticipated that the deeds for parcels that transfer in the future will prohibit the use of existing structures containing LBP for residential or child-occupied facilities. This will not be an issue because the residential and childcare facilities are planned for new structures that will be built in the future. It is anticipated that these transfers will also require the OCII, if it decides to reuse the existing Navy buildings for uses other than residential or child-occupied facilities, to follow all applicable laws for managing LBP hazards as prescribed in the deed restrictions. When the OCII demolishes the existing Navy buildings containing LBP hazards, it will be required to follow all applicable laws as
described in the deed restrictions and provide proof to the SFDPH under requirements in Article 31 that it has complied with those restrictions.
Attachment 12

Pile Driving Through Contaminated Soil
Attachment 12
Pile Driving Through Contaminated Soil

Deep foundations may be required to support some new buildings and structures at the Shipyard including the Yosemite Slough Bridge and other structures near the Bay where soft sediments are present near the ground surface. The foundations for these structures may extend below the soft sediments into competent soil or bedrock to provide adequate support.

As described in Attachment 4, Parcel-by-Parcel Summary and Expected Transfer Dates, there are ongoing remediation programs related to former Navy operations. The Navy is conducting soil and groundwater cleanup to reduce chemical concentrations to meet cleanup levels approved by federal and state regulatory agencies. Residual chemicals in soil, largely consisting of certain metals which are associated with the rock and soil that were historically used to fill in the Bay to expand the Shipyard, may remain. These chemicals are not part of a “spill” or “release” of contaminants, but rather reflect metals concentrations normally associated with Franciscan Formation bedrock that was used as a source of fill material during the period when portions of the Shipyard was filled.

Therefore, the majority of construction on the Shipyard should not present any concern of cross-contamination or “releasing” substances beyond the naturally occurring sources that regularly appear at construction sites throughout the Bay Area. However, should contamination still be a concern at a Shipyard site, piles could be installed using methods that case the pile through the contaminated zone and allow the pile installation through zones of contamination without adversely impacting the environment or spreading the contamination to other subsurface layers. Evaluation of potential impacts related to installation of foundation or utility support piles and mitigation measures will be performed prior to issuance of any building permits. Specifically, in 2010 Article 31 of the Health Code was amended to address this issue to require contractors to submit for approval to SFDPH a Foundation Pile Installation Plan. The plan must explain how they will drill pilot boreholes or an equivalent process will be used so that piles will be installed without damage or misalignment and to prevent potentially contaminated fill materials from being pushed into underlying sediment or groundwater. Additionally, if contaminants were encountered in a location where piles are to be installed, the Covenant(s) to Restrict Use of Property and Deed will require adherence to a RMP, which in addition to requirements in Article 31 and FEIR mitigation measures, specifies procedures in the Unknown Contaminant Response Plan to address previously unknown contamination.
Attachment 13

Public Participation and Notification
Attachment 13  
Public Participation and Notification

The Navy is required to prepare and implement a Community Involvement Plan under the FFA. This plan provides for a number of activities designed to inform neighbors and other members of the public about the status of Shipyard cleanup activities. Community relations and public information requirements may also be incorporated into the requirements of cleanup decision documents, leases and transfer documents imposed on the City and other subsequent purchasers and tenants.

The Community Involvement Plan provides detailed information on community participation and documents interests, issues, and concerns raised by the community regarding ongoing investigation and cleanup activities at the Shipyard. Community outreach activities at the Shipyard include public meetings, public information repositories, newsletters and fact sheets, public notices, site tours and the Navy’s Shipyard website (http://www.bracpmo.navy.mil/basepage.aspx?baseid=45).

Starting in 2010, the Navy hired a full-time outreach coordinator and began conducting bimonthly Community Technical Meetings to discuss the technical aspects of the CERCLA milestone documents with community members (and with participation from the Base Realignment and Closure [BRAC] Cleanup Team). Documents and relevant information relied upon in the remedy selection process are made available for public review in the public information repositories or on the IR Program website.

Community participation is also solicited through public mailings, including newsletters, fact sheets, public notices, and proposed plans, which are designed to broadly disseminate information throughout the local community. Public mailings for the Shipyard are sent to more than 2,000 groups and individuals that have added their names to the community mailing list, including residents in the local Hunters Point-Bayview community; city, state, and federal officials; regulatory agencies; and other interested groups and individuals. Previous updates and fact sheets have included general program information such as the status of environmental investigations and cleanup activities at each parcel. In addition, the Navy has held periodic site tours of the Shipyard to better explain the status of cleanup activities to interested community members.
A complete index of all Navy Shipyard documents is available at the following information repositories:

San Francisco Main Library  HPNS Office Trailer
100 Larkin Street  690 Hudson Street
Government Information Center, 5th Floor  San Francisco, California 94124
San Francisco, California 94102
Phone: (415) 557-4500

Prior to transferring ownership of any property at the Shipyard, the Navy will prepare and circulate for public comment a document called a FOST. These documents will include detailed information about the nature and extent of contaminants and the measures taken to address contamination, including any restrictions that will be imposed on the use of, or activities that may be conducted at, the property, and any notices required to be provided such as notices and notice requirements regarding the existence of LBP and ACM. Such restrictions will also be set forth in both the deed and a separate land use covenant, both of which will be legally recorded, and will also be provided to tenants and any subsequent property owner. General statutory and common law requirements applicable to transfers and leases of real property provide for disclosures of hazardous conditions, including releases of hazardous substances and hazardous materials to purchasers and tenants.

Following transfer, notice of new discoveries of unknown contaminants are addressed in the Unknown Contaminant Response Plan which is part of the RMP and includes appropriate notification and site control procedures. The Covenant(s) to Restrict Use of Property and Deed require adherence to a RMP. The Deed and the Covenant to Restrict Use of Property (CRUP) and therefore the RMP will be binding on all future property owners.

The DCP for the Project is anticipated to include establishing a hotline for surrounding community members who may be affected by dust and requiring the contact person to take corrective action within 48 hours. The hotline number will be provided to adjacent residents, schools and businesses.
Attachment 14

Monitoring and Enforcement of Environmental Restrictions
Attachment 14
Monitoring and Enforcement of Environmental Restrictions

Article 31 of the San Francisco Health Code establishes an administrative process related to Hunter Point Shipyard development requiring the SFDPH to verify compliance with FEIR mitigation measures and other environmental restrictions and plans prior to issuance of construction or grading permits by the DBI or DPW. Following permit issuance, the SFDPH continues to monitor and enforce compliance.

In addition to being enforceable by the SFDPH, the hazardous material-related restrictions, notices and other requirements imposed as institutional controls pursuant to the environmental cleanup and property transfer process will be redundantly incorporated into two separate legally enforceable documents: the recorded deeds conveying ownership of the property and recorded covenants to restrict use of property. Violations of deed restrictions by a subsequent property owner are legally enforceable by the Navy and by any other predecessor owner in the chain of title such as the City, the developer, or parties to whom portions of the property are conveyed. Violations of the recorded CRUP are enforceable by USEPA and DTSC.
Attachment 15

Asbestos Containing Materials
Attachment 15
Asbestos Containing Materials

Due to the presence of ACM in structures at Shipyard Parcels, a deed to include a notification and other requirements pertaining to ACM will be required. The deed notice will state that ACM is present in the buildings and structures on the Parcel, that the location and condition of known ACM is documented in specific reports, and the deed will prohibit the use of these structures. In the covenant regarding ACM, future owners and developers will be responsible for managing ACM and for complying with all applicable federal, state, and local laws relating to ACM, including when demolishing or handling buildings or utilities containing ACM.
Attachment 16

Superfund Sites
Superfund is the common name for CERCLA, the federal law designed to clean up abandoned hazardous waste sites. Superfund provides broad federal authority to clean up releases or threatened releases of hazardous substances that may endanger public health or the environment. The law authorized the USEPA to identify parties responsible for contamination of sites and compel the parties to clean up the sites. By the beginning of the 21st century, cleanups at more than 750 sites had been completed. Superfund sites are a category Brownfields sites. The attached Table 16-1 illustrates that the types of chemicals found at the Shipyard: metals, PCBs, PAHs, and VOCs; are typical Superfund contaminants found at many sites. The Shipyard is similar to a number of the Superfund sites listed in the type of contamination, cleanup remedies selected, end use, and risk management measures. The contamination present at a Superfund site can vary by:

- Media affected (soil, sediment, groundwater)
- Extent of that affected media (shallow to deep soils and shallow to deep aquifers)
- Types and levels of contaminants.

At the Shipyard, the media affected and contamination present are commonly found at many Superfund sites, and in fact Shipyard contamination levels and distribution are less than many Superfund sites.

The Shipyard differs from some of these sites in that a source of drinking water has not been impacted and there are no large-scale significant or fast-moving groundwater plumes at the Shipyard. Shallow groundwater at the Shipyard is not and will not be considered a drinking water source. In addition, the extent of groundwater contamination is limited to certain areas, and in these limited areas there are no large-scale significant or fast moving groundwater plumes. While this situation is not unique to the Shipyard, there are cases of Superfund sites where the groundwater contamination covers/covered a large area and contamination affected or had a high possibility of affecting potential drinking water sources. The Parcel E-2 landfill and adjacent areas that previously impacted the Bay (Attachment 2) have been extensively excavated and contamination removed. Additional contaminant removal actions are being conducted by the Navy. Groundwater results show that leaching from landfill has the potential to continue to impact the Bay and the Parcel E-2 ROD has selected containment remedies to mitigate these potential impacts.
# Table 16-1
Superfund Sites Environmental Management Summary

<table>
<thead>
<tr>
<th>Site</th>
<th>State</th>
<th>City</th>
<th>Former Use(s)</th>
<th>Contaminants</th>
<th>Land Use Covenants</th>
<th>Engineering Controls</th>
<th>Cleanup and Risk Management</th>
<th>Current/Planned Use(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Williams Air Force Base</td>
<td>AZ</td>
<td>Chandler</td>
<td>Military - Air Force flight training school</td>
<td>VOCs, OCPs, PCBs, TPH and radiological wastes</td>
<td>ICs and ECs</td>
<td></td>
<td></td>
<td>Cleanup is ongoing.</td>
</tr>
<tr>
<td>Concord Naval Weapons Station</td>
<td>CA</td>
<td>Concord</td>
<td>Military - Army ammunition transshipment port</td>
<td>SVOCs, OCPs and metals</td>
<td>ECs</td>
<td>ECs include: soil excavation, multi-layer cap.</td>
<td></td>
<td>Inland area closed, transferred and redeveloped. Tidal area retained by military - Army. Cleanup is ongoing.</td>
</tr>
<tr>
<td>March Air Force Base</td>
<td>CA</td>
<td>Riverside</td>
<td>Military - Air Force maintenance and repair facility</td>
<td>VOCs and metals</td>
<td>ICs and ECs</td>
<td></td>
<td></td>
<td>Approximately two-thirds of the Site has been turned over to BRAC (Air Force office). The remaining third has been retained and renamed March Air Reserve Base.</td>
</tr>
<tr>
<td>Denver Radium Site</td>
<td>CO</td>
<td>Denver</td>
<td>Areas where radioactive soil and debris from ore processing for radium (1920's) was left in place or used for fill or paving materials</td>
<td>Radium, thorium, uranium, metals and radon gas</td>
<td>ICs and ECs</td>
<td></td>
<td></td>
<td>Mixed use - Commercial, residential and open space</td>
</tr>
</tbody>
</table>
Table 16-1
Superfund Sites Environmental Management Summary

<table>
<thead>
<tr>
<th>Site</th>
<th>State</th>
<th>City</th>
<th>Former Use(s)</th>
<th>Former Use(s)</th>
<th>Contaminants2</th>
<th>Land Use Covenants 2</th>
<th>Institutional Controls 2</th>
<th>Engineering Controls 2</th>
<th>Cleanup and Risk Management</th>
<th>Current/ Planned Use(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durham Meadows</td>
<td>CT</td>
<td>Durham</td>
<td>Industrial</td>
<td></td>
<td>VOCs, lead and dioxins</td>
<td>ICs and ECs</td>
<td></td>
<td></td>
<td>The final remedy for the Site is under review. Proposed ICs include; environmental land use restrictions (ELURs) as defined by Connecticut Remediation Standard Regulations (CT RSRs), which restrict use of certain areas of the Site or contaminated groundwater. Proposed ECs include; soil excavation, groundwater plume monitoring and potential installation of a groundwater extraction system.</td>
<td>No current redevelopment listed.</td>
</tr>
<tr>
<td>Landia Chemical</td>
<td>FL</td>
<td>Lakeland</td>
<td>Industrial Pesticide blending and formulating</td>
<td></td>
<td>VOCs, SVOCs, OCPs and metals</td>
<td>Site specific LUCs, ICs and ECs</td>
<td></td>
<td></td>
<td>Storage of construction forms</td>
<td>No current redevelopment listed.</td>
</tr>
<tr>
<td>Fairfield Coal Gasification Plant</td>
<td>IA</td>
<td>Fairfield</td>
<td>Industrial (utility) Coal gasification plant</td>
<td></td>
<td>VOCs, PAHs and metals</td>
<td>ICs and ECs</td>
<td></td>
<td></td>
<td></td>
<td>No current redevelopment listed.</td>
</tr>
<tr>
<td>Site</td>
<td>State</td>
<td>City</td>
<td>Former Use(s)</td>
<td>Contaminants</td>
<td>Land Use Covenants</td>
<td>Institutional Controls</td>
<td>Engineering Controls</td>
<td>Cleanup and Risk Management</td>
<td>Current/Planned Use(s)</td>
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</tr>
<tr>
<td>Agricultural Street Landfill</td>
<td>LA</td>
<td>New Orleans Parish</td>
<td>Municipal Landfill</td>
<td>PAHs and metals</td>
<td>ICs and ECs</td>
<td></td>
<td></td>
<td></td>
<td>Previously 47-acres of the 95-acre Site have been developed. Since cleanup and risk management procedures were implemented, the remaining 48-acres have been cleared for unrestricted reuse.</td>
<td></td>
</tr>
<tr>
<td>Aircraft Components (D&amp;L Sales)</td>
<td>MI</td>
<td>Benton Harbor</td>
<td>Industrial/Commercial Plating, airplane parts resale</td>
<td>Radium-226, VOCs, SVOCs, OCPs and metals</td>
<td>ICs and ECs</td>
<td></td>
<td></td>
<td></td>
<td>The property is being redeveloped as part of a golf course. Additional planned development includes a marina, residential properties and condominiums.</td>
<td></td>
</tr>
<tr>
<td>Griffiss Air Force Base</td>
<td>NY</td>
<td>Rome</td>
<td>Military - Air Force 416th Combat Support Group</td>
<td>VOCs, SVOCs, PCBs and metals</td>
<td>Site specific LUCs, ICs and ECs</td>
<td></td>
<td></td>
<td></td>
<td>Griffiss was designated for base realignment under BRAC 93. Five early transfer areas have been approved by EPA and the State, with appropriate restrictions.</td>
<td></td>
</tr>
<tr>
<td>Site</td>
<td>State</td>
<td>City</td>
<td>Former Use(s)</td>
<td>Contaminants</td>
<td>Land Use Covenants</td>
<td>Institutional Controls</td>
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<td></td>
</tr>
<tr>
<td>Naval Support Activity (NSA)</td>
<td>PA</td>
<td>Mechanicsburg</td>
<td>Military - Navy Global management of repair parts for Navy ships, management of conventional ammunition, metal ore repository.</td>
<td>VOCs, PCBs, PAHs and metals</td>
<td>Site specific LUCs, ICs and ECs</td>
<td></td>
<td></td>
<td>Site specific LUCs/deed restrictions have been imposed at two sites, restricting them to industrial use. ICs are expected to be implemented. ECs include: soil and sediment excavation. A bioremediation program was initiated at one location but was subsequently terminated after reevaluation.</td>
<td>NSA, Mechanicsburg is an active Naval installation participating in cleanup activities. Proposed future use is industrial/commercial. However, the possibility of eventually cleaning the Site up to residential levels and encouraging residential growth in the future has not been ruled out.</td>
<td></td>
</tr>
<tr>
<td>Naval Air Station (NAS)</td>
<td>WA</td>
<td>Whidbey Island</td>
<td>Military - Navy Ault Field and the Seaplane Base</td>
<td>VOCs, SVOCs, OCPs, PCBs, PAHs, TPH, dioxins and metals</td>
<td>Site specific LUCs, ICs and ECs</td>
<td></td>
<td></td>
<td>Site specific LUCs, ICs and ECs</td>
<td>NSA, Mechanicsburg is an active Naval installation participating in cleanup activities. Proposed future use is industrial/commercial. However, the possibility of eventually cleaning the Site up to residential levels and encouraging residential growth in the future has not been ruled out.</td>
<td></td>
</tr>
</tbody>
</table>

**Notes**
1. Site - The sites listed are representative of the United States Environmental Protection Agencies (USEPA) ten regions.
2. Contaminants listed are the predominant ones found at a site, but are not an exhaustive list of all contaminants present.
3. LUC - Land Use Covenant incorporates the land use restrictions into environmental restrictive covenants that run with the land and that are enforceable by DTSC against future transferees.
4. ICs - Institutional Controls are legal and administrative mechanisms used to implement land use and access restrictions that are used to limit the exposure of future landowner(s) and/or user(s) of the property to hazardous substances and to maintain the integrity of the remedial action until remediation is complete and remediation goals have been achieved. This is not necessarily an exhaustive list of ICs planned or implemented but rather the main ones.
5. ECs - Engineering Controls are physical controls. Examples of these controls include: the use of building foundations, walkways, parking garages/lots, and import soil to "Cap" the site and limit the exposure of future landowner(s) and/or user(s) of the property to hazardous substances. Maintenance protocols for EC's can be found in site management plans, deed restrictions and LUCs. This is not necessarily an exhaustive list of ECs planned or implemented but rather the main ones.

BRAC - Base Realignment and Closure  
VOCs - volatile organic compounds  
SVOCs - semi-volatile organic compounds  
OCPs - organochlorinated pesticides  
PCBs - polychlorinated biphenyls  
PAHs - polycyclic aromatic hydrocarbons  
TPH - total petroleum hydrocarbons (can be quantified as gasoline, diesel, motor oil, and jet fuel)  
UST - underground storage tank
Following are two example sites with more significant residual chemicals than the Shipyard:

**The Montrose Chemical Corporation and Del Amo Superfund Sites**

The Montrose Chemical Corporation (Montrose) and Del Amo Superfund sites are located in Los Angeles County, California. Portions of the sites are within the boundaries of the City of Los Angeles and adjacent to the City of Torrance. The sites were addressed in a joint ROD (ROD, 1999) because they are adjacent and contamination had co-mingled. More than 30 hazardous substances or Contaminants of Potential Concern (COPCs) have been detected at the joint site. Through sampling and analysis, it was determined that contamination in groundwater from Montrose had migrated vertically through five successive aquifers and laterally the migration had formed a plume approximately 1.3 miles long by 0.75 miles wide. The USEPA was concerned that groundwater contamination would continue to spread and eventually reach locations where it could be drawn into wells used for drinking and potable water. Cleanup is currently ongoing.

**Otis Air National Guard Base/Camp Edwards Site**

The Otis Air National Guard Base/Camp Edwards more commonly known as the Massachusetts Military Reservation covers approximately 22,000 acres in Barnstable County, Massachusetts. Contaminated areas are the result of historic chemical/fuel spills, fire training activities, landfills, and drainage structures. Additionally, effluent from the former sewage treatment plant was historically discharged into sand beds where it seeped into the groundwater. In 1984, the U.S. Geological Survey detected contaminants in monitoring wells downgradient of this former plant. In 1983 and 1984, the Air Force detected VOCs in on-site monitoring wells near the Base Landfill and a Fire Training Area. Monitoring had also detected VOCs in several hundred private wells (all of which are now on municipal water) and in one town well (which is shut down). The groundwater was contaminated with VOCs, including trichloroethene, tetrachloroethylene, ethylene dibromide (EDB), carbon tetrachloride, and dichloroethylene. EDB has been found to be upwelling in two separate locations, outside the property boundaries, within cranberry bogs in Mashpee and Falmouth. People could be at risk if they accidentally drink or come into direct contact with contaminated groundwater. A number of plume areas have been identified at the Site. Cleanups have included numerous remediation projects addressing both the soil and groundwater contamination at MMR have been implemented since the mid- to late 1990’s. Currently there are numerous treatment plants in place which treat approximately 18 million gallons a day of contaminated groundwater. All treated groundwater is returned to the aquifer or discharged to surface water.
Site specific LUCs, deed restrictions, institutional controls and ECs are part of the process in reusing a Superfund site are a standard in many cases, and have been used many times at sites with similar contaminants and issues as the Shipyard as illustrated by following example:

**Aircraft Components, Inc. (D&L Sales) Superfund Site**

The 17-acre Aircraft Components, Inc. (ACI) site is located in Benton Township, Berrien Country, Michigan. Constructed in the 1910s, the main buildings were used by various manufacturing concerns, including a plating facility, until the mid-1950s. ACI, a mail-order airplane parts resale business, then occupied the property until the site was sold to D&L Sales, Inc., in the early 1990s. Aircraft Components bought and sold World War II-era military aircraft gauges and other components and used the ACI site as a warehousing, storage, and shipping center. Some of the aircraft gauges are marked with luminescent paint containing radium-226. The non-radioactive contaminants of concern in soil included the heavy metals, mercury and selenium, and to a lesser extent, lead. Other COPCs in site soil included VOCs, SVOCs and OCPs. Contaminants of concern in groundwater included VOCs. ECs at the Site included; removal and off-site disposal of radioactive airplane gauges and associated debris, initial radiological decontamination of buildings followed by building demolition, excavation and off-site disposal of Radium-226 affected soil, excavation and off-site disposal of metal and/or pesticide soil and sediment, substrate injection into groundwater to promote degradation of VOCs. Institutional controls include; implementing restrictions on land use, and incorporating protective measures into the construction and design of the buildings. USEPA is working closely with the developer to ensure that all applicable state and federal regulations are followed and that reuse of the site is compatible with cleanup levels. The Site is part a community-wide, 530-acre redevelopment project that will include a marina, a golf course, residential homes, and condominium complexes. Site reuse includes part of the golf course.
Attachment 17

Bay Area Brownfields Sites
Attachment 17  
Bay Area Brownfields Sites

The term “Brownfields” has been defined by both the USEPA and the Cal-EPA DTSC as:

“real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.”

Many cities and industrial areas are Brownfields and many have been successfully cleaned up and reused for multi-use developments. The cleanup and reuse of these lands is now common and provides economic, environmental and public health benefits for the area.

Much of downtown San Francisco and the eastern neighborhoods on the Bay from Mission Bay down through Islais creek have been Brownfields since the 1906 earthquake when these neighborhoods were created by filling in the Bay with earthquake rubble. The fact that this rubble contained chemical contamination was recognized long before the word Brownfields became fashionable. The San Francisco Health Department established the “Maher” ordinance in 1986 (now Article 22A of the Health Code) to deal with these fill areas and the contamination associated with them. In addition to the concerns about chemical contamination associated with earthquake rubble, additional industrial activities, such as the railroad yards in Mission Bay, contributed contamination to these areas.

The Shipyard was established as part of the war effort in the 1940’s when the Bay was filled to increase the size of the Shipyard. Industrial activities for shipbuilding contributed to the soil and groundwater contamination at the site. With the exception of the radiological contamination, discussed below, the chemicals used at the Shipyard and the contamination that resulted are similar to other large industrial sites throughout the Bay Area and other Brownfields that have been or are being redeveloped. In particular, once the Navy has prepared the land for transfer, the engineering or institutional controls will be similar to other Brownfields in the Bay Area.

The attached Table 17-1 illustrates that the types of chemicals found at the Shipyard: metals, PCBs, PAHs, VOCs are typical Brownfields contaminants found at many sites. The Shipyard is similar to a number of the Brownfields listed in the type of contamination, cleanup remedies selected, end use, and risk management measures.

Brownfields development typically includes cleanup of contamination for the intended property reuse (residential, commercial/industrial or recreational) and the use of Land
<table>
<thead>
<tr>
<th>Site</th>
<th>City</th>
<th>Former Use(s)</th>
<th>Contaminants</th>
<th>Land Use Covenants</th>
<th>Institutional Controls</th>
<th>Engineering Controls</th>
<th>Cleanup and Risk Management</th>
<th>Current use(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>America Center</td>
<td>San Jose</td>
<td>Class III Landfill</td>
<td>Methane</td>
<td>Deed restriction</td>
<td>LUCs, ICs, and ECs</td>
<td></td>
<td>Landfill Cap and Methane Mitigation System per CCR Title 27</td>
<td>Commercial</td>
</tr>
<tr>
<td>Bay West Cove</td>
<td>South San Francisco</td>
<td>US Steel Facility &amp; Ship Building</td>
<td>Petroleum hydrocarbons, lead, PCBs</td>
<td>LUCs, ICs, ECs</td>
<td></td>
<td></td>
<td>Excavation of petroleum impacted soil. Soil fixation to stabilize lead. PCB sediment dredging and cover. Lead sediment cover. Onshore area covered by 3-feet of clean fill</td>
<td>Hotels, biotech research, commercial</td>
</tr>
<tr>
<td>5600 Third Street</td>
<td>San Francisco</td>
<td>Industrial and Office</td>
<td>Metals</td>
<td>Deed restriction, ICs, and ECs</td>
<td></td>
<td></td>
<td>ECs including capping with concrete, building foundations, pavement and soil</td>
<td>Residential</td>
</tr>
<tr>
<td>Emeryville Redevelopment</td>
<td>Emeryville</td>
<td>Various Commercial industrial activities</td>
<td>VOCs, petroleum hydrocarbons, metals, PCBs, SVOCs</td>
<td>Deed restrictions, site specific LUCs, ICs, and ECs</td>
<td></td>
<td></td>
<td>Numerous sites use risk assessments and remedial action Workplans to determine level of effort to remediate (if necessary) and ECs and/or ICs prior to redevelopment</td>
<td>Mixed - residential, industrial/light industrial and commercial</td>
</tr>
<tr>
<td>Mandela Gateway</td>
<td>Oakland</td>
<td>Military housing, low-income housing and equipment and building material storage</td>
<td>Metals, Pesticides, Petroleum Hydrocarbons</td>
<td>Deed restriction, ICs, and ECs</td>
<td></td>
<td></td>
<td>Issuance of a deed restriction which includes ECs including capping with concrete and soil, guidance on cap maintenance, conditions and restrictions on capped area disturbance. ICs include the prohibition of installation of domestic water supply wells at the site</td>
<td>Mixed - residential, commercial</td>
</tr>
<tr>
<td>Mare Island</td>
<td>Vallejo</td>
<td>(Military Naval Shipyard) - repair and maintenance of military vessels, warehouses, training areas, barracks, post services, Civilian Shipyard - repair and maintenance of vessels, warehouses.</td>
<td>Metals, PCBs, SVOCs, Petroleum Hydrocarbons</td>
<td>Deed restriction, Site specific LUCs, ICs, and ECs</td>
<td></td>
<td></td>
<td>Issuance of a deed restriction (2002) and subsequent LUCs. The deed restriction restricts the re-use of certain areas of Mare Island to uses including research and development, office, Industrial, light industrial, commercial and educational</td>
<td>Mixed - residential, industrial/light industrial and commercial</td>
</tr>
<tr>
<td>Mission Bay</td>
<td>San Francisco</td>
<td>Industrial/commercial</td>
<td>Metals, VOCs, Petroleum Hydrocarbons, Asbestos</td>
<td>Risk Management Plan (RMP), ICs, and ECs</td>
<td></td>
<td></td>
<td>RMP lists ECs include capping with buildings, parking lots, roads sidewalks and soil, guidance on cap maintenance, conditions and restrictions on capped area disturbance. ICs include prohibition of installation of domestic, industrial or irrigation wells</td>
<td>Mixed - residential, industrial/light industrial, commercial, educational, open space</td>
</tr>
<tr>
<td>Site</td>
<td>City</td>
<td>Former Use(s)</td>
<td>Contaminants</td>
<td>Land Use Covenants</td>
<td>Institutional Controls</td>
<td>Engineering Controls</td>
<td>Cleanup and Risk Management</td>
<td>Current use(s)</td>
</tr>
<tr>
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<td>-----------------------------------------------------------------------------------------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>Myers Drum</td>
<td>Emeryville</td>
<td>Industrial/commercial and recreational (shooting range)</td>
<td>Metals, Pesticides, VOCs, SVOCs, Petroleum Hydrocarbons, Hydrogen Sulfides,</td>
<td>Deed restriction, ICs, and ECs</td>
<td></td>
<td></td>
<td>Issuance of a deed restriction. The deed restriction restricts residential reuse to floors at least one floor above the ground floor restricts the re-use of certain areas to uses including industrial, light industrial, and commercial/commercial; lists EC</td>
<td>Mixed - residential, industrial, light industrial and commercial</td>
</tr>
<tr>
<td>North Beach Hope VI</td>
<td>San Francisco</td>
<td>Industrial, commercial, office, residential</td>
<td>Metals, Petroleum Hydrocarbons, PAHs, cyanide</td>
<td>ICs and ECs</td>
<td></td>
<td></td>
<td>ECs including capping with concrete, building foundations, walkways or the parking garage. Capping planter bases with geotextile fabric. ICs include domestic water supply to continue under San Francisco Public Utilities Commission, no use of site groundwater</td>
<td>Mixed - residential, commercial, and parking garages</td>
</tr>
<tr>
<td>Oakland Army Base</td>
<td>Oakland</td>
<td>Military (Army Base) - industrial processes,</td>
<td>Metals, VOCs, SVOCs, PAHs, PCBs, and Petroleum Hydrocarbons</td>
<td>Deed restriction and ICs</td>
<td></td>
<td></td>
<td>Issuance of a deed restriction. The deed restriction restricts any reuse of the site for residences, hospitals, schools, daycare facilities, hospitals or hospices; lists ICs including prohibiting construction of groundwater wells or using groundwater at the site</td>
<td>Currently awaiting redevelopment decision. Under review for many possible reuses including industrial, commercial, and open space.</td>
</tr>
<tr>
<td>Oakland Uptown Development</td>
<td>Oakland</td>
<td>Commercial, residential, parking, vacant parcels</td>
<td>Metals, VOCs, and Petroleum Hydrocarbons</td>
<td>Proposed deed restriction, ICs and ECs</td>
<td></td>
<td></td>
<td>ECs including capping with concrete, building foundations, parking garages, pavement and soil. ICs include domestic water supply to continue under East Bay Municipal Utilities District, no use of site groundwater for residential supply</td>
<td>Commercial, residential, parking, and open space</td>
</tr>
<tr>
<td>Ohlone College</td>
<td>Fremont</td>
<td>Agricultural</td>
<td>Pesticides</td>
<td>Deed restriction and ICs</td>
<td></td>
<td></td>
<td>Issuance of a deed restriction. The deed restriction restricts any reuse of the site for residences, hospitals, public or private schools for persons under 21 years of age, or daycare facilities. The deed restriction lists ICs including prohibiting activities that disturb soil beneath the site</td>
<td>Mixed- Educational (college) and agricultural land</td>
</tr>
</tbody>
</table>
## Table 17-1

<table>
<thead>
<tr>
<th>Site</th>
<th>City</th>
<th>Former Use(s)</th>
<th>Contaminants</th>
<th>Land Use Covenants</th>
<th>Institutional Controls</th>
<th>Engineering Controls</th>
<th>Cleanup and Risk Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oyster Point</td>
<td>South San Francisco</td>
<td>Class III Municipal Waste Landfill</td>
<td>Methane, TPH, Metals and VOCs</td>
<td>Pending</td>
<td>May include - Landfill cap and methane mitigation system per CCR Title 27 and potential additional ICs</td>
<td>Commercial</td>
<td></td>
</tr>
<tr>
<td>The Plant</td>
<td>San Jose</td>
<td>Engine manufacturing plant</td>
<td>VOCs</td>
<td>LUCs and ECs</td>
<td>ECs include soil and groundwater cleanup systems and vapor intrusion mitigations systems</td>
<td>Retail (Mega Mall)</td>
<td></td>
</tr>
<tr>
<td>Sierra Point</td>
<td>Brisbane and South San Francisco</td>
<td>Class III Landfill</td>
<td>Methane</td>
<td>Deed restriction, LUCs and ECs</td>
<td>Landfill cap and methane mitigation system per CCR Title 27</td>
<td>Commercial</td>
<td></td>
</tr>
<tr>
<td>Stockton Event Center</td>
<td>Stockton</td>
<td>Shipbuilding, steel manufacturing, auto repair, and railroads</td>
<td>Metals and Petroleum Hydrocarbons</td>
<td>Deed restriction, LUCs and ICs</td>
<td>ICs in place covered by the Site Mitigation Plan (SMP)</td>
<td>Recreation and retail</td>
<td></td>
</tr>
<tr>
<td>Hunters Point Shipyard Parcel A</td>
<td>San Francisco</td>
<td>Naval Shipyard Housing and Administration</td>
<td>Lead-based paint in soil and Naturally Occurring Asbestos</td>
<td>Deed restriction, LUCs and ICs</td>
<td>San Francisco Health Code Article 31A requires certain activities be completed before issuance of building and grading permits and is monitored by the San Francisco Department of Public Health</td>
<td>Residential</td>
<td></td>
</tr>
<tr>
<td>Hunters Point Shipyard Parcels B and G</td>
<td>San Francisco</td>
<td>Naval and Commercial Shipyard</td>
<td>Metals, VOCs, SVOCs, PAHs, PCBs, and Petroleum Hydrocarbons</td>
<td>RMP, ICs, and ECs</td>
<td>In addition to the RMP, will also be covered by an addition to Article 31 or a similar process</td>
<td>Mixed-use, Commercial, Residential, Stadium and Parking, Open Space</td>
<td></td>
</tr>
</tbody>
</table>

### Notes:
1. Contaminants listed are the predominant ones found at a site, but are not an exhaustive list of all contaminants present.
2. LUC - Land Use Covenant incorporates the land use restrictions into environmental restrictive covenants that run with the land and that are enforceable by DTSC against future transferees.
3. ICs - Institutional Controls are legal and administrative mechanisms used to implement land use and access restrictions that are used to limit the exposure of future landowner(s) and/or user(s) of the property to hazardous substances and to maintain the integrity of the remedial action until remediation is complete and remediation goals have been achieved.
4. ECs - Engineering Controls are physical controls. Examples of these controls include: the use of building foundations, walkways, parking garages/lots, and import soil to "Cap" the site and limit the exposure of future landowner(s) and/or user(s) of the property to hazardous substances. Maintenance protocols for ECs can be found in site management plans, deed restrictions and.
5. Deed restriction - A form of LUC that usually includes site specific ECs and instructions for future practices associated with the site. The deed restrictions include the identical land use restrictions in the LUCs that run with the land and are enforceable against future transferees.
6. Barclays Official California Code of Regulations (CCR Title 27) - Environmental Protection

**RMP** - Risk Management Plan  
**SMP** - Site Mitigation Plan  
**VOCs** - Volatile Organic Compounds  
**SVOCs** - Semi-volatile Organic Compounds  
**PCBs** - Polychlorinated Biphenyls  
**PAHs** - Polycyclic Aromatic Hydrocarbons
Use Covenants, deed restrictions, engineering and institutional controls to protect human health and the environment.

In the case of groundwater plumes in areas like the Shipyard, where the groundwater is not used for drinking water, the groundwater plumes are treated and monitored. Very low levels of residual volatile contaminants are typically too difficult to completely remove from the groundwater and the enhanced natural processes (post-treatment) over several years’ time can just be monitored to verify that the levels are decreasing. The installation of vapor barriers to completely cut off exposure of building occupants to the residual volatile vapors is the usual regulatory requirement for these areas. Typically the building construction itself would act as a barrier to residual vapors and the requirement for vapor barriers is an extra level of protection that ensures that occupants are completely safe.

Comparison to other Brownfields

After completion of a FOST, the Shipyard parcels will be substantially like the examples below - Mission Bay or Emeryville properties that have been cleaned up through removing contaminants and remaining health risks managed through engineering and institutional controls.

Mission Bay

Mission Bay is a typical urban Brownfields. It was an area of Bay Fill that was used for rail yards and miscellaneous dumping. After extensive testing, it was decided to redevelop the area, but to prevent exposure to contaminants, single family homes with private yards are prohibited (example of an institutional control) and there is a requirement for the final end use to require an impervious cover or clean topsoil (example of an engineering control). Additionally, due to organic material in the Bay Fill and underlying native material, methane is sometimes detected in soil gas and if present above action levels, methane gas mitigation systems must be designed and installed during building construction. Most of the ground floor uses include research, commercial office space, retail and parking with occasional subsurface uses, typically as parking garages and electrical/mechanical rooms. Once the buildings are constructed, this reduces the need to excavate in the existing soils except for occasional utility repairs.

Emeryville

Located in the heart of the San Francisco Bay Area, Emeryville is a geographically small city bisected by four freeways, two state highways, and the Union Pacific Railroad line. Emeryville was a former hub of industrial activities due to its proximity to San Francisco and Oakland. As large industries began to contract and relocate to other cities in the 1970s, they left behind properties with toxins that had to be cleaned up before other businesses could use them. In 1996, the USEPA selected Emeryville for a pilot program
of Brownfields cleanup and has granted $5.8 million to the City of Emeryville for this purpose. The City of Emeryville encourages the remediation and reuse of smaller industrial and commercial sites by providing grants and low-interest loans for site assessments and low- or no-interest loans for the cleanup of smaller properties that are often significantly more difficult to redevelop than larger Brownfields sites. The program has helped to stimulate economic growth, create jobs, increase local revenues, encourage cleanup of contaminated properties, and revitalize urban areas. Many properties in Emeryville have been redeveloped using the Brownfields model of evaluating risk and implementing engineering and institutional controls. Emeryville has rapidly developed into a commercial and residential community with a diverse population that is growing at a rate expected to be more than twice the rate of surrounding Alameda County. The city is focusing on development of additional housing and creation of park and recreational facilities including the Emeryville Greenway. Retail development successes include Ikea’s the South Bay Front Area near Interstate 80/Powell Street exit; and the Bay Street regional center with 400,000 square feet of retail, 340 units of residential and parking structures. Sites are served by regional bus system and local city shuttle bus system linking site to BART and Capitol Corridors train systems.
Attachment 18

Environmental Mitigation Measures and the MMRP

(From Candlestick Point/Shipyard Phase II Development Plan FEIR)
Environmental Mitigation Measures and the MMRP

The City certified the FEIR and approved redevelopment plans for Phase 2 of the Shipyard, together with Candlestick Point in the summer of 2010. After the transfer of land from the Navy to the OCII and the concurrence of the various regulatory agencies that the property can safely be used under the City’s redevelopment plans, construction on the Shipyard will be required to comply with a variety of applicable federal, state and local environmental laws. These laws will be enforced both through provisions in those laws and through mitigation measures that are part of the MMRP that were adopted as part of the findings during the California Environmental Quality Act (CEQA) approvals in the summer of 2010. A general description of the MMRP and a summary of the mitigation measures from the MMRP for Hazards and Hazardous Materials and Geology and Soils are presented below.

The Environmental MMRP was prepared pursuant to Section 21081.6 of the California Environmental Quality Act, known as CEQA (Public Resources Code Section 21000 et seq.), to provide for the monitoring of mitigation measures required of the Candlestick Point–Shipyard Phase II Development Plan (Project), as set forth in the FEIR prepared for the Project. The MMRP is kept on file in the offices of the OCII the Successor Agency to the San Francisco Redevelopment Agency located at One South Van Ness Avenue, Fifth Floor, San Francisco, CA, 94103 and at the City Planning Department (City), 1650 Mission Street, Fourth Floor, San Francisco, CA, 94103.

Prior to the issuance of building permits, while detailed development plans are being prepared for approval by OCII and/or City staff, OCII and/or City staff will be responsible for ensuring compliance with mitigation monitoring applicable to the project construction, development, and design phases. OCII and/or City staff will prepare or cause to be prepared reports identifying compliance with mitigation measures. Once construction has begun and is underway, monitoring of the mitigation measures associated with construction will be included in the responsibilities of designated OCII and/or City staff, who shall prepare or cause to be prepared reports of such monitoring no less than once a month until construction has been completed. Once construction has been completed, the OCII and/or City will monitor the project as deemed necessary.

Any substantive change in the monitoring and reporting plan made by OCII and/or City staff shall be reported in writing to the City Environmental Review Officer. Reference to such changes shall be made in the monthly/yearly Environmental Mitigation Monitoring Report prepared by City staff. Modifications to the mitigation measures may be made by City staff subject to one of the following findings, documented by evidence included in the record:

a. The mitigation measure included in the Final EIR and the MMRP is no longer required because the significant environmental impact identified in the Final EIR has been found not to exist, or to occur at a level which makes the impact less than significant as a result of changes in the project, changes in conditions of the environment, or other factors.
b. The modified or substitute mitigation measure to be included in the MMRP either provides corrections to text without any substantive change in the intention or meaning of the original mitigation measure, or provides a level of environmental protection equal to or greater than that afforded by the mitigation measure included in the FEIR and the MMRP; and the environment in addition to or greater than those which were considered by the responsible hearing bodies in their decisions on the FEIR and the proposed project; and The modified or substitute mitigation measures are feasible, and the City, through measures included in the MMRP or other City procedures, can assure their implementation.

Findings and related documentation supporting the findings involving modifications to mitigation measures will be maintained in the project file with the MMRP and will be made available to the public upon request.

The mitigation monitoring matrix on the following pages extracts the Hazards and Hazardous Materials (HZ) and Geology and Soils (GE) mitigation measures for which monitoring is required under the MMRP, the time frame for monitoring, and the responsible implementing and monitoring agencies.

If any mitigation measures are not being implemented, the OCII and/or City may pursue corrective action. Penalties that may be applied include, but are not limited to, the following: (1) a written notification and request for compliance; (2) withholding of permits; (3) administrative fines; (4) a stop-work order; (5) criminal prosecution and/or administrative fines; (6) forfeiture of security bonds or other guarantees; and (7) revocation of permits or other entitlements.

For purposes of this summary, the following definitions are used:

- **City’s Environmental Review Officer**—The Environmental Review Officer at the San Francisco Planning Department, referred to herein as “ERO.”
- **Developer**—An individual who or business that prepares raw land for the construction of buildings or causes to be built physical building space for use primarily by others. This includes contractors of an individual or business that is a developer.
- **Development/Construction Phases**—During construction, three major phases of activities would be expected: abatement and demolition, site preparation and earthwork/grading, and building construction. Within each of these phases are sub-phases generally identified by area. For each parcel, a lot application would be required and individual building permits.
- **Project Applicant**—A Developer.
## Draft Mitigation Monitoring & Reporting Program

<table>
<thead>
<tr>
<th>Mitigation Measure</th>
<th>Responsibility for Implementation</th>
<th>Mitigation Timing</th>
<th>Enforcement Responsibility</th>
<th>Monitoring Responsibility</th>
<th>Monitoring Action/ Verification of Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>MM HZ-1a</td>
<td>Article 22A Site Mitigation Plans</td>
<td>Not included because Applies only to Candlestick Point.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM HZ-1b</td>
<td>Compliance with Requirements Imposed by Cleanup Decision Documents and Property Transfer Documents. (Applies only to HPS Phase II) Prior to obtaining a grading,</td>
<td>Project Applicant</td>
<td>Prior to obtaining a grading, excavation, site, building or other permit from the City</td>
<td>OCII/DPH</td>
<td>OCII/DPH</td>
</tr>
</tbody>
</table>

**SOURCE:**
Candlestick Point-Hunters Point Shipyard
Phase II Development Plan EIR
SFRA File No. ER 06.05.07
Planning Department Case No. 2007.09 46E

**MMRP HZ HAZARDS AND HAZARDOUS MATERIALS**

**MM HZ-1a** Article 22A Site Mitigation Plans. Not included because Applies only to Candlestick Point.

**MM HZ-1b** Compliance with Requirements Imposed by Cleanup Decision Documents and Property Transfer Documents. (Applies only to HPS Phase II) Prior to obtaining a grading,
### Draft Mitigation Monitoring & Reporting Program

<table>
<thead>
<tr>
<th>Mitigation Measure</th>
<th>Responsibility for Implementation</th>
<th>Mitigation Timing</th>
<th>Enforcement Responsibility</th>
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<th>Monitoring Action/Verification of Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>excavation, site, building or other permit from the City for development activity at HPS Phase II involving subsurface disturbance</td>
<td>for development activity at HPS Phase 2 involving subsurface disturbance</td>
<td></td>
<td></td>
<td></td>
<td>Documents and Property Transfer Documents</td>
</tr>
<tr>
<td>MM HZ-2a.1 Unknown Contaminant Contingency Plan. (Applies to Candlestick Point, HPS Phase II, and off-site improvements.) Prior to obtaining the first site, building or other permit for development activities involving subsurface disturbance, the Project Applicant shall prepare and the San Francisco Department of Public Health shall approve a contingency plan to address unknown contaminants encountered during development activities. This plan, the conditions of which shall</td>
<td>Project Applicant</td>
<td>Prior to obtaining the first site, building or other permit for development activities involving subsurface disturbance</td>
<td>OCI/DPH</td>
<td>OCI/DPH</td>
<td>DPH to approve contingency plan</td>
</tr>
</tbody>
</table>
be incorporated into the first permit and any applicable permit thereafter, shall establish and describe procedures for implementing a contingency plan, including appropriate notification to nearby property owners, schools and residents and appropriate site control procedures, in the event unanticipated subsurface hazards or hazardous material releases are discovered during construction. Control procedures would include, but would not be limited to, further investigation and, if necessary remediation of such hazards or releases, including off-site removal and disposal, containment or treatment. In the event unanticipated subsurface hazards or hazardous material releases are discovered during construction, the requirements of this unknown contaminant contingency plan shall be followed. The contingency plan shall be amended, as necessary, in the event new information becomes available that could affect the implementation of the plan. This measure shall be implemented for HPS Phase II through additions to Article 31 or through an equivalent process established by the City or OCII as explained in MM HZ-1b.

MM HZ-2a.2 Site-Specific Health and Safety Plans. (Applies to Candlestick Point, HPS Phase II, and off-site improvements.) Prior to obtaining the first site, building or other permit for the Project from the City for development activities involving subsurface disturbance, the Project Applicant shall prepare and submit to SFDPH a site-specific health and safety plan (HASP) in compliance with applicable federal and state OSHA requirements and other applicable laws to minimize impacts to public health and the environment. Development of the plan shall be required as a condition of any applicable permit. The plan shall include

<table>
<thead>
<tr>
<th>Responsibility for Implementation</th>
<th>Mitigation Timing</th>
<th>Enforcement Responsibility</th>
<th>Monitoring Responsibility</th>
<th>Monitoring Action/Verification of Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Applicant</td>
<td>Prior to obtaining the first site, building or other permit for the Project from the City for development activities involving subsurface disturbance</td>
<td>OCII/DPH</td>
<td>OCII/DPH</td>
<td>DPH to approve HASP.</td>
</tr>
</tbody>
</table>
### Draft Mitigation Monitoring & Reporting Program

<table>
<thead>
<tr>
<th>Mitigation Measure</th>
<th>Responsibility for Implementation</th>
<th>Mitigation Timing</th>
<th>Enforcement Responsibility</th>
<th>Monitoring Responsibility</th>
<th>Monitoring Action/Verification of Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Project Applicant/OCII/DBI</td>
<td>Prior to obtaining a permit from the City that authorizes installation of deep foundation piles</td>
<td>OCII/DBI/DPH</td>
<td>OCII/DBI/DPH</td>
<td>DPH/DBI to approve plan</td>
</tr>
<tr>
<td>MM HZ-5a Foundation Support Piles Installation Plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Applies to Candlestick Point and HPS Phase II.)</td>
<td>Project Applicant/OCII/DBI</td>
<td>Prior to obtaining a permit from the City that authorizes installation of deep foundation piles</td>
<td>OCII/DBI/DPH</td>
<td>OCII/DBI/DPH</td>
<td>DPH/DBI to approve plan</td>
</tr>
<tr>
<td>Prior to obtaining a permit from the City that authorizes installation of deep foundation piles, the Project Applicant shall prepare and submit a plan acceptable to the City stating that pilot boreholes for each pile would be drilled through the artificial fill materials so the piles can be installed without damage or misalignment and to prevent potentially contaminated fill materials from being pushed into the underlying sediments or groundwater. This measure shall be implemented for Candlestick Point through implementation of mitigation measure MM HZ-1a. This measure shall be implemented for HPS Phase II through additions to Article 31 or through an equivalent process established by the City or OCII as explained in MM HZ-1b.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MM HZ-9 Navy-approved workplans for construction and remediation activities on Navy-owned property. (Applies only to the portions of HPS Phase II on Navy-owned property.) Construction activities and remediation activities conducted on behalf of the OCII or the Project Applicant, on Navy-owned property shall be</td>
<td>Project Applicant/OCII/City</td>
<td>Prior to construction and remediation activities on Navy-owned property.</td>
<td>City/OCII</td>
<td>City/OCII</td>
<td>Navy to approve construction and remediation activities workplan. Construction Contractor to submit quarterly report of</td>
</tr>
</tbody>
</table>
### Draft Mitigation Monitoring & Reporting Program

<table>
<thead>
<tr>
<th>Mitigation Measure</th>
<th>Responsibility for Implementation</th>
<th>Mitigation Timing</th>
<th>Enforcement Responsibility</th>
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<td></td>
<td>OCII – Approved Workplans and Permits for Shoreline Improvements</td>
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<td>compliance activity, until deemed complete by OCII.</td>
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<td>Prior to undertaking any shoreline improvement activities that would affect sediment at HPS Phase II, the OCII or its contractor or Project Applicant shall prepare appropriate design documents and submit to US EPA, DTSC, RWQCB, and, if necessary, the Navy and CDPH for approval. A Dredged Material Management Office (DMMO) permit shall be obtained. The design documents shall incorporate the necessary shoreline improvements required for each specific area (e.g., including, but not limited to, rock buttressing, pile replacement, backfilling, riprap, or</td>
<td>Project Applicant/Construction Contractor/OCII</td>
<td>Prior to undertaking any shoreline improvement activities that would affect sediment at HPS Phase II</td>
<td>OCII</td>
<td>US EPA, DTSC, RWQCB, and, if necessary, the Navy and CDPH</td>
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</table>
installation of natural-looking shoreline protection using fill and ACB mats) such that remediation (removal of sediment and any necessary dredging) and structural improvements are performed under the same regulatory approvals and permits.

Prior to undertaking any shoreline improvement activities that could affect contaminated sediments left in place and covered or capped with a Navy-installed remedial measure, or that would involve pile replacement in such areas, the OCII or its contractor or Project Applicant shall prepare appropriate design documents that: (1) describes how the cover or cap would be inspected to determine whether proposed shoreline improvements would adversely affect the cover or cap; and (2) describes how construction activities would be performed to mitigate environmental risk and to restore the cover or cap. The design documents shall be submitted to US EPA, DTSC, RWQCB, and, if necessary, the Navy and CDPH for approval. A DMMO permit shall be obtained, as applicable.

Prior to undertaking any shoreline improvements that could encounter contaminated sediments, the OCII or its contractor or Project Applicant shall comply with all requirements incorporated into the design documents, work plans, health and safety plans, dust control plans, and any other document or plan required under the Administrative Order of Consent. This includes all restrictions imposed pursuant to a CERCLA ROD, Petroleum Corrective Action Plan, FOSET, including restrictions imposed in deeds, covenants, and requirements set forth in Land Use Control Remedial Design Documents, Risk Management Plans and health and safety plans. Prior to obtaining a grading, excavation, site, building, or other permit from the City that
### Draft Mitigation Monitoring & Reporting Program

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<tr>
<td>authorizes remedial activities, SFDPH shall confirm that the work proposed complies with the applicable plans required by the Administrative Order of Consent. This measure shall be implemented through additions to Article 31 or through an equivalent process established by the City or OCII as explained in MM HZ-1b.</td>
<td>Project Applicant/ OCII</td>
<td>Prior to obtaining a grading, excavation, site, building, or other permit from the City that authorizes remedial activities</td>
<td>OCII/DPH</td>
<td>OCII/DPH</td>
<td>DPH to determine compliance with Administrative Order on Consent.</td>
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</table>

**MM HZ-12 Compliance with Administrative Order on Consent at Early Transferred Parcels.** (Applies only at HPS Phase II.) Prior to undertaking any remediation activities at HPS Phase II on property that the Navy has transferred to the OCII as part of an early-transfer, the OCII or its contractor or Project Applicant shall comply with all requirements incorporated into remedial design documents, work plans, health and safety plans, dust control plans, community involvement plans, and any other document or plan required under the Administrative Order on Consent. This includes all notices, restrictions, and requirements imposed pursuant to a CERCLA ROD, Petroleum Corrective Action Plan, FOSET, including restrictions imposed in deeds, covenants, and requirements set forth in Land Use Control Remedial Design Documents, Risk Management Plans, community involvement plans, and health and safety plans. Prior to obtaining a grading, excavation, site, building, or other permit from the City that authorizes remedial activities, SFDPH shall confirm that the work proposed complies with the applicable plans required by the Administrative Order on Consent. This measure shall be implemented through a requirement in the potential additions to Article 31 imposing requirements to parcels other than Parcel A or through an equivalent process established by the City or OCII.
Dust Control Plans. Prior to obtaining a grading, excavation, site, building or other permit from the City that includes soil disturbance activities, the Project Applicant shall obtain approval of an Asbestos Dust Mitigation Plan (ADMP) from BAAQMD for areas over 1 acre that potentially contain naturally occurring asbestos and approval of a Dust Control Plan (DCP) from SFDPH for all areas at HPS Phase II and for areas over 0.5 acre at Candlestick Point. Compliance with the ADMP and DCP shall be required as a condition of the permit.

The ADMP shall be submitted to and approved by the BAAQMD prior to the beginning of construction, and the Project Applicant must ensure the implementation of all specified dust control measures throughout the construction Project. The ADMP shall require compliance with the following specific control measures to the extent deemed necessary by the BAAQMD to meet its standard:

- For construction activities disturbing less than one acre of rock containing naturally occurring asbestos, the following specific dust control measures must be implemented in accordance with the asbestos ATCM before construction begins and each measure must be maintained throughout the duration of the construction Project:
  > Limit construction vehicle speed at the work site to 15 miles per hour
  > Sufficiently wet all ground surfaces prior to disturbance to prevent visible dust emissions from crossing the property line
  > Keep all graded and excavated areas around soil improvement operations, visibly dry unpaved roads, parking and staging areas wetted at least three times

- Monitoring Action/Verification of Compliance:
  BAAQMD and DPH to approve site specific DCP and ADMP and to monitor compliance throughout construction activity

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<tr>
<td>MM HZ-15 Asbestos Dust Mitigation Plans and DCP</td>
<td>Project Applicant</td>
<td>Prior to obtaining a grading, excavation, site, building or other permit from the City that includes soil disturbance activities</td>
<td>BAAQMD</td>
<td>BAAQMD/DPH</td>
<td>BAAQMD and DPH to approve site specific DCP and ADMP and to monitor compliance throughout construction activity</td>
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<td>per shift daily with reclaimed water during construction to prevent visible dust</td>
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<td>emissions from crossing the property line. Increased watering frequency may be</td>
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<td>necessary whenever wind speeds exceed 15 miles per hour</td>
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<td>&gt; Adequately wet all storage piles, treat with</td>
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<td>chemical dust suppressants, or cover</td>
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<td>piles when material is not being added to or removed from the pile</td>
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<td>&gt; Wash down all equipment before moving</td>
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<td>from the property onto a paved public road</td>
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<td>&gt; Clean all visible track out from the paved public road by street sweeping or a</td>
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<td>HEPA filter equipped vacuum device within 24 hours</td>
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<td>• For construction activities disturbing greater than one acre of rock containing</td>
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<td>naturally occurring asbestos, construction contractors are required to prepare an</td>
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<td>ADMP specifying measures that will be taken to ensure that no visible dust</td>
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<td>crosses the property boundary during construction. The plan must specify the</td>
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<td>following measures, to the extent deemed necessary by the BAAQMD to meet its</td>
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<td>standard:</td>
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<td>&gt; Prevent and control visible track out from</td>
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<td>the property onto adjacent paved roads. Sweep with reclaimed water at the end</td>
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<td>of each day if visible soil material is carried out from property</td>
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<td>&gt; Ensure adequate wetting or covering of</td>
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<td>active storage piles</td>
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<td>&gt; Hydroseed or apply non-toxic soil</td>
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<td>stabilizers to disturbed surface areas and storage piles greater than ten cubic</td>
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<td>yards</td>
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or 500 square feet of excavated materials, backfill material, import material, gravel, sand, road base, and soil that will remain inactive for seven days or more.

> Control traffic on on-site unpaved roads, parking lots, and staging areas—including a maximum vehicle speed of 15 miles per hour or less.

> Control earth moving activities

> Provide as much water as necessary to control dust (without creating run-off) in any area of land clearing, earth movement, excavation, drillings, and other dust-generating activity

> Control dust emissions from off-site transport of naturally occurring asbestos containing materials

> Stabilize disturbed areas following construction

If required by the BAAQMD, air monitoring shall be implemented to monitor for off-site migration of asbestos dust during construction activities, and appropriate protocols shall be established and implemented for notification of nearby schools, property owners and residents when monitoring results indicate asbestos levels that have exceeded the standards set forth in the plan.

The DCP shall be submitted to and approved by the SFDPH prior to the beginning of construction, and the site operator must ensure the implementation of all specified dust control measures throughout the construction Project. The DCP shall require compliance with the following specific mitigation measures to the extent deemed necessary by the SFDPH to achieve no visible dust at the property boundary:

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• Submission of a map to the Director of Health showing all sensitive receptors within 1,000 feet of the site.
• Keep all graded and excavated areas, areas around soil improvement operations, visibly dry unpaved roads, parking and staging areas wetted at least three times per shift daily with reclaimed water during construction to prevent visible dust emissions from crossing the property line. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour.
• Analysis of wind direction and placement of upwind and downwind particulate dust monitors.
• Record keeping for particulate monitoring results.
• Requirements for shutdown conditions based on wind, dust migration, or if dust is contained within the property boundary but not controlled after a specified number of minutes.
• Establishing a hotline for surrounding community members who may be potentially affected by Project-related dust. Contact person shall respond and take corrective action within 48 hours. Post publicly visible signs around the site with the hotline number as well as the phone number of the BAAQMD and make sure the numbers are given to adjacent residents, schools, and businesses.
• Limiting the area subject to construction activities at any one time.
• Installing dust curtains and windbreaks on windward and downwind sides of the property lines, as necessary. Windbreaks on windward side should have no more than 50% air porosity.

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<td>Keep all graded and excavated areas, areas around soil improvement operations, visibly dry unpaved roads, parking and staging areas wetted at least three times per shift daily with reclaimed water during construction to prevent visible dust emissions from crossing the property line. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour.</td>
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<td>Limiting the area subject to construction activities at any one time.</td>
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<td>Installing dust curtains and windbreaks on windward and downwind sides of the property lines, as necessary. Windbreaks on windward side should have no more than 50% air porosity.</td>
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<td>Limiting the amount of soil in trucks hauling soil around the job site to the size of the truck bed and securing with a tarpaulin or ensuring the soil contains adequate moisture to minimize or prevent dust generation during transportation.</td>
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<td>Enforcing a 15 mph speed limit for vehicles entering and exiting construction areas.</td>
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<td>Sweeping affected streets with water sweepers at the end of the day.</td>
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<tr>
<td>Hiring an independent third party to conduct inspections for visible dust and keeping records of those inspections.</td>
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<tr>
<td>Minimizing the amount of excavated material or waste materials stored at the site.</td>
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<tr>
<td>Prevent visible track out from the property onto adjacent paved roads. Sweep with reclaimed water at the end of each day if visible soil material is carried out from property.</td>
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For all areas, this measure shall be implemented through Article 22B (areas over one half acre) or for HPS Phase II through a requirement in the potential additions to Article 31 imposing requirements to parcels other than Parcel A or through an equivalent process established by the City or OCII.

**MMRP GE GEOLOGY AND SOILS**

**MM GE-2a Mitigation to Minimize Dewatering Impacts during Construction.** Prior to the issuance of any permit for a construction activity that would involve dewatering that could affect structures on adjacent or nearby properties, the Applicant shall, in compliance with Section 1803.1 of the San Francisco Building Code (SFBC), include in the permit application methods and techniques to

<table>
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<tr>
<th>Project Applicant</th>
<th>Prior to the issuance of any permit for a construction activity that would involve dewatering that could affect structures on adjacent or nearby properties</th>
<th>DBI</th>
<th>DBI</th>
<th>Approval of permit applications</th>
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ensure that dewatering would not lower the water table such that unacceptable settlement (as determined by a California Certified Engineering Geologist [CEG] or California Registered Geotechnical Engineer [GE]) at adjacent or nearby properties would occur. Such methods and technologies shall be based on the specific conditions at the construction site and could include, but are not necessarily limited to, the following:

- Excavating below the groundwater table in confined areas with steel sheet piling driven below the base elevation of the proposed excavation, installation of bracing to support the excavation walls as required and, if necessary, underpinning the foundations of adjacent structures. Subsequently, the excavation would be carried out and seepage that enters the dammed area would be pumped out.
- Perform dewatering using methods such as wellpoint systems, drainage ditches, and sump pumps.

The excavation or dewatering methods shall be monitored to detect ground settlement and to monitor individual dewatering activities in the vicinity of an excavation. Monitoring results shall be submitted to the San Francisco Department of Building Inspection (DBI). In the event of unacceptable ground movement, as determined by DBI inspections and/or the review of monitoring results, all excavation work shall cease and corrective measures (including, for example, different dewatering methods and/or ground stabilization methods) shall be determined by the Project CEG or GE and reviewed and approved by DBI. No construction permit involving dewatering includes, but are not necessarily limited to, the following:

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<td></td>
<td>Project Applicant</td>
<td>During excavation and dewatering activities</td>
<td>DBI</td>
<td>DBI</td>
<td>Approval of corrective measures. Ongoing throughout construction activity</td>
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</table>
would be issued until the Project CEG or GE and DBI have approved dewatering and/or ground stabilization methods. The Project CEG or GE shall implement the corrective measures and continue monitoring activities.

**MM GE-3 Mitigation to Minimize Rock Fragmentation Impacts during Construction.** Prior to the issuance of any permit for a construction activity that would involve controlled rock fragmentation that could cause settlement or lateral movement of structures on adjacent or nearby properties, the Applicant shall, in compliance with Section 1803.1 of the San Francisco Building Code (SFBC), include in the permit application methods and techniques to ensure that controlled rock fragmentation would not cause unacceptable vibration and/or settlement or lateral movement of structures at adjacent or nearby properties. Such methods and technologies shall be based on the specific conditions at the construction site such as, but not limited to, the following:

- Pre-excavation surveying of potentially affected structures.
- Underpinning of foundations of potentially affected structures, as necessary.

The excavation plan shall include a monitoring program to detect ground settlement or lateral movement of structures in the vicinity of an excavation. Monitoring results shall be submitted to DBI. In the event of unacceptable ground movement, as determined by DBI inspections, all excavation work shall cease and corrective measures shall be implemented. The controlled rock fragmentation program and ground stabilization measures shall be reevaluated and approved by the DBI.

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<tr>
<td>MM GE-3 Mitigation to Minimize Rock Fragmentation Impacts during Construction</td>
<td>Project Applicant</td>
<td>Prior to the issuance of any permit for a construction activity that would involve controlled rock fragmentation</td>
<td>DBI</td>
<td>DBI</td>
<td>Approval of permit applications</td>
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### Mitigation Timing

- During controlled rock fragmentation activities
- Approval of corrective measures. Ongoing throughout controlled rock fragmentation activities
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<tr>
<td>MM GE-4a.1 Site-Specific Geotechnical Investigation with Seismic Analyses, Prior to the issuance of any building permits for the Project site:</td>
<td>Project Applicant</td>
<td>Prior to issuance of construction site permit</td>
<td>DBI</td>
<td>DBI</td>
<td>Approval of design requirements for foundations and all other improvements associated with the permit application. Ongoing throughout construction activity</td>
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- The Applicant shall submit to the San Francisco Department of Building Inspection (DBI) for review and approval a site-specific, design-level geotechnical investigation prepared by a California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE), as well as project plans prepared in compliance with the requirements of the San Francisco Building Code (SFBC), the Seismic Hazards Mapping Act, and requirements contained in CGS Special Publication 117A “Guidelines for Evaluating and Mitigating Seismic Hazards in California." In addition, all engineering practices and analyses of peak ground accelerations and structural design shall be consistent with SFBC standards to ensure that structures can withstand expected ground accelerations. The CEG or GE shall determine and DBI shall approve design requirements for foundations and all other improvements associated with the permit application.

- DBI shall employ a third-party CEG and California Registered Professional Engineer (Civil) (PE) to form a Geotechnical Peer Review Committee (GPRC), consisting of DBI and these third-party reviewers. The GPRC shall review the site-specific geotechnical investigations and the site-specific structural, foundation, infrastructure, and other relevant plans to ensure that these plans incorporate all necessary geotechnical mitigation measures. No permits shall be issued by DBI until the...
GPRC has approved the geotechnical investigation and the Project plans, including the factual determinations and the proposed engineering designs and construction methods.

- All Project structural designs shall incorporate and conform to the requirements in the site-specific geotechnical investigations.
- The Project CEG or GE shall be responsible for ensuring compliance with these requirements.

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<tr>
<td>MM GE-4a.2 Seismic Design Compliance Documentation</td>
<td>Project Applicant</td>
<td>Prior to the issuance of building permits for the replacement of the Alice Griffith Public Housing site</td>
<td>DBI/HUD</td>
<td>DBI</td>
<td>Approval of site-specific geotechnical investigations for the replacement of the Alice Griffith Public Housing site.</td>
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<tr>
<td>MM GE-4a.3 Site-specific Seismic Analyses to Ensure Safety of Bridge Design</td>
<td>Project Applicant</td>
<td>Prior to the issuance of building permits for the Yosemite Slough bridge</td>
<td>DPW</td>
<td>DPW</td>
<td>Approval of site-specific geotechnical investigations for the Yosemite Slough bridge</td>
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<td>Project CEG or GE and California Registered Structural Engineer (SE) shall approve bridge design. No building permits shall be issued until the CEG or GE and SE verify that the Project's bridge design complies with all Caltrans specifications and BOE requirements.</td>
<td>Project Applicant/Project Geologist</td>
<td>Prior to issuance of building permits for the Project site</td>
<td>DBI</td>
<td>DBI</td>
<td>Approval of site-specific geotechnical investigations</td>
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<tr>
<td>MM GE-5a Site-Specific Geotechnical Investigation with Analyses of Liquefaction, Lateral Spreading and/or Settlement. Prior to issuance of building permits for the Project site:</td>
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<td>• The Applicant shall submit to the San Francisco Department of Building Inspection (DBI) for review and approval a site-specific, design-level geotechnical investigation prepared by a California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE), as well as project plans prepared in compliance with the requirements of the San Francisco Building Code (SFBC), the Seismic Hazards Mapping Act, and requirements contained in CGS Special Publication 117A “Guidelines for Evaluating and Mitigating Seismic Hazards in California.” In addition, all engineering practices, and analyses of structural design shall be consistent with SFBC standards to ensure seismic stability, including reduction of potential liquefaction hazards.</td>
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<tr>
<td>• DBI shall employ a third-party CEG and California Registered Professional Engineer (Civil) (PE) to form a Geotechnical Peer Review Committee (GPRC), consisting of DBI and these third-party reviewers. The GPRC shall review the site-specific geotechnical investigations and the site-specific structural, foundation, infrastructure, and other relevant plans to ensure that these plans incorporate all</td>
<td>DBI</td>
<td>Prior to approval of site-specific geotechnical investigations</td>
<td>DBI</td>
<td>DBI/GPRC</td>
<td>Approval of site-specific geotechnical investigations</td>
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necessary geotechnical mitigation measures. No permits shall be issued by DBI until the GPRC has approved the geotechnical investigation and the Project plans, including the factual determinations and the proposed engineering designs and construction methods.

- All Project structural designs shall incorporate and conform to the requirements in the site-specific geotechnical investigations.
- The site-specific Project plans shall incorporate the mitigation measures contained in the approved site-specific geotechnical reports to reduce liquefaction hazards. The engineering design techniques to reduce liquefaction hazards shall include proven methods generally accepted by California Certified Engineering Geologists, subject to DBI and GPRC review and approval, including, but not necessarily limited to:

  > Structural Measures
  o Construction of deep foundations, which transfer loads to competent strata beneath the zone susceptible to liquefaction, for critical utilities and shallow foundations
  o Structural mat foundations to distribute concentrated load to prevent damage to structures

  > Ground Improvement Measures
  o Additional over-excavation and replacement of unstable soil with engineering-compacted fill
  o Dynamic compaction, such as Deep Dynamic Compaction (DDC) or Rapid Impact Compaction (RIC), to densify loose soils below the groundwater
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<td>- The Project CEG or GE shall be responsible for ensuring compliance with these requirements.</td>
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<td><strong>MM GE-6a Site-Specific Geotechnical Investigation with Landslide Risk Analyses. Prior to issuance of building permits for the Project site:</strong></td>
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<tr>
<td>- The Applicant shall submit to the San Francisco Department of Building Inspection (DBI) for review and approval a site-specific, design-level geotechnical investigation prepared by a California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE), as well as project plans prepared in compliance with the requirements of the San Francisco Building Code (SFBC), the Seismic Hazards Mapping Act, and requirements contained in CGS Special Publication 117A &quot;Guidelines for Evaluating and Mitigating Seismic Hazards in California.&quot; In addition, all engineering practices, and analyses of structural design shall be consistent with SFBC standards to ensure seismic stability, including reduction of potential landslide hazards.</td>
<td>Project Applicant</td>
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<td>DBI</td>
<td>DBI</td>
<td>Approval of site-specific geotechnical investigations</td>
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<td>- Vibro-compaction, sometimes referred to as vibro-floating, to densify loose soils below the groundwater table</td>
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<td>- Stone columns to provide pore pressure dissipation pathways for soil, compact loose soil between columns, and provide additional bearing support beneath foundations</td>
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<tr>
<td>- Soil-cement columns to densify loose soils and provide additional bearing support beneath foundations</td>
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Mitigation Measure

- DBI shall employ a third-party CEG and California Registered Professional Engineer (Civil) (PE) to form a Geotechnical Peer Review Committee (GPRC), consisting of DBI and these third-party reviewers. The GPRC shall review the site-specific geotechnical investigations and the site-specific structural, foundation, infrastructure, and other relevant plans to ensure that these plans incorporate all necessary geotechnical mitigation measures. No permits shall be issued by DBI until the GPRC has approved the geotechnical investigation and the Project plans, including the factual determinations and the proposed engineering designs and construction methods.

- All Project structural designs shall incorporate and conform to the requirements in the site-specific geotechnical investigations.

- The site-specific Project plans shall incorporate the mitigation measures contained in the approved site-specific geotechnical reports to reduce landslide hazards. The engineering design techniques to reduce landslide hazards shall include proven methods generally accepted by California Certified Engineering Geologists, subject to DBI and GPRC review and approval. The design-level geologic and geotechnical studies shall identify the presence of landslides and potentially unstable slopes and shall identify means to avoid the hazard or support the design of engineering procedures to stabilize the slopes, as required by Chapter 18 (Soils and Foundations) of the SFBC, as well as the procedures outlined in CGS Special Publication 117A. SFBC Sections 1803 through 1812 contain the formulae, tables, and graphs by which the

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<tr>
<td>Project engineer shall develop the Project’s slope-stability specifications, including the appropriate foundation designs for structures on slopes and which would be used by DBI to verify the applicability of the specifications. If the presence of unstable slopes is identified, appropriate support and protection procedures shall be designed and implemented to maintain the stability of slopes adjacent to newly graded or re-graded access roads, work areas, and structures during and after construction, and to minimize potential for damage to structures and facilities at the Project site. These stabilization procedures, including, but not necessarily limited to, the following:</td>
<td>Project Applicant</td>
<td>Prior to issuance of building permits for the Project site</td>
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<td>DBI/GPRC</td>
<td>Approval of site-specific geotechnical investigations</td>
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<td>- Retaining walls, rock buttresses, screw anchors, or concrete piers</td>
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<td>- Slope drainage or removal of unstable materials</td>
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<td>- Rockfall catch fences, rockfall mesh netting, or deflection walls</td>
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<td>- Setbacks at the toe of slopes</td>
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<td>- Avoidance of highly unstable areas</td>
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**MM GE-10a** Site-Specific Geotechnical Investigation with Expansive Soils Analyses. Prior to issuance of building permits for the Project site:

- The Applicant shall submit to the San Francisco Department of Building Inspection (DBI) for review and approval a site-specific, design-level geotechnical investigation prepared by a California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE), as well as project
Mitigation Measure shall identify the presence of expansive soils and conform to the requirements in the site

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<td>DBI/GPRC</td>
<td>Approval of site-specific geotechnical investigations</td>
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The means to avoid the hazard or support the design of engineering procedures to stabilize the soils, as required by Chapter 18 (Soils and Foundations) of the SFBC. SFBC Sections 1803 through 1812 contain the formulae, tables, and graphs by which the Project engineer shall develop the Project’s soil-stability specifications, including the appropriate foundation designs for structures on expansive soils and which would be used by DBI to verify the applicability of the specifications. If the presence of expansive soils is identified, appropriate support and protection procedures shall be designed and implemented to maintain the stability of soils adjacent to newly graded or re-graded access roads, work areas, and structures during and after construction, and to minimize potential for damage to structures and facilities at the Project site.

- The Project CEG or GE shall be responsible for ensuring compliance with these requirements.

**MM GE-11a** Site-Specific Geotechnical Investigation with Corrosive Soils Analyses, Prior to issuance of building permits for the Project site:

- The Applicant shall submit to the San Francisco Department of Building Inspection (DBI) for review and approval a site-specific, design-level geotechnical investigation prepared by a California Certified Engineering Geologist (CEG) or California Registered Geotechnical Engineer (GE), as well as project plans prepared in compliance with the requirements of the San Francisco Building Code (SFBC). In addition, all engineering practices, and analyses of structural design

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<td>Project Applicant</td>
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<td>DBI</td>
<td>DBI/GPRC</td>
<td>Approval of site-specific geotechnical investigations</td>
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Mitigation Measure shall be consistent with SFBC standards to ensure soils stability, including reduction of potential hazards from corrosive soils.

- DBI shall employ a third-party CEG and California Registered Professional Engineer (Civil) (PE) to form a Geotechnical Peer Review Committee (GPRC), consisting of DBI and these third-party reviewers. The GPRC shall review the site-specific geotechnical investigations and the site-specific structural, foundation, infrastructure, and other relevant plans to ensure that these plans incorporate all necessary geotechnical mitigation measures. No permits shall be issued by DBI until the GPRC has approved the geotechnical investigation and the Project plans, including the factual determinations and the proposed engineering designs and construction methods.

- All Project structural designs shall incorporate and conform to the requirements in the site-specific geotechnical investigations.

- The site-specific Project plans shall incorporate the mitigation measures contained in the approved site-specific geotechnical reports to reduce potential hazards from corrosive soils. The engineering design techniques to reduce corrosive soils hazards shall include proven methods generally accepted by California Certified Engineering Geologists, subject to DBI and GPRC review and approval. The design-level geologic and geotechnical studies shall identify the presence of corrosive soils and shall identify means to avoid the hazard, as required by Chapter 18 (Soils and Foundations) of the SFBC. SFBC Sections 1803 through 1812 contain the formulae, tables, and graphs by which the

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<td>DBI</td>
<td>Prior to approval of site-specific geotechnical investigations</td>
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<tr>
<td>Project engineer shall develop the Project's structural design specifications, including the appropriate foundation designs for structures on corrosive soils and which would be used by DBI to verify the applicability of the specifications. If the presence of corrosive soils is identified, appropriate protection procedures shall be designed and implemented to minimize potential for damage from corrosive soils to structures and facilities at the Project site.</td>
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<td>• The Project CEG or GE shall be responsible for ensuring compliance with these requirements.</td>
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Attachment 19

City Permitting and City Maintenance of Public Property
Attachment 19
City Permitting and City Maintenance of Public Property

This attachment explains the City permit process that will apply to all development at the Shipyard and the role the City will have in maintaining public property once development is complete.

Overview

Prior to transfer of property from the Navy to the City at the Shipyard, the Navy will complete the remedial action plan for the property under CERCLA (Attachment 3), place environmental restrictions on the property through the recording of deed restrictions and enter into a CRUP with the DTSC. Through these documents, the environmental restrictions will run with the land and bind all future property owners. It is expected that these restrictions will, among other requirements, prohibit disturbance of the durable covers (i.e. hardscape or two feet of clean imported fill) placed on the property by the Navy and prohibit extraction of groundwater unless undertaken in a manner that complies with procedures approved by the signatories to the FFA between the Navy, USEPA, DTSC and RWQCB (hereinafter collectively referred to as the "FFA Signatories"). Under some circumstances, such as disturbance of less than an acre of soil, it is anticipated that property owners would be authorized to perform subsurface work if done in accordance with procedures in a Risk Management Plan (RMP) approved by the FFA Signatories and incorporated into the CRUP. In other circumstances, such as disturbance of more than an acre of soil, it is anticipated that the FFA Signatories will approve specific work plans submitted by the party wishing to undertake the work.

Complementing the regulatory scheme established by the FFA, deed restrictions and CRUP, the City requires anyone who disturbs soil or the durable cover placed on the property by the Navy as part of its CERCLA remedial action plan to provide proof that construction plans comply with the environmental restrictions before obtaining any subsurface work permit from the City of San Francisco Health Code Article 31, Health Code Section 804, Health Commission Regulations Under Article 31, Building Code Section 106A.3.2.5, S.F. Public Works Code Section 2.3.1, and Subdivision Code Sections 1645 and 1646). Once permits are issued, the City has authority to enforce the permit requirements. Before closing out the permits, the City has a process for assuring that the structures or public improvements were constructed in accordance with code requirements, which assure that any building foundations, streets, parks or other "soil covers" also satisfy the cover requirements that apply under the environmental restrictions. Finally, at the conclusion of the development, the City will own all streets and sidewalks and most public open space areas, which it will maintain. These City mechanisms will assure an additional level of oversight during any development activities that will complement the oversight provided by the Navy and Regulatory Agencies.
City Construction Permit Process

Permit Application Review and DPH Oversight Once Approved

During the development process at the Shipyard, a developer, contractor, property owner, or other person developing a site is required by the San Francisco Building, Public Works, and Health Codes to obtain permits to engage in subsurface work and to satisfy the SFDPH that the work will be done in accordance with environmental restrictions placed on the property through the CERCLA process. Persons wishing to develop property at the Shipyard are required to apply for:

1. A permit at the DBI to build a structure or to excavate or grade a site for a structure that requires a building permit under the San Francisco Building Code or;

2. A permit at the Department of Public Works (DPW) to excavate, grade or construct in any current or proposed public right of way area (e.g. proposed streets, sidewalks and parks) under the San Francisco Public Works Code and San Francisco Subdivision Code or;

3. A permit at SFDPH to install an underground storage tank or to install a groundwater well (i.e. for construction dewatering) under the San Francisco Health Code.

Under Article 31 of the Health Code, permitted activities described above involving the disturbance of soil at the Shipyard require the permit applicant (Applicant) to obtain approval of various plans under Article 31 to assure that environmental restrictions and conditions are appropriately taken into account during the permitted activities. Only after the Applicant receives approval of the required plans and meets all other permit requirements, will the Applicant receive approval to begin the building, grading or other permitted activity.

Health Code Article 31 and Health Commission implementing regulations specify details for the required plans and reports, including the preparer’s qualifications. The following required evaluations, plans, and reports are specified in the ordinance and regulations and will be required for Shipyard property with a durable cover restriction:

- Site Evaluation Report containing project description information;
- Evaluation of areas within a thousand feet of the Parcel E-2 landfill
- Dust Control Plan;
- Disposal Plan for removal of soil or other material from the site;
- HASP for worker health and safety;
- Soil Importation Plan, if applicable;
- An Unknown Contaminant Contingency Plan containing information about what to do in the event of the discovery of unknown contamination or unexpected conditions;
- A Foundation Support Piles Installation Plan for areas where piles will be driven into artificial fill materials (this would apply to all areas that are not on bedrock);
- Closure Report confirming implementation of the required plans;

---

8 Only construction of a few types of structures do not require a permit, such as a fence not more than 6 feet tall and a small storage shed.
• Proof of compliance with the specific institutional controls listed in any transfer document that may contain institutional controls such as the deeds, Land Use Control Remedial Design (LUC RD), RMPs, or CRUP.

Under Health Code Article 31, if a RMP for the property has been approved that includes approved a DCP, HASP, or Soil Importation Plan, then the Applicant can submit copies of those plans and approval letters from EPA to meet the submittal requirement for those plans. If the EPA approved DCP does not include specifics about particulate monitoring then the Director can require that information to be submitted.

For Parcel A and D-2 that are designated by the Navy as suitable for unrestricted residential reuse with no durable cover requirement, there are a few additional items and/or plans required to be submitted, as applicable, prior to obtaining a permit or closure of permit. These Parcel A and D-2 specific requirements are:

• In most cases, areas on Parcel A and D-2 may meet a 50 cubic yard soil disturbance exclusion because the area is suitable for unrestricted residential use.

• If demolition of LBP impacted structures is planned, then the Applicant is required to submit a Scope of Work to Collect Additional Information related to the potential concern about LBP in soil. Proof of implementation of the approved plan is also required as part of the Closure Report process.

• Submittal of a Serpentinite Cover Plan to address the requirement for one foot of clean fill, vegetative cover that holds soil in place or hardscape over areas containing serpentinite fill (which is presumed to contain NOA).

• Additional information may need to be included in a Site Evaluation Report if the area of soil disturbance does not have a previously approved Closure Report that included an approved Serpentinite Cover Plan unless concerns about NOA have been addressed. The additional information required for the Site Evaluation Report may include a site history, data evaluation, sampling, or additional characterization information.

Once the applicable plans are approved the Applicant is required to implement the plans during their work. In the case of some plans, like the Soil Importation Plan, the implementation is relatively simple. Prior to bringing imported soil or sand to the site the applicant tests the material to verify that it passes the import criteria. By contrast the implementation of the DCP on Parcel A requires daily control and monitoring activities. Some of the activities include watering work areas prior to and during excavation, running particulate monitors, submitting the daily particulate record to SFDPH and noting if any particulate was recorded above an action level or if there are any problems with the particulate monitoring. DPH reviews these records to verify proper implementation and to determine if there are any dust control problems. In the case of Parcel A, DPH also receives the airborne asbestos monitoring results and reviews those results.

City Enforcement during Permitted Activity

While the grading, excavation or construction is in progress and prior to issuance of certificates of occupancy or completion, SFDPH, DBI and DPW have many enforcement mechanisms at their disposal.

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Department of Public Health

SFDPH has a range of enforcement mechanisms that can be used under Article 31 of the Health Code. SFDPH can respond to community complaints and conduct inspections to verify that the Applicant is complying with its approved plans. In addition, since proof of compliance with the institutional controls for the property (such as compliance with the RMP) are included as a requirement under Article 31, SFDPH can use its enforcement mechanisms under Article 31 for these requirements too. In addition to responding to complaints and conducting inspections, SFDPH can issue Notices of Violation, require the Applicant to stop work for a specified period of time, require the Applicant to attend a Director’s Hearing, issue cleanup and abatement orders, impose administrative civil penalties or ask the City Attorney to pursue injunctive relief.

As an example, SFDPH employed all of the following enforcement mechanisms during the mass grading project at Parcel A:

- Responded to community complaints by conducting inspections;
- Conducted random unannounced inspections ranging from monthly to weekly to daily;
- For a certain period of time, conducted continuous daily inspections;
- Issued Notices of Violation for DCP violations with requirements for increased control, mitigation, monitoring or reporting;
- Required the Applicants to stop work for a specified period of time to identify and implement additional dust mitigation measures.

Departments of Building Inspection and Public Works

Because the SFDPH approvals are incorporated as part of the DBI and DPW permit, SFDPH can ask DBI and DPW to use their enforcement mechanisms or DBI and DPW can act in their own capacity. The enforcement mechanisms for DBI and DPW include responding to community complaints, conducting inspections, issuing Notices of Violation, imposing penalties for permit violations, requiring the Applicant to stop work for a specified period of time until violations are corrected or requiring the Applicant to attend a Director’s Hearing.

City Process for Closing Permits

In the case of building permits, when the work is complete and the relevant departments verify that their requirements are met, DBI issues a temporary certificate of occupancy or a final occupancy permit. Before DBI will issue a certificate of occupancy for any building, the departments that were required to review the permit for applicable code requirements and sign the permit prior to DBI permit issuance are asked to verify that all permit requirements were met.

To construct public improvements, developers typically will obtain a DPW street improvement permit. When DPW issues such permits, it consults with any interested department and once the construction is done, the departments that imposed requirements will inspect the improvements to confirm that the requirements are satisfied before DPW will issue a notice of completion. DPW also oversees the subdivision mapping process and approves infrastructure.
requirements, including public improvement agreements, which will set out the specific public improvements required to be constructed to support a particular subdivided area.

In the case of SFDPH’s authority under Article 31, SFDPH will not approve closure of a DPW permit or certificate of occupancy for a DBI permit or until it has approved the related Article 31 permitted activity. For instance, in the past SFDPH was asked to sign off on closure of DBI permits for demolition of LBP impacted structures on Parcel A. In that process, SFDPH verified that closure reports related to soil sampling for LBP had been approved by SFDPH. For final closure of DPW and DBI permits, Article 31 and its implementing regulations require the closure report submitted by the Applicant to include:

- proof of compliance with institutional controls listed in the deed, CRUP or RMP to the extent that the institutional controls apply to the activities authorized by the permit;
- proof of implementation of all approved plans (listed above) and any changes made during implementation of the plans;
- certification by a registered professional that has overseen the compliance with approved plans.

**City Acceptance of Streets and Parks in the Candlestick Point-Shipyard Project**

If the City is going to own public improvements constructed by a developer it must accept them as having satisfied the requirements for public improvements under the Subdivision Code. The City goes through a formal acceptance process by adopting an ordinance to accept improvements or property containing the improvements. If the public improvements are to be in new public right of way areas, the approving ordinance will specify the nature of the public right of way and designate the area as such. Under the Subdivision Map Act and the Shipyard Subdivision Code, the Developer will be required to bond for the improvements and that security will not be released until the work is completed and approved by the City. The City will not accept public improvements until it confirms that the improvements have been constructed in accordance with code requirements and approved plans.

**Subsequent Permitting Once Initial Construction is Complete**

Once the Shipyard site is developed with new structures, streets, sidewalks and parks, alterations to property might be undertaken, such as modifying or building new structures or excavating in streets or parks. These kinds of activities will require going back through the DBI or DPW permit process and, if soil is being disturbed, through the SFDPH Article 31 process. All property under DPW permit jurisdiction (e.g. public right of way) would be required to obtain DPW permits for any excavation.

After initial redevelopment construction is complete, all subsequent activities that require subsurface disturbance will require City permits with the exception of minimal landscaping activities on private property (or other property not under the jurisdiction of DPW) that would not involve construction of any structure under DBI jurisdiction.
**City Property Maintenance**

At the conclusion of initial redevelopment, the City would expect to own and maintain all of the major public parks and all streets, sidewalks and utilities in street areas classified as retail streets, boulevard park streets or local streets in the Shipyard Design for Development. In the case of accepted City street areas, the City maintains the street and adjacent property owners are responsible for maintaining sidewalks, for which permits for work are required. Generally, adjacent owners are also responsible for maintaining street trees; removal and replacement of street trees also are subject to City permit requirements. The Design for Development identifies some additional public amenities that are required that would be open to the public but held in private ownership and maintained by the private owner of the property. These include mid-block breaks (public easements over private property used as pedestrian mews or vehicular alleyways) and public plazas and pocket parks in specified areas.

**Summary**

As part of the initial development, the developer will have to comply with many environmental restrictions during construction that involves subsurface disturbance through permits issued and overseen by DBI, DPW and SFDPH. Work that does not involve subsurface disturbance but involves construction of structures will additionally be overseen by DBI.

During subsequent rounds of construction, any construction of new or modification of old structures will require permits from DBI and any excavation of public right of way areas (expected to include all streets, sidewalks and parks) will require permits from DPW. In either case, subsurface excavations would be subject to the Health Code Article 31 process and oversight by SFDPH.

Once construction is complete, the City will own and maintain accepted public streets and sidewalks and all of the major public parks. Only mid-block breaks, small plazas and small pocket parks will be held privately.

Therefore, the activities that are subject to public agency oversight are:

- Construction and maintenance activities that require SFDPH, DBI or DPW permits;
- All activities carried out on public property (streets, sidewalks, parks), including long term maintenance.
Attachment 20

Summary of Prior Dust Issues
Attachment 20
Summary of Prior Dust Issues

Between 2006 and 2010, concerns were expressed about dust and asbestos fibers generated during grading and infrastructure construction at Parcel A. The SFDPH and its outside consultants have carefully studied the potential health impacts of the dust particulates and naturally occurring asbestos disturbed during grading activities on Parcel A. As explained in a memorandum dated February 1, 2007, from Dr. Rajiv Bahtia, the medical director of SFDPH's Environmental Health Section (Exhibit 20-1), SFDPH consulted the Chief of the Epidemiological Investigations Unit at the California Department of Health Services (DHS) to determine appropriate investigations to assess the impacts on area residents of exposure to the construction dust generated on Parcel A. SFDPH also retained an independent environmental consultant (Treadwell & Rollo) and an industrial hygiene expert (Acumen Industrial Hygiene) to address the same issues (Exhibit 20-2). All of these expert sources confirmed SFDPH's conclusion that, given the limited exposure periods and low levels that could have occurred at the Shipyard, it is highly unlikely that exposure to naturally occurring asbestos from the grading operations on Parcel A posed an endangerment to human health. This conclusion applies even if "worst case" assumptions are made about the period when Lennar's air monitors were not functioning during the summer of 2006.

SFDPH also sought guidance from CDPH as to whether there were any medically accepted tests that could address community concerns. CDPH confirmed SFDPH's assessment that non-invasive testing (e.g. x-rays, blood tests) for asbestos in humans does not exist and invasive testing (e.g. lung biopsy) is not routinely available or recommended. In addition, SFDPH consulted with the ATSDR and they too confirmed that there are no tests for asbestos in humans and that adequate air monitoring is the recommended method to assess exposure (Exhibits 20-3 and 20-4).

On October 29th, 2007, the BAAQMD held a hearing on the Shipyard dust issue. Although the BAAQMD Board instructed staff to consider fining Lennar for violations related to the failure of Lennar's monitors in the Summer of 2006 (BAAQMD later did fine Lennar for this monitoring failure), the BAAQMD reiterated that the “action” levels set for the Shipyard are “conservative and health protective and provide a significant margin of safety” and that the risk from estimated exposures at the Shipyard are less than 3 in 1,000,000, well within BAAQMD’s health standards. A copy of BAAQMD’s presentation is attached as Exhibit 20-5.

The analyses of several independent experts have provided further support of the judgments of the SFDPH, CAL-OSHA and BAAQMD that the construction work on Parcel A did not represent a significant long-term health risk to the community or workers.

In September 2007, one of the country's leading public health experts on issues related to asbestos exposures and other environmental health matters, Dr. John Balmes of the University of California at San Francisco, concluded that he "agreed[d] with SFDPH that it is unlikely that exposure to naturally occurring asbestos from grading operations on
Parcel A will create a significant risk to human health in the community”. Dr. Balmes based his conclusion, in part, on the fact that the shut-down (or “exceedance”) levels set by BAAQMD were set so low as to be “designed to be health protective and ensure a low risk even assuming a person would be exposed to certain levels of asbestos on a continual and ongoing basis for 70 years (emphasis added). Here by contrast, the grading period was less than eighteen months and the air monitoring data shows that the average level of asbestos was significantly lower than the amount that is thought to pose a risk of long-term injury.” Dr. Balmes presented his findings at workshop hosted by the CAC in September 2007 and a copy of his report is attached as Exhibit 20-6.

The ATSDR, working with the CDPH, also completed its analysis of the dust issue at the Shipyard in September 2007. The CDPH performed the substantive analysis in the report and concluded that “even a 7-year exposure to the levels of asbestos measured around the excavation was estimated to have risks that, on personal level, would be considered low. When one considers that the exposures [at the Shipyard] have occurred over the course of a year or two, the estimated risk would be even lower.” The report also concluded that individual medical testing, including blood and radiological testing, is not warranted or recommended. A copy of the CDPH’s substantive report is attached as Exhibit 20-3.

The CDPH report did, however, stress that as a matter of good public health policy, less dust is better, and, thus, the CDPH made a series of recommendations to further improve dust control at the site. Those recommendations included additional independent oversight, and public outreach. The City agreed with CDPH’s focus on further minimizing dust and implemented many of CDPH’s recommendations. A copy of SFDPH’s 2007 response letter to the ATSDR and CDPH outlining the City’s plans to implement those recommendations is attached as Exhibit 20-7. In 2009, USEPA conducted a data review of the construction and the airborne asbestos monitoring. They also conducted a reanalysis of 34 of the airborne asbestos samples that were collected at the site. Their reanalysis included several of the highest airborne asbestos readings that have ever been detected at the site. The re-analysis took into consideration the types and lengths of asbestos fibers found in the samples. USEPA issued a final report of their work in June 2010 which is attached as Exhibit 20-8. Their analysis was biased to the highest detections of airborne asbestos at the site since the majority of the samples analyzed from the site have detected no airborne asbestos or much, much lower levels than the 34 samples that were reanalyzed. Their conclusion is that the Dust Monitoring Program and the BAAQMD monitoring procedures are operating in an effective manner in minimizing dust generation and limiting asbestos exposure.

In summary, the following agencies have reviewed the dust and airborne asbestos monitoring and control systems in place at the Shipyard Parcel A Redevelopment:

- San Francisco Department of Public Health
- Bay Area Air Quality Management District
- California Department of Public Health
Agency for Toxic Substances and Disease Registry
United States Environmental Protection Agency

These Agency reviews suggested improvements to the dust monitoring and control and the majority of these suggestions were implemented. None of these agencies recommended shutting down the construction or suggested that the prior grading or excavation work created a substantial or long-term health risk. As the attached letter from the CAC states, the conclusions of these regulators and health experts at this point in time should be considered “definitive” (Exhibit 20-9).
Exhibit 20-1

Informational Memorandum to SFRA regarding Monitoring the Enforcement of Dust Control Measures and the Evaluation of Health Concerns Related to Phase I Construction, from SFDPH, February 2007
INFORMATIONAL MEMORANDUM

DATE: February 1, 2007

TO: Marcia Rosen, Executive Director, San Francisco Redevelopment Agency

FROM: Rajiv Bhatia, Medical Director, Environmental Health Section

PURPOSE OF INFORMATION

The San Francisco Redevelopment Agency Commission has expressed an interest in closely monitoring the enforcement of dust control measures and the evaluation of health concerns related to the Hunters Point Shipyard Phase I construction. This memo provides an update on the San Francisco Department of Public Health (SFDPH) activities related to these issues.

Overall SFDPH has two priority objectives

- Ensuring effective compliance with required dust control plans in order to prevent resident exposure to both particulate matter and specific constituents in dust.
- Responding to community concerns regarding the safety of development activities via public communication, assessment of environmental hazards, and individual health assessments.

SFDPH is currently involved in several related activities to achieve the above objectives. Updates on each of these activities are provided below.

Enhancing Dust Control Plan Compliance Activities

Over the course of the Parcel A Phase I redevelopment project, SFDPH has responded to public complaints about the dust control issues at the site. These complaint inspections have involved inspecting the site, working with Lennar to correct the source of the complaint and citing Lennar when the problem was a violation of the DCP. In addition, because of the problems that have occurred with dust control, SFDPH has conducted regular random compliance inspections to verify Lennar’s compliance with their DCP.

As a result of continued community concerns, SFDPH has initiated a new program of daily unannounced compliance inspections to monitor Lennar’s
compliance with their DCP. These inspections are scheduled at two independent random times per day. These formal inspections are in addition to the regular random compliance inspections that were occurring and will continue to occur when the on-site SFDPH inspector drives to and from his Shipyard office during the course of his other daily activities.

Enhancing the Dust Control Plan

SFDPH has informed Lennar verbally and in writing on a number of occasions that their dust control efforts needed improvement. SFDPH has proposed revisions to the DCP to enhance clarity and specificity of roles and required actions. We intend to finalize the revisions to the DCP no later than the week of February 12. As a public document, copies of the revised plan will be sent to interested parties.

Facilitating BAAQMD Oversight for Community Monitoring Locations

On Tuesday, January 23, 2006, SFDPH received an email from the Bay Area Air Quality Management District (BAAQMD) stating that the community monitoring locations would not be subject to BAAQMD enforcement authority. These community monitoring locations were voluntarily installed by the Agency’s consultant, Treadwell and Rollo, with the intent of being used by Lennar as part of their asbestos air sampling network subject to the work suspension requirements. Lennar has consistently directed their subcontractor to suspend work when the community monitoring locations have exceeded the work suspension number.

In the interest of having all monitoring locations subject to the same enforcement procedures, SFDPH sent a letter on January 25, 2007 to BAAQMD asking that the community monitoring locations be added to Lennar’s required asbestos monitoring sites subject to BAAQMD enforcement. SFDPH also requested that BAAQMD specifically review the data from Wednesday, January 10 and take appropriate enforcement action. BAAQMD has acknowledged receipt of these requests.

Responding to Health Concerns of Students and Staff of the Muslim University of Islam School (the “School”)

SFDPH believes that direct communication with concerned individuals is an important component of response to community concerns about environmental hazards. SFDPH maintains its willingness to meet with parents, students and staff of the School; however, School staff has not responded to continued offers by SFDPH to schedule such a meeting.
Conducting Health Evaluations of Students from the School

At the January 3, 2007 meeting, attended by the San Francisco Redevelopment Agency (the “Agency”), the School and two Agency Commissioners, representatives from SFDPH made a commitment to conducting scientifically appropriate health evaluations of any individual who had health concerns related to exposure at the School. Subsequently, Dr. Rajiv Bhatia sent a draft protocol for assessing the children’s health to Dr. Alim Muhammad on January 9, 2007. Dr. Muhammad acknowledged his receipt of the draft protocol today and has indicated he will send a detailed response in the next week or so. SFDPH is willing to implement this protocol but will need the assistance of the School to identify concerned parents and children. Delay in implementing the protocol may adversely affect the ability of the evaluation to assess the relationship between health concerns and the exposure concerns.

Dr. Bhatia has contacted the Chief of the Epidemiological Investigations Unit at the California Department of Health Services (“DHS”), Environmental Health Investigations Branch for advice and recommendations as to the components of a health assessment. SFDPH specifically asked what tests might be appropriate and provide useful information in this exposure context. DHS did not recommend any biological, laboratory, or radiological testing. They also felt that it is unlikely that risk assessments would yield useful results due to the limited duration of the exposure.

Conducting an Assessment of Exposures at the School to Airborne Naturally Occurring Asbestos (NOA) Generated during Grading Activity

At the January 3, 2007 meeting with the School’s administrators, SFDPH agreed to review all the asbestos air sampling and particulate monitoring data collected from Parcel A and the School and use this information to estimate an upper limit of likely exposures to NOA at the School for the period covering April 25, 2006 through August 2, 2006. While definitive conclusions are difficult for the time period with no data, it is possible to use existing data to try and make an educated scientific guess about the upper limit to the possible NOA exposures. DPH is currently working with Treadwell and Rollo, the Agency’s environmental consultants, on an internal draft of this assessment. A draft for public review will be available no later than the week of February 12.

Notifying the School of all Exceedances of NOA Work Suspension Thresholds

SFDPH made a commitment to communicate all NOA exceedances to the School. Ms. Brownell from SFDPH has telephoned and emailed Dean Leon Muhammad whenever Lennar has had an exceedance of the asbestos air sampling work suspension level and informed him of the required work suspension. She has also continued to work with him on any complaints or questions that he has had about Lennar’s work.
Exhibit 20-2

Memorandum to All Interested Parties regarding Assessment of Exposure to Airborne Asbestos at Parcel A, from SFDPH, February 2007
DATE: February 15, 2007

TO: All Interested Parties

FROM: Rajiv Bhatia, Medical Director

SUBJECT: Assessment of Exposure to Airborne Asbestos at Hunters Point Shipyard Parcel A’ Lennar BVHP Redevelopment Project

Attached is an assessment conducted by Treadwell and Rollo on behalf and in close consultation with staff of the San Francisco Department of Public Health. This assessment evaluates airborne asbestos exposure for residents, students and workers adjacent to the Hunters Point Shipyard Parcel A’ Lennar BVHP Redevelopment Project. Naturally occurring serpentinite rock on the project site contains naturally occurring asbestos. Asbestos air samples were required to be collected during the mass grading of this project to monitor the levels of naturally occurring asbestos. Due to a problem with Lennar’s asbestos air sampling, there are no verifiable asbestos air samples for the project from April 25 (the start of mass grading) through August 2, 2006. Asbestos air samples have been reliably collected since August 3, 2006 on days when excavation activities have been conducted. The attached analysis was conducted to assess the possible exposure to airborne asbestos during the gap in sampling at the beginning of the project and throughout the life of the project.
MEMORANDUM

This memorandum presents Treadwell & Rollo, Inc. and Acumen Industrial Hygiene’s comments on the potential for community exposure to airborne asbestos related to grading and excavation work conducted by Lennar contractors at Parcel A’ in areas where serpentinite rock containing naturally occurring asbestos (NOA) is present.

Memorandum Summary

To evaluate the potential for community exposure to airborne asbestos near the Parcel A’ grading operations, Treadwell & Rollo completed the following:

- Reviewed the Asbestos Hazard Emergency Response Act (AHERA) methodology for air sampling;
- Compared the AHERA and worker personal monitoring methodology;
- Reviewed and compared the existing particulate and asbestos monitoring data;
- Estimated a possible “worst-case” exposure to asbestos; and
- Compared the worst case exposure to existing health based standards.

The AHERA methodology used for the ambient air asbestos sample collection was developed for use in clearing school buildings for rehabilitation following asbestos abatement work. Under AHERA, the affected areas of a school can be reoccupied if results for air samples collected within the buildings are 20,000 structures per cubic meter or do not exceed results for samples collected outside the buildings.

Workers represent the population who experience the greatest and most direct hazards from the activity of concern due to the higher concentration of NOA and longer duration of exposures. Although results from the AHERA method and the phase contrast microscopy (PCM) method used to analyze worker personal samplers are not comparable, there have been no exceedances of worker asbestos criteria for Lennar’s worker personal sampler results.

No correlation was found to exist between the asbestos and particulate data sets, i.e. high dust levels do not correlate to high asbestos levels and vice versa. Thus, particulate measurements can not be used to derive airborne asbestos levels for a period when there is no asbestos sampling data.

Based on the analysis of the asbestos air sampling data, the predicted worst case average asbestos air concentration for individuals at the Muhammad University of Islam School is 6,609 structures per cubic meter (sampling location HV-5) and the worst case average asbestos air concentration for any adjacent resident, student or worker is 5,403 structures per cubic meter. This exposure can be compared to the Bay Area Air Quality...
Management District (BAAQMD) work suspension level of 16,000 structures per cubic meter which predicts an increased risk for asbestos cancers of one in ten thousand if exposed continuously for 70 years.

Background

The grading work occurring on Parcel A’ is regulated by three agencies: the San Francisco Department of Public Health (SFDPH) has authority over dust control per Health Code Article 31; the Bay Area Air Quality Management District (BAAQMD) has authority over asbestos in air via the Asbestos Dust Mitigation Plan (ADMP) and by requiring a conservative work suspension level for air sampling results; and the California Occupational Health and Safety Administration (Cal OSHA) regulates worker protection. The BAAQMD asbestos work suspension level of 16,000 structures per cubic meter (s/m³) is based on the increased likelihood of getting asbestos cancers (asbestosis, lung cancer, and mesothelioma) if an individual is exposed to this level continuously for a 70-year period. Work suspension based on exceedance of this level is intended to prevent resident exposure to asbestos for a significant duration of time.

Significant earthwork began on 25 April 2006. Lennar’s environmental consultant began monitoring particulates in air for dust control on 28 June 2006. Lennar monitored asbestos in air for BAAQMD compliance from the beginning of the project; however Lennar’s consultant CH2MHill discovered problems with the asbestos air monitoring data through 2 August 2006. Therefore, verifiable asbestos air monitoring data are only available starting 3 August 2006.

Because of these problems with lack of asbestos air monitoring data for three months, enhanced community monitoring protocols were developed to provide independent monitoring of Lennar’s activities. In mid-September, SFDPH and the San Francisco Redevelopment Agency’s (SFRA) environmental outreach consultant, ArcEcology, proposed the following protocols to Lennar:

- Independent monitoring at three new in-neighborhood community air sampling stations;
- Establish one additional monitoring station on the Shipyard near Building 101/110; and
- Acceptance of a protocol where exceedances at community monitoring locations would trigger a work suspension.

Lennar began monitoring at the additional locations on 5 December 2006. SFRA’s consultant, Treadwell & Rollo, began monitoring at the additional community locations on 21 December 2006. Asbestos and particulate monitoring locations are shown on the attached Figure 1. All available verifiable data from all asbestos and particulate monitoring locations were evaluated in this exposure assessment.
Asbestos Hazard Emergency Response Act (AHERA) Methodology

The Asbestos Hazard Emergency Response Act (AHERA) method using transmission electron microscopy (TEM) is used for the asbestos air sample collection and analysis. The AHERA method was developed for asbestos abatement carried out in schools and is subject to regulations under the AHERA rule of 1986. The AHERA rule (40 CFR Part 763) specifies a bifactorial process for determining when an asbestos abatement site is clean enough for the primary containment barriers to be removed. The process consists of a thorough visual inspection of surfaces for debris, residue, or dust to establish that a "no dust criterion" has been achieved. After the abatement site has passed a thorough visual inspection, air samples are collected under aggressive sampling conditions; i.e., air blowers are used to dislodge fibers from surfaces and circulating fans keep the fibers suspended during sampling. The air samples are analyzed by TEM. If no visible debris, residue, or dust is detected by the unaided eye, the site is more likely to pass the TEM clearance air test specified in the AHERA rule. Clearance for re-habitation of the building is given if results for samples collected within the building are not statistically above levels outside the containment or building (using a z-test) or the fiber loading is less than or equal to 70 structures per square millimeter (s/mm²) of filter area. The TEM AHERA method could pass clearance with levels of 20,000 s/m³ (0.02 s/cc), inside a school, based on the minimum sample volume of 1,200 liters and fiber loading of 70 s/mm². The CARB Modified AHERA method uses a much larger volume (~3,000 liters) for the ambient air to reach the required analytical sensitivity of 1,000 s/m³ (0.001 s/cc), and the work suspension level is 16,000 s/m³ (0.016 s/cc).

Asbestos Air Sampling and Worker Personal Monitoring Data Comparison

The AHERA TEM and phase contrast microscopy (PCM) methods are very different. The PCM method is used to analyze worker personal samples using a much smaller volume (~400 liters) and the limit of detection would be about 0.1 fibers per cubic centimeter (f/cc) or 100,000 fibers per cubic meter (f/m³). PCM also uses a Light Microscopy to identify fibers greater than 5 microns which may or may not be asbestos fibers, whereas the TEM AHERA method uses a larger volume (~3,000 liters) for the ambient air samplers to identify small structures down to 0.5 microns. Because the AHERA method uses TEM, it identifies actual asbestos; however the AHERA method counts fibers that are bound to particles, whereas PCM would not. Although not every regulatory agency agrees, the >5 micron fiber length represents current scientific consensus that attributes cancer-causing potential to long (>5 microns) fibers.

Although the worker and ambient air results are not directly comparable, there have been no exceedances of worker protection criteria for PCM results from the Lennar worker personal samplers. Worker exposure is relevant to the assessment of exposures adjacent to the site because workers represent a population who experience the greatest and most direct hazards from the activity of concern, both in terms of concentration of NOA and duration of exposures.
Asbestos Air Sampling and Particulate Sampling Data Comparison

Due to problems with the initial asbestos air sampling, there are no verifiable asbestos air sampling data from the start of grading 25 April through 2 August 2006. There is particulate data for part of this time period from 28 June through 2 August and there is both asbestos air sampling and particulate monitoring data available from August through the present day. If a relationship exists between particulate and asbestos air sampling data then asbestos levels during the time period from 28 June to 2 August 2006 could be estimated based on the particulate measurements.

The correlation coefficient is a statistical measure of the relationship between two sets of data. The calculations were performed using Microsoft® Excel™ which takes the covariance of the two data sets and divides by the product of their standard deviations. Correlation is a bivariate (two variables) measure of association (strength) of the relationship between two variables. It varies from 0 (random relationship) to 1 (perfect linear relationship) or -1 (perfect negative linear relationship). It is usually reported in terms of its square (r²), interpreted as a percent of variance. For instance, if r² is 0.25, then the independent variable is said to explain 25% of the variance in the dependent variable.

For this site, three of the data sets evaluated are relatively large, with between 73 and 76 pairs of data, while three other data sets are smaller, with between 14 and 19 pairs of data. The correlation analysis was performed for the following six pairs of data:

- Asbestos levels at HV-1 and particulate levels at the Haul Road;
- Asbestos levels at HV-1 and particulate levels at the Hilltop;
- Asbestos levels at HV-5 and particulate levels at the Hillside;
- Asbestos levels at HV-5 and particulate levels at the School;
- Asbestos levels at HV-6 and particulate levels at the Hillside; and
- Asbestos levels at HV-6 and particulate levels at the School.

The calculated correlation coefficient (r²) for five out of six data pairs is zero, indicating that there is no relationship between particulate (i.e., dust) levels and airborne asbestos levels in these areas at Parcel A’. For one of the smaller data sets, the value of r² is 0.22, which a very low value and, particularly in light of the results for the five other data pairs, is likely attributable to mere chance. Thus, elevated dust levels measured at the particulate monitoring locations at this site do not correspond to the elevated asbestos levels measured at the asbestos air sampling locations. Conversely, an elevated airborne asbestos level may be occurring at a time when particulate levels are relatively low. Therefore, it appears that soil-disturbing construction activities resulting in releases of airborne particulates (dust) do not appear to correlate to elevated asbestos levels in the air at the perimeter of Parcel A’. Hence, dust measurements at the perimeter of the site can
not be used to predict levels of airborne asbestos at the perimeter of the site during the
time period of missing asbestos data.

**Estimated Average Worst Case Exposure Levels**

Because construction activities started on 25 April 2006, but adequate daily asbestos air
monitoring only began on 3 August 2006, a gap of 100 days exist with no asbestos air
monitoring data. Thus, the potential time period when unknown exposures to NOA
occurred is relatively short (100 days).

The 95% Upper Confidence Limit (UCL) for the asbestos data was developed using the
U.S. EPA software ProUCL Version 3.00.22, which evaluates the distribution of the data,
identifies the optimum method for estimating the 95% UCL, and then estimates the actual
value.

95% UCL values were developed for the available data, incorporating the following
assumptions:

- The available data included samples collected at HV1, HV2, HV4, HV5, HV6, HV7, HV8, HV9, HV10, and HV11. Samples were only collected Monday through Friday of each week.
- The total structures per m$^3$ concentration for each sample was used.
- All available data, including duplicates (samples collected by MACTEC, CH2MHiIl, and Treadwell & Rollo/Acumen) were included as individual data points.
- Results reported as not detected were assumed to be a value of ½ the detection limit (consistent with U.S. EPA and Cal EPA guidance).
- Results reported as Not Available or Not Detected, but with no detection limit, were excluded from the data set.
- 95% UCL concentrations were developed for the entire data set, as well as for the data individually collected at HV1, HV2, HV4, HV5 and HV6. Insufficient data (less than 15 data points each) were available for HV7, HV8, HV9, HV10, and HV11 and most of those data points were reported as not detected.

Based on these assumptions and methods the worst case average exposure levels at each
location are:

- HV-1 = 9,786 structures per m$^3$
- HV-2 = 7,133 structures per m$^3$
- HV- 4 = 7,219 structures per m$^3$
- HV-5 = 6,609 structures per m$^3$
- HV-6 = 4,744 structures per m$^3$
- Total for all data = 5,403 structures per m$^3$
Estimates of asbestos exposure were developed based on the available air monitoring data for samples collected between 3 August 2006 and 24 January 2007. In accordance with U.S. EPA guidelines, an upper bound estimate of the average concentration was used to evaluate the overall potential asbestos exposures. U.S. EPA considers the average concentration as the most representative of the concentration that would be contacted at a given site over time. The 95 percent (%) Upper Confidence Limit (UCL) of the average concentration is a statistical upper bound estimate of the average concentration that takes into account the relative distribution of the data.

**Short-term Exposure and Existing Health Based Standards**

The 95% UCL concentrations, for data from the individual monitors as well as for the data combined, were all less than the BAAQMD work suspension level of 16,000 structures per m³. As stated previously, the BAAQMD work suspension level of 16,000 structures per m³ is based on an exposure duration assumption of 70 years. Any evaluation of potential excess cancer risks for the Parcel A’ construction activities would be for less than one year. The Office of Environmental Health Hazard Assessment (OEHHA) of Cal EPA has indicated that “short-term high exposures are not necessarily equivalent to longer-term lower exposures even when the total dose is the same. OEHHA therefore does not support the use of current cancer potency factors to evaluate cancer risk for exposures of less than 9 years.” Therefore, estimating cancer risk based on one year of exposure is not recommended and has not been developed for the 95% UCL values.
Treadwell & Rollo

Project No. Figure Date

ASBESTOS MONITORING LOCATIONS
PARCEL A’ PHASE 1 DEVELOPMENT PROJECT
HUNTERS POINT SHIPYARD
San Francisco, California

3848.02 02/13/07

Approximate scale

LEGEND

BAAQMD Required Monitoring Location
Community Asbestos Monitoring Location
Parcel A’ Boundary
Parcel B Boundary
Buildings
Buildings Numbers
Community Asbestos Monitoring Location
Results do not trigger work shut down


ASBESTOS MONITORING LOCATIONS
Date 02/13/07  Project No. 3848.02  Figure 1
Exhibit 20-3
Letter to SFDPH from ATSDR, September 2007, and Letter to ATSDR from CDPH, September 2007, regarding Recommendations Related to Parcel A Development Activities
Rajiv Bhatia, M.D., M.P.H.
Director of Occupational and Environmental Health
1390 Market Street
Suite 910
San Francisco, California 94102

Dear Dr. Bhatia:

On July 17, 2007, you requested that the Agency for Toxic Substances and Disease Registry (ATSDR) respond to concerns related to grading operations at Hunters Point Shipyard (HPS) Parcel A in San Francisco. As you know, ATSDR funds the California Department of Public Health (CDPH), Site Assessment Section (SAS), to assist us with work within the State of California. The CDPH provided a written evaluation of your request on September 10, 2007. This evaluation is enclosed.

ATSDR concurs with the essential findings, conclusions, and recommendations made by CDPH regarding asbestos and dust levels. There was clear evidence that levels of asbestos exceeded mandated thresholds at both the fence line and in the community. The concentrations of dust could not be interpreted because of the sampling methods. It is reasonable to conclude that levels of dust and asbestos were similar during the months when sampling did not occur. The exposures did result in some increased risk for community residents, although it is not possible to quantify this risk. Medical follow-up or screening is not recommended because there are no valid tests to identify current exposures or predict developing future disease.

Public health follow-up should focus on effective efforts to further reduce exposures and to monitor and verify that these reductions occur. These steps are outlined in the CDPH letter.

You and the Bay Area Air Quality Management District have taken many steps to protect the public from the dust and asbestos generated during work activities at HPS Parcel A. ATSDR and CDPH support your efforts and are committed to helping you address the issues we have raised.
Please feel free to contact CAPT Susan Muza at (415) 947-4316; via email at 
Muza.Susan@epamail.epa.gov or me at (404) 498-0004; via email at TSinks@cdc.gov if 
you have comments or concerns.

Sincerely,

Thomas Sinks, Ph.D.
Deputy Director, National Center for Environmental 
Health/Agency for Toxic Substances and Disease 
Registry

Enclosure: 
Letter from CDPH

cc: 
Dr. Rick Kreutzer, CDPH 
Ms. Karen Henry, USEPA, Region 9 
Mr. Clancy Tenley, USEPA, Region 9 
Dr. Tina Forrester, ATSDR, Division of Regional Operations (DRO) 
CAPT Susan Muza, ATSDR, DRO
September 10, 2007

Captain Susan L. Muza
Agency for Toxic Substances and Disease Registry
75 Hawthorne Street, Suite 100, HHS-1
San Francisco, CA 94105

Dear Captain Muza:

As part of our cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), the Site Assessment Section (SAS), within the California Department of Public Health (CDPH), is sending this letter to assist you with addressing concerns related to grading activities occurring on Parcel A in the Hunters Point district of San Francisco.

On July 17, 2007, the San Francisco City and County Department of Public Health (SFDPH) formally requested assistance from ATSDR to perform the following: 1) review and interpret available air monitoring data for residents living adjacent to Hunters Point Shipyard (HPS) Parcel A development activities and the significance of data gaps; 2) evaluate the assessment and judgments made by SFDPH on the significance of exposure and health impacts on residents and other sensitive uses adjacent to HPS Parcel A development activities; and 3) make recommendations for additional appropriate dust and exposure control and monitoring necessary to protect health of residents.

HPS Parcel A is approximately 75 acres and is located in a geologic area where Naturally Occurring Asbestos (NOA) has been identified. CDPH is aware that the community is divided over the plans to develop this site. Many steps have been taken to address the dust and naturally occurring asbestos issues at this site already (some of which are summarized in this letter).

Since July 17, 2007, the SAS, with ATSDR, has gathered technical information about Parcel A, conducted outreach to the Hunters Point community, and communicated with SFDPH to clarify details of their request and to share a preliminary draft of findings for fact verification. Here, we provide recommendations for reducing dust/ asbestos air levels from on-going and future grading/soil disturbing activities at Parcel A. These recommendations are based upon our review of the plans in place for monitoring dust and asbestos emissions from the site and review of the available monitoring data. Because grading operations are nearing an end, there was some urgency to share these findings with the hope that future dust and asbestos levels could be made even lower.
CDPH Recommendations

CDPH recommends the following actions occur to assure greater confidence, among those living near the excavation, in the safety of activities on Parcel A. These recommendations build on actions SFDPH and other agencies are already conducting at the parcel (the agencies that have authority to implement the recommendation are noted in parentheses). Information that forms the basis for these recommendations is provided in this letter and is referenced at the end of each recommendation:

- Because the contractor has exceeded the Bay Area Air Quality Management District (BAAQMD) asbestos action level that triggers work stoppage on 13% of excavation days, and because there have been complaints about dust, which may cause other health concerns, SFDPH should assign a person to continuously monitor dust production and dust abatement activities during working hours. This is an important way to prevent both dust and asbestos exposures. Essential to this recommendation is that the assigned person not only observes but has the authority to alter activity on the site based on his/her observations. Please see Overview of Current Dust and Asbestos Monitoring Plans.

- The assigned person should promptly report to the public what is observed and what is done as a result of the above-mentioned monitoring activities. Please see Overview of Current Dust and Asbestos Monitoring Plans.

- Explore additional dust control procedures such as misting at the fence line, tarping the fence, adding an on-site meteorological station, stopping activity that generates dust if winds are 15 miles per hour or more, or tarping grounds where no activity is occurring for seven days or more. It is recommended that the developer engage someone with expertise in dust control to specifically define additional mechanisms to achieve better mitigation and dust suppression. This recommendation is based upon findings in the CDPH Review of Environmental Data section.

- Air monitoring equipment on-site and in the community should be used to evaluate the effectiveness of added measures. If ongoing exceedances occur, then more measures should be adopted. Please see Overview of Current Dust and Asbestos Monitoring Plans.

- To assist the SFDPH assigned inspector in evaluating the current Dust Control Plan, the contractor should conduct real-time dust monitoring using appropriate equipment for respirable dust (PM-10) at several locations, co-located with asbestos sampling (SFDPH and BAAQMD). SFDPH should use information from monitors during the day to identify activities which are generating PM 10 and alter activity to reduce its generation. As explained below, there are validity problems with the currently used monitoring equipment. Please see Overview of Current Dust and Asbestos Monitoring Plans.
• Include the community monitors, especially HV-7, HV-8, and HV-9, in the official asbestos monitoring plan, as regulated by the BAAQMD. These monitors, along with the on-site monitors, create better coverage of the perimeter of such a large parcel (BAAQMD). Please see Overview of Current Dust and Asbestos Monitoring Plans.

• Explore ways to reduce the time lag between measuring elevated levels of naturally occurring asbestos and altering parcel activities by returning to 12-hour sampling (when samples often resulted in results the next day). Or, collect from 7 p.m. to 7 p.m., which would similarly mean a result may be available the next day. (BAAQMD for the on-site monitors; SFDPH for the community monitors). As a matter of principle, public agencies should try to be as timely in their feedback as possible. These sampling strategies will advance this goal. Please see Overview of Current Dust and Asbestos Monitoring Plans and CDPH Review of Environmental Data.

Overview of Current Dust and Asbestos Monitoring Plans

The Asbestos and Dust Control Plans required by BAAQMD and SFDPH call for air monitoring and outline steps the contractor should implement to keep dust from leaving the site perimeter. Mass grading/earthmoving activities began on Parcel A on April 25, 2006.

According to a SFDPH memorandum dated June 2007, there were complaints about dust from the very beginning of the grading activities. The memo notes that, in response to specific complaints, SFDPH would evaluate the adequacy of the dust control measures. In 2006, SFDPH issued three Notices of Violation to the developer concerning the generation of visible dust.

Under SFDPH oversight of the implementation of Article 31, consultants for the developer have conducted real-time monitoring for total dust (primarily 10 micron and smaller) since June 2006. As described in the Parcel A Dust Control Plan, an action level of 0.5 milligrams per meter cubed was established as an action level for total dust (PM 10). The monitors (two downwind and one upwind) record minute by minute readings of PM 10; however, the dust data is not reviewed as it is recorded. It may be reviewed at the end of the day or later. According to the Dust Control Plan, “if dust is generated from on-site soil disturbance or excavation activities and dust levels from these activities are recorded above the action level, the work will stop until additional controls are implemented to reduce dust generation from the specific work area causing the problems.”

On August 20, 2007, SFDPH issued a Notice of Violation to the developer of Parcel A for observations that occurred on August 17 related to dust crossing the property boundary and visible dust occurring for over 90 minutes, which was observed by the SFDPH inspector from 2:45 to 4:30 p.m. In issuing the Notice of Violation, they ordered the developer to cease all dust generating activities for 48 hours in order for the developer to “establish work practices that will prevent future recurrences.” SFDPH asked the developer to “review the incident for the causes of compliance failure and training of all relevant employees and subcontractors on the requirements
of the Dust Control Plan.” In the Notice of Violation letter, SFDPH indicated to the developer that they will be providing a monitor (a person) who will be supervised by SFDPH staff, with costs billed to the developer. In the letter, they state that “through this monitor, SFDPH will independently verify that the dust control is meeting all Dust Control Plan requirements and assist the developer in adhering to plan requirements.”

At this time, CDPH has reviewed the equipment being used to monitor dust and a limited set of the dust data. According to the manufacturer, the instrument that has been used to monitor dust at Parcel A is designed for personal/breathing zone monitoring, plant walk-through surveys, remediation site worker exposure monitoring, and indoor air quality. The instrument being used is sensitive to moisture and is a passive sampler. Dust monitors that are approved for PM 10 ambient air standards by the California Air Resources Board are all active samplers. Further, there are dust monitors available that are designed for outdoor applications where moisture is present. Due to the novel application of the equipment for fence line monitoring, CDPH is not able to interpret whether dust exposures in the community occurred that would explain some of the community health complaints such as headaches, bloody noses, adult onset asthma, respiratory symptoms, nausea, and vomiting. We recommend using dust monitors that have been certified for fence line monitoring.

Since there is naturally occurring asbestos at the site, the BAAQMD required consultants for the developer to conduct asbestos air monitoring around the perimeter of the parcel since April 2006. The SFDPH further requested air monitors for asbestos in the neighborhood. The asbestos ambient air action level that would “trigger an immediate on-site evaluation to determine if dust mitigation measures are still effective” was set at 1,600 TEM (Transmission Electron Microscope) structures/m³. This level corresponds to a 1 in 100,000 increased cancer risk for a 70-year exposure. The ambient air asbestos action level at which grading operations are shut down was set at 16,000 structures/m³. This level corresponds to a 1 in 10,000 increased cancer risk for a 70-year exposure. Asbestos samples have been collected daily using a vacuum pump that feeds to a filter cassette. The filter cassettes were sent to a laboratory for analysis, typically with a two-day turn around time for results. The two-day lag time delays detecting exceedances of action levels and taking actions to reduce them.

We understand that in the past, staff from SFDPH and BAAQMD have visited the site. In recent months, BAAQMD staff has visited for approximately one hour to two hours every day.

Additionally, the developer hired local community members from Young Community Developers to act as the community’s “eyes and ears on the ground” to make sure the construction dust is being properly managed. ATSDR, CDPH, and SFDPH have no detailed information about the training these individuals received or the power these community members have to alter activities on-site.
CDPH Review of Environmental Data

CDPH reviewed the asbestos monitoring data collected between August 3, 2006, and August 19, 2007. There are no asbestos monitoring data available for the first few months of grading (April 25, 2006 – August 2, 2006), due to operator error and equipment malfunctions. Asbestos samples were collected for 12-hour periods starting August 3, 2006, typically from 7 a.m. to 7 p.m. Starting on October 18, 2006, samples were collected for 24 hours, from approximately 7 a.m. to 7 a.m.

The asbestos data has been plotted in a calendar format and color coded to reflect the asbestos measurements while grading activities were occurring relative to the corresponding action levels (see attached). When a recording of greater than 16,000 structures/m$^3$ occurred, the monitoring station that recorded that level is indicated in parenthesis. A map with names of the monitoring stations and the location of the monitoring stations is also attached. A narrative summary of these findings is also attached.

- Asbestos levels exceeded 1,600 structures/m$^3$ (the level that triggers an immediate determination of the adequacy of dust mitigation measures) 166 out of 200 days (83%) when grading was occurring on the site. This does not include days of non-operation.

- Asbestos levels exceeded 16,000 structures/m$^3$ (the level at which grading operations are shut down) 26 out of 200 days (13%) when grading was occurring on the site. This does not include the days of non-operation or of other activities on the property.
  - Exceedances of 16,000 structures/m$^3$ do not seem to follow a geographical pattern:
    - Exceedances of 16,000 structures/m$^3$ occurred at stations located along the perimeter of the project where residences or community buildings are located (HV-2, HV-4, HV-5, HV-6, HV-8) 19 times on 16 days of the 200 days. On seven of these days, there were also exceedances at monitoring stations (HV-1, HV-10, HV-11, or HV-12) on the eastern side of the “hilltop” Parcel A away from residences and the community.
    - Exceedances of 16,000 structures/m$^3$ occurred only at monitoring stations located on the eastern border of the “hilltop” Parcel A away from residences and the community (HV-1, HV-10 (prior to January 26, 2007), HV-11) 20 times on 10 days of the 200 days.
    - There has never been an exceedance of 16,000 structures/m$^3$ at the monitor on the Muhammed University of Islam School (HV-7) when grading was occurring on Parcel A. The first data from HV-7 occurred on December 5. On February 7, HV-7 recorded 17,800 structures/m$^3$ on a day when work was being done on the Stormwater Pollution Plan.
  - Exceedances of 16,000 structures/m$^3$ occurred to a lesser extent last winter during the rainy season, but otherwise do not show a temporal pattern:
The following is a listing of the number of exceedances of 16,000 structures/m³ by month starting in August 2006: 5,2,2,1,1,3,0,0,1,1,3,5,2 (data are not complete for this month).

The following is the number of occurrences at the monitoring stations located near the community before and after December 30, 2006:

- HV-2 5/0
- HV-4 3/1
- HV-5 3/3
- HV-6 1/1
- HV-8 0/2

Wind pattern data are not available for Parcel A. The nearest wind pattern monitoring station is San Francisco Airport, located approximately 10 miles away. This data can not accurately predict conditions at Parcel A.

Between August 3 and August 10, 2006, asbestos levels exceeded 16,000 structures/m³ on three days (no measurement reported three of the seven days), with a maximum level of asbestos measured at 24,400 structures/m³. Grading did not occur on the two weekends during this period. Grading occurred on August 7, August 9, August 11, and August 14; however, no monitoring occurred. (Because of the prior non-detect results from April to June, the developer, as per provisions of the Naturally Occurring Dust Protocol, opted on June 24 to reduce the number of days they would monitor for asbestos to 2 days per week.) On August 15, 16, 17, and 18, no grading occurred because of the exceedances occurring earlier in the month. Apparently the asbestos results for the beginning of August were not received until August 14. This is a gap of 11 days between the first exceedance and the official ceasing of operations due to the exceedance.

The delay in reporting asbestos levels meant that exceedances of 16,000 structures/m³ could occur two days in a row: This happened on August 22 and 23, 2006, on January 15 and 16, June 28 and 29, and July 11 and 12, 2007. In all cases, work was stopped two days after the first exceedance.

Exceedances of 16,000 structures/m³ occurred on August 30, September 27, October 18, December 18, 2006, and on January 10 and 22, April 12, and July 14 and 24, 2007; work was stopped two days later. There were no exceedances of 16,000 structures/m³ in the day between the exceedance and shutdown.

On September 13, 2006, an exceedance of 16,000 structures/m³ occurred; work was stopped at 11 a.m. the next day due to the exceedance.

On October 12, 2006, an exceedance of 16,000 structures/m³ occurred; grading operations were shut down on the afternoon of the following day, October 13.
On November 30, 2006, asbestos levels exceeded 16,000 structures/m³, with a maximum level of asbestos measured at 55,700 structures/m³; grading operations were shut down four days later.

On February 7, 2007, an exceedance of 16,000 structures/m³ occurred in a community monitor while work on the Sediment Control Plan of the Stormwater Pollution Prevention Plan was occurring. Although no grading was occurring, this activity involved moving soil on the parcel.

On Friday, May 4, 2007, an exceedance of 16,000 structures/m³ occurred. Grading occurred on Saturday with no exceedances. No activity occurred on Sunday, which was the second day after the exceedance. Levels were still high on Monday, May 7. On May 9, work was stopped for the exceedance on Monday, May 7.

On Friday, June 1, 2007, an exceedance occurred; no work occurred over the weekend. Work was shut down on Monday, June 4 and Tuesday, June 5 because of exceedances on June 1.

On Friday, July 17, 2007, an exceedance occurred; no work occurred on the weekend because of the exceedances.

On Friday, July 27, 2007, an exceedance occurred; no work occurred over the weekend. Work was shut down on Monday, July 30 and Tuesday, July 31 because of exceedances on July 27.

On January 29, 30, 31, February 1 and 6, April 23 and 30, May 24, June 27, July 2, 13, 18, 20, 23, and August 8 and 9, 2007, asbestos levels exceeding 16,000 structures/m³ were collected from two monitors (HV-10 and HV-12) located in an area believed to be influenced by another source of asbestos other than Parcel A grading operations (see attached figure). As a result, the developer was not required to shut down operations.

Summary of Findings

CDPH evaluated available monitoring data collected from 10 monitoring locations to determine whether the asbestos control measures specified in the Naturally Occurring Asbestos Dust Mitigation Control Plan, dated August 2005, are adequate to maintain compliance with air levels set by the BAAQMD. In addition, CDPH reviewed the Dust Control Plan dated February 2007.

As described in the above bullets, the operations on the Parcel A property have resulted in levels of asbestos above mandated thresholds being measured at the fence line and in the community. These elevations have required work stoppages. The two day delay in reporting air level elevations has often prevented changing the operations in a timely way to reduce these levels.
Our recommendations above are intended to build upon existing efforts to control dust and asbestos migration off-site and to decrease the likelihood of elevations above the level set by the BAAQMD.

The BAAQMD mandated threshold action levels are based on numbers derived from studies of long-term (many years) exposure to high (higher than the levels being measured at and around the parcel) levels of asbestos resulting in mesothelioma to workers. However, there are studies in the scientific literature in which long term lower level/non-occupational exposures (from take home exposure and other areas of the world where naturally occurring asbestos occurs) caused a low but epidemiologically detectable excess risk of mesothelioma. For example an ecological study in California suggests an association between residential proximity to naturally occurring asbestos and mesothelioma. There are technical difficulties in estimating risk from exposures as brief as a year, using techniques that were developed for life-long exposures. Nonetheless, even a 7-year exposure to the levels of asbestos measured around this excavation was estimated to have risks that, on a personal level, would be considered low. When one considers that the exposures have occurred over the course of a year or two, the estimated risk would be even lower. Regardless, site conditions warrant the monitoring and careful dust abatement measures recommended above.

Based on CDPH scientists’ review of previous studies, they would not expect to find X-ray changes as a result of the kinds of exposures that have occurred during excavation. Since X-rays carry their own risks, CDPH would not recommend them. Furthermore, there are no known blood tests for asbestos exposures.

We note that public health concerns and subsequent regulations to control the movement of naturally occurring asbestos dust have only recently arisen, e.g., on July 29, 2002, the state (California Air Resources Board) issued the regulation for asbestos airborne toxic control measures for construction, grading, quarrying, and surface mining operations, as guidance to the local Air Quality Management Districts. Guidelines and their implementation are new and will undoubtedly undergo improvements over time, in part based upon healthy discussion in communities like Bayview Hunters Point.

We look forward to working with you and the other agencies to address the recommendations. If you have any questions, please contact me at (510) 620-3620.

Sincerely,

Rick Kreutzer, M.D., Chief
Environmental Health Investigations Branch

Enclosure
ASBESTOS MONITORING LOCATIONS

Treadwell & Rollo

Date 05/10/07  Project No. 3848.02  Figure 1

### Asbestos Monitoring Results at Parcel A, August 2006

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Grading: Asbestos measurements over 16,000 structures/m³
Grading: Asbestos measurements over 1,600 structures/m³ and below 16,000 structures/m³
No grading (Weekend)
Grading shut down due to exceedances

Action levels: 1,600 structures/m³ indicate a measurement that triggers an immediate on-site evaluation to determine if dust mitigation measures are still effective; 16,000 structures/m³ indicate a measurement that triggers an immediate shut-down of construction and/or grading operations.
Blank days indicate no information was provided.
*Under the developer’s approved Dust Mitigation Plan, if results showed consistently low results, the monitoring frequencies could be reduced. On June 27, 2006, the developer reduced the monitoring frequencies to two days a week, based on no detection of asbestos since the monitoring had begun on April 25. As was discovered later, the non-detects were not credible.*
### Asbestos Monitoring Results at Parcel A, October 2006

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**Action levels:** 1,600 structures/m³ indicate a measurement that triggers an immediate on-site evaluation to determine if dust mitigation measures are still effective; 16,000 structures/m³ indicate a measurement that triggers an immediate shut-down of construction and/or grading operations.

Blank days indicate no information was provided.
### Asbestos Monitoring Results at Parcel A, December 2006

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**Action levels:**
- 1,600 structures/m³ indicate a measurement that triggers an immediate on-site evaluation to determine if dust mitigation measures are still effective.
- 16,000 structures/m³ indicate a measurement that triggers an immediate shut-down of construction and/or grading operations.

**Blank days** indicate no information was provided. **Bold values** indicate asbestos measurements taken from monitors not located on Parcel A.

### Asbestos Monitoring Results at Parcel A, January 2007

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**Grading:**
- Asbestos measurements over 1,600 structures/m³ and below 16,000 structures/m³
- No grading (Weekend)
- Grading shut down due to exceedances
- Asbestos measurements over 16,000 structures/m³ attributed to a source other than Parcel A grading operations; asbestos above 1,600 structures/m³ at stations related to Parcel A; work shutdown was not required.

**Fraction** indicates number of asbestos detections / number of samples.

**Action levels:**
- 1,600 structures/m³ indicate a measurement that triggers an immediate on-site evaluation to determine if dust mitigation measures are still effective.
- 16,000 structures/m³ indicate a measurement that triggers an immediate shut-down of construction and/or grading operations.

Blank days indicate no information was provided. Bold values indicate asbestos measurements taken from monitors not located on Parcel A.
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**Action levels:**
- 1,600 structures/m³ indicate a measurement that triggers an immediate on-site evaluation to determine if dust mitigation measures are still effective.
- 16,000 structures/m³ indicate a measurement that triggers an immediate shut-down of construction and/or grading operations.
- Blank days indicate no information was provided.
- Bold values indicate asbestos measurements taken from monitors not located on Parcel A.

**Grading:**
- Asbestos measurements over 16,000 structures/m³ attributed to a source other than Parcel A grading operations; asbestos above 1,600 structures/m³ at stations related to Parcel A; work shutdown was not required.
- Asbestos measurements over 1,600 structures/m³ and below 16,000 structures/m³
- No grading (Weekend)
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Asbestos Monitoring Results at Parcel A, May 2007

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<td>1,000; 1,900; 3,800; 4,900</td>
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<td>2,800; 1,000; 1,900; 1,900; 2,900</td>
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<td>900; 900; 1,000; 2,800; 1,900; 8,000</td>
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<td>900; 900; 6,800; 10,400</td>
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<td>1,000; 900; 3,500; 6,900; 5,300</td>
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<td>1,000; 3,900; 1,000; 11,800; 7,800</td>
<td>4/9</td>
<td>1,900; 7,700; 2,900; 13,600</td>
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Action levels: 1,600 structures/m³ indicate a measurement that triggers an immediate on-site evaluation to determine if dust mitigation measures are still effective; 16,000 structures/m³ indicate a measurement that triggers an immediate shut-down of construction and/or grading operations. Blank days indicate no information was provided. Bold values indicate asbestos measurements taken from monitors not located on Parcel A.
### Asbestos Monitoring Results at Parcel A, June 2007

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<tr>
<th>Sunday</th>
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- 1,600 structures/m³ indicate a measurement that triggers an immediate on-site evaluation to determine if dust mitigation measures are still effective.
- 16,000 structures/m³ indicate a measurement that triggers an immediate shut-down of construction and/or grading operations.
- Blank days indicate no information was provided.
- Bold values indicate asbestos measurements taken from monitors not located on Parcel A.

### Asbestos Monitoring Results at Parcel A, July 2007

<table>
<thead>
<tr>
<th>Sunday</th>
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</table>

- Grading: Asbestos measurements over 16,000 structures/m³.
- Grading: Asbestos measurements over 1,600 structures/m³ and below 16,000 structures/m³.
- No grading (Weekend).
- Grading shut down due to exceedances.

Action levels: 1,600 structures/m³ indicate a measurement that triggers an immediate on-site evaluation to determine if dust mitigation measures are still effective; 16,000 structures/m³ indicate a measurement that triggers an immediate shut-down of construction and/or grading operations. Blank days indicate no information was provided. Bold values indicate asbestos measurements taken from monitors not located on Parcel A.
## Asbestos Monitoring Results at Parcel A, August 2007

<table>
<thead>
<tr>
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<td>12,700; 7,500; 14,300</td>
<td>8,100; 6,200; 900; 3,000; 10,900</td>
<td>1,900; 1,000; 8,500; 27,400 (HV-12)</td>
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<td>1,800; 900; 1,900; 2,900; 12,900</td>
<td>1,600; 1,900; 2,000; 1,000; 1,900; 9,600; 11,500</td>
<td>1,900; 1,000; 2,900; 1,000; 3,200 (HV-11); 53,200 (HV-12)</td>
<td>1,900; 1,000; 2,900; 1,000; 3,200 (HV-11); 53,200 (HV-12)</td>
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</table>

**Action levels:**
- 1,600 structures/m³ indicate a measurement that triggers an immediate on-site evaluation to determine if dust mitigation measures are still effective; 16,000 structures/m³ indicate a measurement that triggers an immediate shut-down of construction and/or grading operations.
- Blank days indicate no information was provided. Bold values indicate asbestos measurements taken from monitors not located on Parcel A.
Exhibit 20-4

Letter to SFDPH regarding Tests for Asbestos Exposure, from ATSDR
June 2007
June 29, 2007

Rajiv Bhatia, M.D., M.P.H.
Director, Occupational and Environmental Health
San Francisco Department of Public Health
Assistant Clinical Professor of Medicine
UCSF 1390 Market Street
Suite 822
San Francisco, California 94102

Dear Dr. Bhatia:

Thank you for the opportunity to discuss the exposure issues related to construction activities of Lennar BVHP, LLC on Parcel A at Hunter’s Point. During this conversation, you requested that the Agency for Toxic Substances and Disease Registry (ATSDR) provide you with information regarding tests for asbestos exposures.

ATSDR conducted an expert panel to review the state of scientific knowledge on asbestos biomarkers. A summary report is enclosed. The discussion of the panel centered on analysis of fiber burden in the lung from living humans or autopsy samples; fiber content of sputum samples; fiber content of bronchoalveolar lavage; fiber analysis of sentinel animals; asbestos bodies counts; use of blood proteins or blood tests; and use of clinical tests such as spirometry or x-ray or CT scan for pathological change.

The panel concluded that none of the techniques are currently adequate to assess asbestos exposures or disease risk. Because of this finding, ATSDR has concluded that the best approach to assess community exposure is to conduct adequate air monitoring to confirm asbestos exposure.

If we can be of further assistance on this issue, please contact CDR Susan Munza, ATSDR Region 9, telephonically at (415) 947-4316 or via email at munza.susan@epa.gov.

Sincerely,

Thomas Sinks, Ph.D.
Deputy Director, National Center for Environmental/ Health/Agency for Toxic Substances and Disease Registry

Enclosure
Exhibit 20-5

BAAQMD Presentation – Lennar Bay View Hunters Point, Parcel A, Naturally Occurring Asbestos, Asbestos Dust Mitigation Plan, October 2007
Lennar Bay View Hunters Point
Parcel A
Naturally Occurring Asbestos
Asbestos Dust Mitigation Plan

Kelly Wee
Director of Enforcement
October 29, 2007
Lennar BVHP Parcel A Project

- Redevelopment project on Parcel A at BVHP comprises 75 acres in NE portion of Hunters Point Shipyard.
- Lennar BVHP plans to construct 1600 attached single family homes on the site.
- Asbestos Dust Mitigation Plan (ADMP) received from Lennar in May 2005, as required by the statewide Air Toxic Control Measuring for Naturally Occurring Asbestos (ATCM).
- The Air Pollution Control Officer required that an ambient air monitoring plan be included due to nearby sensitive receptors.
Naturally Occurring Asbestos (NOA)

- Naturally occurring mineral found in Serpentinite rock
- Serpentine is the California State Rock
- NOA found in soil in 44 of California’s 58 counties
Regulatory Background

- California Air Resources Board developed an Air Toxic Control Measure (ATCM) for NOA.
- The ATCM established notification and work practice requirements that reflect best dust mitigation measures.
- The ATCM was adopted into California law in July 2002. (Title 17 CA Code of Regulations Section 93105)
- Air District implemented its regulatory program in November 2002.
NOA ATCM Requirements

- Operators of large construction projects (> 1 acre) must prepare an Asbestos Dust Mitigation Plan (ADMP) subject to local air district approval.
- The plan must specify measures that will ensure dust control.
- Air monitoring is optional, based on sensitive receptors and is at the discretion of the local District.
- There are no ambient standards in the ATCM.
Final ADMP approved October 2005

- Track–out Prevention and Control
- Cover and Water Surface Areas and Storage Piles
- Dust Mitigation for Unpaved Roads, Parking Lots, and Staging Areas
- Dust Control for Earth Moving Activities
- Control Dust from Vehicle Transport
- Upwind/downwind/perimeter air monitoring
- Post Construction Stabilization (cover with clean fill and re-plant)
Monitoring Locations
Asbestos Monitoring Apparatus

- Air Pump
- Air Filter and Cassette
- Enclosed in secured lock box
- Battery
- Air Sample
Public Health Protection

- In order to protect Public Health at the Parcel A development, the Air District set two action levels.
- The action levels are Conservative and Health Protective and provide a significant Margin of Safety.
Action Levels

- At 1,600 asbestos structures per cubic meter, project operators must notify Air District and implement more stringent dust controls.
- At 16,000 asbestos structures per cubic meter, project operators must stop work until levels decline.
Air Monitoring Results

BVHP Air Monitoring Data (10/28/06 through 10/14/07)

Asbestos structures/cubic meter

Stop Work Action Level (16,000 s/m³)
Annual Average NOA Concentration (2,068 s/m³)
Notification Action Level (1600 s/m³)
### Air Monitoring Comparisons

<table>
<thead>
<tr>
<th>Monitoring Location</th>
<th>Sampling Dates</th>
<th>Number of Samples Collected</th>
<th>Average Concentration (s/m³)</th>
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</thead>
<tbody>
<tr>
<td>El Dorado County¹</td>
<td>Various months during 1998, 1999, 2000, and 2001</td>
<td>387</td>
<td>5,700</td>
</tr>
<tr>
<td>El Dorado County - Near Potential Source²</td>
<td>October 1998</td>
<td>110</td>
<td>13,600</td>
</tr>
<tr>
<td>Placer and Nevada Counties³</td>
<td>July 1998</td>
<td>37</td>
<td>3,200</td>
</tr>
<tr>
<td>Monterey County⁴</td>
<td>June 2001</td>
<td>98</td>
<td>2,800</td>
</tr>
<tr>
<td>Santa Clara County (Gilroy)⁴</td>
<td>July 2001 and September 2001</td>
<td>98</td>
<td>13,600</td>
</tr>
<tr>
<td>Bay View Hunters Point Parcel A⁵</td>
<td>October 28, 2006 to October 14, 2007</td>
<td>1,207</td>
<td>2,068</td>
</tr>
</tbody>
</table>

¹Projects included background monitoring at four various locations throughout the County, including public buildings and schools.
²Samples collected near serpentine quarry.
³Background and road constructions samples.
⁴Background and grading samples.
⁵Grading samples.
Health Risks

- Health risk is within District Guidelines using established risk assessment protocols developed by the Office of Environmental Health Hazard Assessment (OEHHA) at the monitoring locations sited by the District at Parcel A.

- Risks are less than 3 in a million.
Compliance Assurance

- Air District staff conducts surveillance at the Parcel A site on a daily basis, making sure Lennar follows measures in the ADMP.
- During inspections, two violations were documented for which Lennar was cited. Two additional under review.
- A Notice of Violation was issued in October 2006 for non-compliance with the ADMP.
Summary

• Major grading is completed and project is moving into utility installations (trenching, foundations)
• Regular compliance inspections will continue and the Air District will continue to require stringent dust controls until the project no longer disturbs NOA.
• Asbestos ambient monitoring will continue with expansion of the network.
• The Air District is requiring ADMP enhancements.
Community Air Risk Evaluation Program

- BVHP is a focus area under CARE.
- Air District will continue to look at the air pollution impacts to Bay View Hunters Point.
- Stationary Sources and Mobile Sources (Diesel PM) are included.
- Additional monitoring, outreach, and mitigation may be in the future.
Exhibit 20-6

Letter to the Bayview-Hunters Point Community Regarding Assessment of Health Issues Related to Construction Activities at Parcel A, from John R. Balmes, MD, Professor of Medicine at University of California, San Francisco, and Chief of Occupational and Environmental Medicine at San Francisco General Hospital, September 2007
To the Bayview-Hunters Point Community:

We recognize the very real health concerns that many of you face every day. That is why we are pleased to announce the findings of Dr. John Balmes, Professor of Medicine at the University of California and Chief of Occupation and Environmental Medicine at San Francisco General Hospital. After a review of relevant data, Dr. Balmes has concluded that the construction at Hunters Point Shipyard does not pose a significant risk of long-term health problems.

In particular, Dr. Balmes agrees with the San Francisco Department of Public Health that it is highly unlikely that exposure to naturally occurring asbestos found at the Shipyard poses a danger to human health.

Dr. Balmes has also concluded that a variety of symptoms reported by some residents cannot be tied to asbestos in construction dust generated at the Shipyard. “I believe that the many health concerns that the community is experiencing are likely caused by events and circumstances that are unrelated to Lennar’s construction activities at Hunters Point Shipyard,” he writes in his report. “Many of these health concerns predate construction and involve symptoms that are not associated with exposure to naturally occurring asbestos.

As we informed you in a letter last week, Dr. Balmes conducted his investigation at our request but his time and expenses were paid for by Lennar. However, his analysis has been objective and not influenced by the company. We are grateful for his thorough work on the community’s behalf. A copy of his full findings is attached with this letter.

Finally, and most importantly, we believe that Dr. Balmes’ findings will help facilitate a broader discussion of health and environmental issues in Bayview-Hunters Point. You have our promise to make these long-standing issues a priority so that health officials more aggressively pursue solutions that result in a safer and healthier community for all of us. We look forward to working with as many of you as possible to make that dream a reality.

Sincerely Yours,

African American Community Revitalization Consortium

Rev. Arelius Walker  
True Hope of Christ in God Church

Rev. Josiah Bell  
The Church at San Francisco

Pastor George Lee  
Shilo Gospel Church

Rev. Gary Banks  

Marketplace Fellowship Church  
San Francisco African American Chamber of Commerce

Bayview Merchants Association  
The Tabernacle Development Group

Aboriginal Blackmen Union  

Individual members of the Hunters Point Shipyard Citizens Advisory Committee and Hunters Point Project Area Committee

And scores of Bayview-Hunters Point residents
September 5, 2007

Dr. Arelious Walker  
True Hope Church of God in Christ  
950 Gilman Ave.  
San Francisco, California 94124

Dear Dr. Walker:

It was a pleasure meeting with you last month. I wanted to provide you with a status report on my efforts to date, including my initial assessment of the health issues that have been raised by the community about LeRnan's construction work at Hunters Point Shipyard Parcel A.

As you know, I am a Professor of Medicine at the University of California, San Francisco, and Chief of the Division of Occupational and Environmental Medicine at San Francisco General Hospital. At your request, I have agreed to provide advice and guidance to you and other leaders of the Bayview-Hunters Point community regarding health issues, including whether naturally occurring asbestos in dust from the construction site poses a health risk.

Also at your request, LeRnan has agreed to pay for my time and expenses because, as I understand it, there are no other resources to support my involvement. I agreed to this arrangement only with the express understanding that I will provide you with an objective assessment that will be independent of LeRnan and the many competing interests that have dominated the health debate to date. I committed to telling you my opinion regardless of what others, including LeRnan, might think.

My work to date has included reviewing the available data, reports from the San Francisco Department of Public Health (DPH) and other relevant information. Additionally, I have reached out to the government agencies looking at the site, including the DPH and the Environmental Health Investigations Branch of the California Department of Health Services (EHIB), and spoken with LeRnan's own experts, Dr. Mark Utell, who is a pulmonologist and Professor of Medicine and Environmental Medicine at the University of Rochester, and Dr. Robert Scefield, a toxicologist and risk-assessor employed by ENVIRON International Corporation.
I. **OBSERVATIONS**

My current assessment of the health issues is consistent with the determination reached by the San Francisco Department of Public Health that Lennar's construction activities do not appear to present a significant long-term risk to public health, including to the residents of Bayview-Hunters Point.

On August 18, I had the opportunity to tour the Parcel A construction site to examine the field conditions, monitoring stations and dust abatement measures. Immediately following the tour, I was able to speak with Dr. Rick Kreutzer of the EHIB, who is consulting with the federal Agency for Toxic Substances and Disease Registry (ATSDR). Based on the information I have reviewed to date, the tour of the site and review of the dust abatement measures, combined with the available monitoring data, the site does not appear to present a significant long-term health risk to the community. In support of my preliminary assessment, I wanted to share with you and the community the following observations:

A. **Grading Is Complete**

I understand that the grading work is almost done and that the site will be capped to reduce any potential for future dust exposure. The end of grading will greatly reduce, if not eliminate, any potential for exposure to naturally occurring asbestos from activities at the site.

B. **Asbestos Monitoring Data**

I agree with DPH that it is highly unlikely that exposure to naturally occurring asbestos from grading operations at Parcel A will create a significant risk to human health in the community. The work stoppage level set by the responsible government agency -- the Bay Area Air Quality Management District -- was designed to be health-protective and ensure a low risk even assuming a person would be exposed to certain levels of asbestos on a continual and ongoing basis for 70 years. Here, by contrast, the grading period was less than eighteen months and the air monitoring data show that the average level of asbestos was significantly lower than the amount that is thought to pose a risk of long-term injury.

C. **Community Health Issues**

I am acutely aware that the Bayview-Hunters Point community has long been plagued by health problems, such as high rates of asthma in children, that predate Lennar's activities at the site. And I am aware that the community is concerned that these health problems may relate to exposures to airborne pollutants or other agents in the neighborhood environment.

While it is important that we remain mindful of and responsive to community health concerns, and their possible link to the neighborhood environment, it is also important that we not improperly attribute the cause of these health concerns to the recent grading activities at the Shipyard. I believe that the health problems that the community is experiencing are likely caused by events and circumstances that are unrelated to Lennar's construction activities at Hunters Point Shipyard. Many of the health concerns predate construction and involve symptoms that are not associated with exposure to naturally occurring asbestos.
II. CONSULTATION WITH STATE AND FEDERAL AGENCIES

As I believe you are aware, DPH is working with ATSDR and EHIB to conduct a public health consultation regarding certain issues relating to construction activities at the shipyard site. I have spoken with these agencies and plan on meeting with them to share information and analysis, although a date for a meeting has not yet been set. I believe that such a meeting will be helpful for the agencies, for my assessment and for the community.

I hope that you find this status report helpful. I will continue to keep you advised of my analysis and assessment as we move forward. Please do not hesitate to contact me with any questions or concerns that you might have.

Sincerely,

John R. Balmes, MD
Professor of Medicine, UCSF
Chief, Division of Occupational and Environmental Medicine,
San Francisco General Hospital
Exhibit 20-7
Letter to CDPH in response to Recommendations for Asbestos and Nuisance Dust Control at Parcel A, from SFDPH, October 2007
October 9, 2007

Dr. Rick Kreutzer  
Chief Environmental Health Investigations Branch  
Division of Environmental and Occupational Disease Control  
California Department of Public Health  
850 Marina Bay Parkway, Building P, Third Floor  
Richmond, CA 94804  

Dear Dr. Kreutzer:

On September 20, 2007, the San Francisco Department of Public Health received your assessment of hazards associated with development at Hunters Point Shipyard Parcel A in a letter from California Department of Public Health (CDPH) to the Agency for Toxic Substances Disease Registry (ATSDR). At the same time, we also received ATSDR’s concurring letter.

The Department of Public Health deeply appreciates your agency’s detailed review of the available air monitoring data as well as the many supportive recommendations for optimizing control of airborne dust and asbestos. We share your frank assessment of the limitations of human exposure and risk assessment in this situation, yet we are also heartened by your judgment that the risks of serious asbestos-related health impacts for community residents from development at Parcel A are likely to be low on a personal level even if those exposures were to have occurred over seven years. We also concur with your conclusions that radiological testing of residents for asbestos exposures is not recommended and blood tests for asbestos exposures do not exist.

Most important, we agree that the primary goal for environmental health is preventing exposure to hazards. We believe that the pro-active regulatory controls established by the Bay Area Air Quality Management District (BAAQMD) and the San Francisco Department of Public Health (SFDPH) both for naturally occurring asbestos and nuisance dust were developed to achieve precautionary and environmental justice ends. When adopted, these regulations clearly recognized asbestos from natural sources as a potential health hazard. We take very seriously our responsibility to critically review and optimize our pro-active regulatory scheme on an ongoing basis. The recommendations you have provided to us in this regard will be invaluable.
As you know, major earthmoving activities at Parcel A have ceased, and the soil on a large section of the parcel is now stabilized. Still, SFDPH has begun to move forward with a number of the CDPH recommendations anticipating ongoing development activities at the Shipyard.

At this point, we would like to share an early status report on all the CDPH recommendations (See attached table). You will note that we have already implemented some of the recommendations CDPH made in whole or part. In the near future, we would hope to take advantage of your expertise on specific technical questions.

Again, please accept my personal thanks for all of the efforts you and your staff have made on behalf of the health of San Francisco residents. Do not hesitate to contact me at 415-252-3931 if you would like to discuss the status of our efforts or if you have additional recommendations to provide.

Sincerely,

Rajiv Bhatia, MD, MPH
Medical Director, Occupational and Environmental Health

Cc: Tom Sinks, ATSDR
    Susan Muza, ATSDR
    Amy Brownell, SFDPH
    Mitch Katz, SFDPH
    John Balmes, UCSF

Attachment
<table>
<thead>
<tr>
<th>CDPH recommendation (September 20th, 2007):</th>
<th>Status (October 9, 2007)</th>
</tr>
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<tbody>
<tr>
<td>SFDPH should assign a person to continuously monitor dust production and dust abatement activities during working hours. This is an important way to prevent both dust and asbestos exposures. Essential to this recommendation is that the assigned person not only observes but has the authority to alter activity on the site based on his/her observations.</td>
<td>We agree with benefit of direct agency observation of regulatory compliance. SFDPH routinely conducts regular unannounced random site inspections to verify compliance with the Dust Control Plan, and inspectors have had the power to alter activity and stop work at the site if they observe violations of the Dust Control Plan. A recent violation of the plan resulted in a two day suspension of work activities. SFPD has not observed dust plan violations in the vast majority of observations in the current year and no current year dust complaints from the public have been verified on inspection. Nevertheless, because continuous SFDPH presence might provide some benefit over random inspections, SFDPH will explore the mechanisms available to us for employing a full-time dust inspector while Lennar is conducting dust generating activities.</td>
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</table>

The assigned person should promptly report to the public on what is observed and what is done as a result of the above-mentioned monitoring activities.

We agree with the need for more timely public communication. SFDPH has created a website for Hunters Point development that includes: frequently asked questions; resources and referral information; the dust control plan; and Notices of Violation. Future plans are to update the status of development activities on a weekly or monthly basis. The SFDPH Hunter’s Point website is accessible at: [http://www.dph.sf.ca.us/eh/hunterspoint/index.htm](http://www.dph.sf.ca.us/eh/hunterspoint/index.htm)
<table>
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<tr>
<th>Explore additional dust control procedures such as misting at the fence line, tarping the fence, adding an on-site meteorological station, stopping activity that generates dust if winds are 15 miles per hour or more, or tarping grounds where no activity is occurring for seven days or more. It is recommended that the developer engage someone with expertise in dust control to specifically define additional mechanisms to achieve better mitigation and dust suppression.</th>
<th>We agree that all of the listed dust control methods merit consideration and evaluation. Lennar has maintained an on-site meteorological station since the inception of the project. (See: <a href="http://clients2.engeo.com/weather/hunterspoint/">http://clients2.engeo.com/weather/hunterspoint/</a>) In addition, Lennar has already installed misting systems and tarping of the fence line for many areas of the site - including many, if not all, the areas adjacent to residents. We will verify these efforts and whether additional areas would merit misting or tarping. We will explore the other listed dust control procedures. Finally, SFPDH recently obtained a complete copy of historical data (temperature, humidity, wind direction, wind speed and other parameters) from the weather station and we are conducting an analysis to determine if there are any correlations between meteorological data and asbestos results at the site.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air monitoring equipment on-site and in the community should be used to evaluate the effectiveness of added measures. If ongoing exceedances occur, then more measures should be adopted.</td>
<td>We agree with this recommendation. We have used in the past and will continue to use the air monitoring equipment to evaluate dust control measures. We have also, in the past, revised our dust control plans and requirements for the developer based on regulatory history. We expect to continue to use this adaptive approach in the future.</td>
</tr>
<tr>
<td>To assist the SFPDH assigned inspector in evaluating the current Dust Control Plan, the contractor should conduct real-time dust monitoring using appropriate equipment for respirable dust (PM-10) at several locations, co-located with asbestos sampling (SFPDH and BAAQMD). SFPDH should use information from monitors during the day to identify activities which are generating PM 10 and alter activity to reduce its generation. As explained...</td>
<td>We agree with the recommendation about co-locating dust and asbestos monitoring equipment. According to our records, several of the particulate dust monitors are already co-located with several of the asbestos sampling stations. We will evaluate co-locating some of the other sampling stations. Our consultants reviewed your concerns about use of the particulate monitoring equipment and concluded the current equipment was appropriate for perimeter monitoring. We...</td>
</tr>
<tr>
<td>below, there are validity problems with the currently used monitoring equipment.</td>
<td>are considering installation of alternative monitoring equipment on an experimental basis in order to do a side by side comparison with the current monitors. We will also investigate further with the BAAQMD and other experts to see if there is agreement on the optimal choice of equipment.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Include the community monitors, especially HV-7, HV-8 and HV-9, in the official asbestos monitoring plan, as regulated by the BAAQMD. These monitors, along with the on-site monitors, create better coverage of the perimeter of such a large parcel (BAAQMD).</td>
<td>We agree with this recommendation. In January 2007, SFPDH made the same request to BAAQMD. We will follow-up with them to review this issue again.</td>
</tr>
<tr>
<td>Explore ways to reduce the time lag between measuring elevated levels of naturally occurring asbestos and altering parcel activities by returning to 12-hour sampling (when samples often resulted in results the next day). Or, collect from 7 p.m. to 7 p.m., which would similarly mean a result may be available the next day. (BAAQMD for the on-site monitors; SFPDH for the community monitors). As a matter of principle, public agencies should try to be as timely in their feedback as possible. These sampling strategies will advance this goal.</td>
<td>We agree with this recommendation. SFPDH will be meeting with BAAQMD to review the pros and cons of 12 hour vs. 24 hour sampling and the possibility of changing the pickup time of the samples so that results can be received in time to influence the next day’s activities. Please note that the samples are currently collected at 7 am and results are reported by the lab no later than 5 pm that day.</td>
</tr>
</tbody>
</table>
Exhibit 20-8

USEPA Review of Dust/ Naturally Occurring Asbestos Control Measures and Air Monitoring at the Former Shipyard, June 2010
Executive Summary

At the request of several groups from the Bayview Hunters Point community, the U.S. Environmental Protection Agency (EPA) Region 9 reviewed the dust control measures and possible exposures to dust and naturally occurring asbestos near the development at Parcel A of the former Hunters Point Naval Shipyard. EPA also evaluated the dust control measures and air monitoring for naturally occurring asbestos, radiation and metals at the Navy cleanup sites at the former Shipyard.

Parcel A was originally used by the Navy primarily for housing, and as such, there were only small amounts of contamination on the property. The Navy completed environmental cleanup work at Parcel A to residential standards and transferred it to the City of San Francisco in 2004. Development work at Parcel A began in 2006. The Navy plans to finish its work on Parcels B and G this year and transfer those parcels to the City in 2011. The remaining parcels will follow in the next few years.

Many regions of California, including areas in San Francisco such as Hunters Point, sit on soil containing naturally occurring asbestos. Because naturally occurring asbestos in construction dust is a widespread concern in California, the State of California requires that all large construction projects in such areas work under an Asbestos Dust Mitigation Plan (ADMP) enforced by the local Air District. The goal is to control the dust in order to minimize possible exposure to asbestos. EPA reviewed the ADMP for the Parcel A development and found that strict best management practices for dust and asbestos monitoring and mitigation are in place to protect the community and keep exposure to asbestos in dust within acceptable levels. The current practice of daily inspections by the Bay Area Air Quality Management District ("Air District") and the City of San Francisco Department of Public Health provide appropriate oversight and enforcement.

The Air District requires air monitoring for asbestos as part of the ADMP for the Parcel A development project to provide feedback on the effectiveness of the dust mitigation efforts. While the Air District did not intend the asbestos air monitoring program to be used to evaluate exposure or health risk in the neighborhood, EPA calculated potential risk using the daily air monitoring data as a screening evaluation of what is in the air directly at the monitoring stations. The results were within EPA’s defined acceptable risk range of between a one-in-one-million and one-in-ten-thousand chance of developing an asbestos related cancer.

The daily analysis of asbestos at the site is done by the method required by the California Air Resources Board (CARB), which counts all asbestos fibers. EPA re-analyzed 34 asbestos monitoring filters using a different method that provides a specific count of the longer asbestos fibers that correlate with asbestos health effect studies. EPA found lower levels of the “long” asbestos fibers. The results confirm previous conclusions by the Air District, the San Francisco
Department of Public Health, and the California State Department of Public Health that the daily monitoring results are within acceptable risk levels.

While EPA’s analysis focused primarily on naturally occurring asbestos, some community groups also asked EPA to evaluate whether metals and radiation might be in the dust at Parcel A and the Navy portion of the Shipyard. The monitoring data indicate that naturally occurring metals in dust at Parcel A and the Navy portion of the Shipyard do not pose an unacceptable risk. The radiation measured at all Navy excavations is below levels set for residential exposure. The Navy completed its cleanup at Parcel A to EPA’s unrestricted residential standards, so the development work is not releasing Navy-related chemicals, metals or radiation to the community.

EPA will continue to coordinate with the Air District to ensure that both the developer and the Navy meet all the requirements of their Dust Mitigation Plans and that any releases of dust, asbestos and other possible contaminants remain at acceptable levels.

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Introduction

Parcel A at the former Hunters Point Naval Shipyard is located in the Bayview Hunters Point neighborhood of San Francisco and covers approximately 75 acres (see Figure 1). Parcel A is being developed by the City of San Francisco and its developer, and the construction involves excavating and grading large amounts of soil and bedrock. The rock and soil in the Bayview neighborhood is partially comprised of the mineral serpentine, which contains naturally occurring asbestos and metals such as manganese and arsenic. Construction projects larger than one-acre in size in areas with naturally occurring asbestos are required to file an Asbestos Dust Mitigation Plan (ADMP) with the Air District under a state law called the Airborne Toxics Control Measure.

Review of the Asbestos Dust Mitigation Plan for Parcel A

EPA reviewed the ADMP for Parcel A prior to its reauthorization by the Air District in 2009. EPA found that the plan contained strict dust control measures, including requirements for wetting work areas, controlling soil stockpiles, covering truck loads, controlling dirt track out (e.g., washing wheels), and cleaning streets. The goal of the plan is to allow no visible dust to leave the site and no dirt track out onto neighborhood streets. This is in line with lessons learned from other sites with naturally occurring asbestos -- the best way to minimize exposure is to minimize dust generation. The plan is enforced through daily inspections by the Air District and separately by the City Department of Public Health under a city ordinance (Article 31).
Review of Dust and Asbestos Monitoring Plans and Practices at Parcel A

As part of the ADMP, the Air District required the developer to install five stationary air monitors on and around the site (Figure 2). The locations of the Air District monitors (HV-1, 2, 4, 5 and 6) were determined by geophysical modeling based on terrain and meteorological information to present the best locations to evaluate asbestos levels at the fence line.

Samples are generally collected for each 24 hour period on work days. The monitors work by pumping air in through a filter, which catches the asbestos fibers. The filters are collected in the morning and sent to an independent certified laboratory which counts the fibers using an electron microscope.

The Air District established a trigger level of 16,000 total asbestos structures per cubic meter (s/m³) of air. Under the ADMP, a reading at any monitor above the trigger level requires that the developer stop work for the day and subsequent days until all monitors are below the trigger level. The purpose of the work stoppages is to decrease asbestos releases by forcing the developer and Air District to re-evaluate procedures and methods to reduce dust and asbestos levels before work resumes. It is important to note that the trigger level established by the Air District for this project is not a legal standard and that results above the trigger level do not constitute a violation. The monitors and the trigger level are part of the specific ADMP for the development project and are intended to help minimize generation of asbestos from construction activities, not as a method to assess health risks in the community.

Due to concerns from the community about the problems with the monitors in the early summer of 2006, the City required the developer to install an additional five monitors. The filters are analyzed using the same protocol as the Air District monitors. Three of the City monitors (HV-7, 9, and 11) are generally sampled every work day. Similar to the Air District, the City required that work stop on days that results are above the trigger level. HV-8 is located upwind of the project and is sampled one day per week at random, though its results are also compared to the trigger level and used in the stop work process. HV-12 is located the furthest distance from the project and is sampled on work days. It was originally included in the stop work process, but because HV-12 is located on a dirt shoulder adjacent to a roadway and its results do not correlate with grading and excavating activities, the City now simply collects the data for informational purposes. The Air District formally added City monitors HV-7, 8, 9, and 11 to the ADMP in the latest update, finalized in August 2009.

The City Department of Public Health also requires continuous measurements for dust, with a minimum requirement that there be one dust monitor upwind of the project and two downwind. Currently, the City requires dust monitoring at five stations (HV-1, 2, 5, 7, and 11).

EPA found that the asbestos and dust monitors are the appropriate types of equipment for the project and provide the necessary information to monitor and control the worksite.
General Analytical and Risk Calculation Methods for Asbestos in Air

Asbestos hazard assessments are based on epidemiological studies conducted several decades ago on occupational exposures to asbestos. The best method available at that time for measuring asbestos was phase contrast microscopy (PCM) which uses a magnification of 400X. The epidemiological studies correlated risk with asbestos fibers measured with the PCM method, which was able to measure fibers longer than 5 micrometers (µm) and with an aspect ratio (length divided by width) greater than 3. Such fibers are called the PCM equivalents.

The current method used to count asbestos fibers is transmission electron microscopy (TEM) which has a magnification of 20,000X. TEM can resolve fibers as small as 0.5 µm in length, as well as definitively determine the asbestos type and provide a more accurate fiber size distribution. However, the specific asbestos fiber type and size associated with disease is not known, therefore the PCM equivalents are used as a surrogate for exposure. This leads to a problem with utilizing the newer data in risk assessments since TEM can resolve both the short and long fibers, but the epidemiological data are based only on the longer fibers.

One approach to work around this problem is to convert the total fiber counts from the current TEM measurements back to the original epidemiologic measures. This is the approach that the California Air Resources Board (CARB) requires in their asbestos regulations. CARB utilizes a modified version of the procedures outlined in the Asbestos Hazard Emergency Response Act (AHERA) published in 1987 in response to asbestos material in schools. The CARB procedure counts all the fibers greater than 0.5 µm in length, then converts the total count to PCM equivalents by applying a conversion factor of 320 total fibers/1 PCM equivalent. This is based on observations that with chrysotile asbestos, a common commercial mineral form, the fiber distribution is heavily weighted to fibers shorter than 5 µm in length. However, site specific conversion factors may vary in situations with naturally occurring asbestos.

EPA prefers to use the International Organization for Standardization (ISO) 10312 method published in 1995. This method also uses TEM but provides a count of both the total number of fibers as well as a count of the strict PCM equivalents. The PCM equivalents count can then be used directly in the risk calculations. Another significant difference between the CARB and the EPA procedures is in how individual fibers are categorized and tabulated. The ISO 10312 method allows the analyst to identify and tabulate any distinguishable fiber that meets the dimensional requirements regardless of the complexity, while the CARB procedure counts a complex of fibers as a single entry. This means that the CARB method reports a clump of fibers as one, while the EPA method attempts to count all the fibers in the clump. Both the CARB method and the ISO 10312 method use similar sample collection methods, preparation, instrumentation and resolution. However, the fiber dimensions of concern are different and the procedures for how individual fibers or complexes are tallied can result in differences in the totals based on the complexity of the asbestos structures and size distribution. Therefore, the results from the two methods cannot be directly correlated.
Analysis of Air Asbestos Data at Parcel A

In the health studies that form the basis for evaluating potential health effects from asbestos exposures, cancer was correlated with cumulative average lifetime exposure. Since the perimeter sampling is designed to assess the level of airborne asbestos at the fence line and not represent a continuous individual exposure, it is not appropriate to calculate an overall risk number. However, as a screening measure, EPA calculated a potential risk number at each of the monitoring stations using the 7,000 plus data points collected and analyzed by the CARB method from mid-2006 through 2009. The result at each monitoring station is below a one-in-one-hundred-thousand potential risk. This calculation was based on exposure beginning in infancy to provide the most conservative estimate. Again, this does not represent the risk in the community, but rather is a measure of what is in the air directly at the fence line monitoring stations.

More than half of the filters originally analyzed by the CARB method over the life of this project were non-detect -- that is, no asbestos fibers were measured in 4,153 out of 7,278 filters. In the original CARB analysis, approximately two percent of the filters had results above the trigger level.

EPA oversaw the re-analysis of 34 filters – including at least one from each monitoring station that had results above the detection limit. EPA selected filters over the complete range of detected fiber concentrations and with a majority representing filters with high counts from the CARB method. EPA’s re-analysis employed both the CARB and EPA procedures and fiber counting rules and definitions. The filters available for selection were from days between December 2008 and August 2009.

The monitor locations and dates are shown in the table below, along with the original CARB result and the PCM equivalents re-analysis results. The results in bold denote filters whose original CARB results were above the trigger level of 16,000 structures/m³.

<table>
<thead>
<tr>
<th>Monitor</th>
<th>Date</th>
<th>Original CARB Total (s/m³)</th>
<th>PCM Equivalents (EPA re-analysis) (s/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HV-4</td>
<td>2/27/2009</td>
<td>non-detect</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-2</td>
<td>4/2/2009</td>
<td>800</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-1</td>
<td>5/7/2009</td>
<td>800</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-8</td>
<td>3/2/2009</td>
<td>900</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-5</td>
<td>5/15/2009</td>
<td>900</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-9</td>
<td>4/9/2009</td>
<td>1,000</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-11</td>
<td>5/5/2009</td>
<td>2,000</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-7</td>
<td>3/10/2009</td>
<td>2,800</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-1</td>
<td>4/21/2009</td>
<td>2,900</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-4</td>
<td>3/20/2009</td>
<td>2,900</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-2</td>
<td>5/1/2009</td>
<td>2,900</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-9</td>
<td>6/5/2009</td>
<td>3,900</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-1</td>
<td>5/1/2009</td>
<td>4,800</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-11</td>
<td>4/13/2009</td>
<td>5,900</td>
<td>non-detect</td>
</tr>
<tr>
<td>Filter</td>
<td>Date</td>
<td>Asbestos (structures/m³)</td>
<td>Fiber Count</td>
</tr>
<tr>
<td>---------</td>
<td>------------</td>
<td>-------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>HV-12</td>
<td>5/15/2009</td>
<td>7,700</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-12</td>
<td>4/20/2009</td>
<td>9,700</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-11</td>
<td>4/29/2009</td>
<td>12,800</td>
<td>980</td>
</tr>
<tr>
<td>HV-4</td>
<td>6/5/2009</td>
<td>13,800</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-4</td>
<td>7/17/2009</td>
<td>14,100</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-4</td>
<td>5/6/2009</td>
<td>14,400</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-4</td>
<td>5/29/2009</td>
<td>17,100</td>
<td>920</td>
</tr>
<tr>
<td>HV-12</td>
<td>3/10/2009</td>
<td>20,000</td>
<td>3,800</td>
</tr>
<tr>
<td>HV-4</td>
<td>5/18/2009</td>
<td>20,400</td>
<td>970</td>
</tr>
<tr>
<td>HV-11</td>
<td>4/14/2009</td>
<td>23,200</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-12</td>
<td>4/14/2009</td>
<td>23,200</td>
<td>990</td>
</tr>
<tr>
<td>HV-4</td>
<td>5/5/2009</td>
<td>31,100</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-12</td>
<td>3/12/2009</td>
<td>32,300</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-09</td>
<td>4/21/2009</td>
<td>33,400</td>
<td>2,900</td>
</tr>
<tr>
<td>HV-4</td>
<td>5/14/2009</td>
<td>41,500</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-09</td>
<td>5/21/2009</td>
<td>43,500</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-4</td>
<td>5/15/2009</td>
<td>45,300</td>
<td>920</td>
</tr>
<tr>
<td>HV-11</td>
<td>4/21/2009</td>
<td>52,000</td>
<td>1,900</td>
</tr>
<tr>
<td>HV-12</td>
<td>12/29/2008</td>
<td>95,300</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-11</td>
<td>12/29/2008</td>
<td>192,000</td>
<td>non-detect</td>
</tr>
</tbody>
</table>

Seventy-four percent of the filters re-analyzed by the EPA method did not have any detectable PCM equivalents fibers, even though the CARB method results for these filters were frequently above the trigger level. The data indicate that a high CARB result may or may not correlate with the presence of PCM equivalents fibers, but a low CARB result does correlate with low PCM equivalents results.

A true risk calculation cannot be done with only 34 data points and with so many non-detects. However, as a point of reference, the highest value measured by EPA, 3,800 structures/m³, corresponds to a potential risk of one-in-ten-thousand if that were the concentration that a person was continuously exposed to. All of the PCM equivalents data in the above table were either non-detect or below this level indicating that the risk is at acceptable levels. In addition, we can conclude that if the trigger level were based on the PCM equivalents fiber counts, the result would be far fewer shut-down days than required using the CARB method.

**Malfunctioning Monitors Around Parcel A in 2006**

There was a period of approximately three months at the beginning of earthmoving activity in 2006 when the perimeter asbestos air monitors were not functioning properly. The Air District assessed a penalty for this violation and the problem was fixed in early August of 2006. The only data available from this time period are several worker safety monitors worn by equipment operators on Parcel A and Navy monitors located downwind near Navy excavations on Parcels B-G. The asbestos levels measured in worker safety monitors at Parcel A and at Navy monitors during this time period are below limits set for worker exposure. The measurements for the worker safety monitors use different methods than the perimeter monitors and thus may not be directly compared or averaged with the perimeter monitors for risk analysis. EPA believes that
the three plus years of data taken daily at the perimeter monitors since 2006 provide the best representation of conditions at the site and thus used this data in our assessment.

**Radionuclides and Metals Dust at Parcel A and the Navy Portion of the Shipyard**

EPA, California EPA and the Air District enforce a similar Dust Mitigation Plan for the Navy’s Shipyard remediation work as the Air District requires at Parcel A. In addition to asbestos and dust, the Navy also monitors for radiation, manganese and lead immediately adjacent to all of its work sites at the Shipyard.

The average monitoring result for radiation is $10^{-13}$ microcuries/milliliter of air for both alpha and beta activity. These reported levels include both potential Navy sources and naturally occurring sources native to the soil. This corresponds to a dose less than EPA’s limit of 5 millirems per year for residential exposure. Thus, EPA sees no elevated risk to the community from radioactivity related to Navy cleanup activities. At Parcel A, EPA scanned the entire surface of the parcel prior to transfer and found no radiation above natural background levels. Thus, the construction activity at Parcel A should also pose no threat to the community from radionuclides.

For metals, manganese poses the highest potential risk of the naturally occurring metals and lead poses the highest potential risk of possible Navy contaminants. Other metals, such as arsenic, chromium, nickel, etc., are present in the soil at concentrations with lower potential risks than manganese and lead. The following table shows that the concentrations for these two metals measured in airborne dust adjacent to Navy excavations are less than the EPA Schools Air Toxics screening levels.

<table>
<thead>
<tr>
<th>Metal</th>
<th>Average Navy Measurement (micrograms/m$^3$)</th>
<th>Schools Air Toxics Screening Level (micrograms/m$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>0.0076</td>
<td>0.15</td>
</tr>
<tr>
<td>Manganese</td>
<td>0.028</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Because the San Francisco Department of Public Health and the Air District only require monitoring for dust and asbestos at Parcel A, EPA compared the dust levels measured at Parcel A with dust levels measured by the Navy. The dust measurements are of particulates with a diameter smaller than 10 micrometers, called PM-10. Since the soil type is the same at both sites, the concentrations of naturally occurring metals in dust would be expected to also be the same. The average dust concentration measured by the Navy is 35 micrograms/m$^3$. The annual averages at the five dust monitors at Parcel A are in this same range, typically between 30 and 60 micrograms/m$^3$. Therefore, we expect that the concentrations of metals in dust at Parcel A are below the screening criteria. Finally, EPA’s national standard for PM-10 is 150 micrograms/m$^3$ in ambient air, meaning the general air in a region. The dust concentrations directly at the construction site at Parcel A are below this level.
Minimizing Exposure to Dust and Asbestos

Because naturally occurring asbestos is found throughout Bayview Hunters Point, it is important to minimize all potential exposure pathways. EPA will continue to work with the Air District and the City Department of Public Health on improving the dust mitigation efforts. However, there are also a number of non-construction activities that can release asbestos. Based on research in other locations with naturally occurring asbestos, EPA has developed recommendations for how individuals can minimize their exposure. The recommendations include:

- Cover areas of rock and soil with clean soil, rock, vegetation, or other material
- Pave over unpaved walkways, driveways, or roadways containing naturally occurring asbestos (NOA)
- Landscape areas with vegetation and add a layer of organic mulch or NOA-free soil
- Water garden areas before digging
- After gardening or other activities in the dirt, remove boots and gloves outside and take dirty clothes directly to the laundry
- Keep windows and doors closed on windy days
- Limit track-in by using door mats, and wipe down pets before they enter buildings to reduce the amount of soil tracked indoors
- Allow children to play in outdoor areas only if the area has a ground covering, such as wood chips, mulch, sand, pea gravel, grass, asphalt, shredded rubber, or rubber mats
- Relocate outdoor activities to areas that do not contain NOA. Walk, run, hike, and bike only on paved trails
- Avoid dusty areas, especially in windy conditions

Conclusion

The Air District effectively oversees and regulates the developer’s construction activities at Parcel A under the Asbestos Dust Mitigation Plan. Dust generation is minimized by the dust mitigation measures and the monitoring and inspection procedures, thus keeping asbestos and metals exposures within acceptable risk levels. At the same time, EPA, California EPA and the Air District oversee the Navy’s dust and asbestos mitigation efforts. Navy monitoring results for metals, radiation and asbestos are all below health based screening levels.

Additional Resources

EPA factsheet on naturally occurring asbestos:
http://www.epa.gov/superfund/health/contaminants/asbestos/noa_factsheet.pdf

EPA website on the former Hunters Point Naval Shipyard Superfund site:
http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/db29676ab46e80818825742600743734/23b69b19b13d34c488257007005e9421!OpenDocument
San Francisco Department of Public Health webpage with fact sheets and a spreadsheet with the daily asbestos monitoring data:  http://www.sfdph.org/dph/EH/HuntersPoint/default.asp

Figure 1: Location Map of Hunters Point
**Figure 2:** Asbestos Air Monitor Locations Around Parcel A
U.S. EPA Response to Comments from the Technical Assistance Services for Communities (TASC) Independent Contractor on the “Draft Technical Summary of EPA’s Analysis of Hunters Point Air Monitoring Filters for Asbestos, December 22, 2009”

The comments below were received in a report from E² Inc., which provided independent technical assistance to the community under EPA’s TASC program. Comments from E² were developed based on input from Dr. James Millette of MVA Scientific Consultants, a national expert on asbestos, and on input from community groups.

Note that in finalizing the report, EPA changed the title from “Draft Technical Summary of EPA’s Analysis of Hunters Point Air Monitoring Filters for Asbestos” to “U.S. EPA Review of Dust/Naturally Occurring Asbestos Control Measures and Air Monitoring at the former Hunters Point Naval Shipyard” to better reflect the new content.

Comments included in the body of the text of the TASC Report:

Comment 1: The Draft Technical Summary does not specifically address dust generation.

Response: The comment is correct; EPA did not specifically address dust in the draft report. EPA added a discussion on dust to the final report and clarified the differentiations between dust and asbestos.

Comment 2: During the site visit on March 1, Sample Site HV-8 equipment was not present, suggesting that no sampling is taking place at HV-8. The EPA Draft Technical Summary lists this monitor as being sampled one day per week at random. It is uncertain if sampling is not taking place at this site at all or if the equipment is moved when not actively sampling. Examination of the 68 results from the HV-8 monitor (12/05/06 – 2/26/10) shows the same trends as the other sets of monitor data. Most of the time, no asbestos was detected. A few times the level was above the trigger level, but below the EPA risk level for continuous exposure.

Response: HV-8 has been present during every EPA inspection. HV-8 is located within a fenced perimeter and is not easily visible from outside the site.

Comment 3 (related to Recommendation 3 below): The EPA Draft Technical Summary did not attempt to address the exposure to the community between April and August 2006 when mass grading/earthmoving activities occurred on Parcel A. There are no perimeter monitoring data from that period. It may be possible to estimate exposures with other data or by use of a modeling study. There are several different approaches that could be used for modeling. A combination of approaches may also be appropriate. Three approaches are:

a. Data extrapolation: There is some perimeter data collected on August 17, 2007 during work activities similar to those occurring during the April-August 2006 period.
The perimeter air sampling values for that day (8/17/07) were 0.0019, 0.0010, 0.0029, 0.0057, 0.0009, <0.0010, 0.0460, <0.0010, <0.0010, and 0.0038 structures per cubic centimeter.

**Response:** The comment suggests looking at data from a day when monitoring was functional and field operations were out of compliance (the commenter suggests a specific day with an inspection that led to a Notice of Violation). As the comment notes, nine out of ten monitors were well below the trigger level on that day, and one monitor was at three times the trigger level. While this may qualitatively suggest that monitoring results are not necessarily high on dusty days, it only represents a single day and risk should be estimated from exposure measurements over a long time period. EPA prefers to focus on the three plus years of existing data. There is no way to recreate the missing data, but the monitoring during the last three years of construction activity are the best estimate of what conditions may have been like during the early summer of 2006.

b. **Data calculation:** It may be possible to use a modeling study to estimate the community exposures during that period at the site. A key parameter needed to perform this calculation is the amount of asbestos released by the grading/earth moving and truck related activities during the time period of interest. There is some data from personal monitoring at the site that was conducted in May 2006 that can be assumed to reflect the levels of fibers released during the grading/earth moving activities. The highest values from the personal samples were (all in fibers per cubic meter):

- Scraper moving dirt: 30,000
- Blade operator: 40,000
- Compactor: 50,000

All of the fibers in these samples are longer than five micrometers. These are Phase Contrast Microscopy (PCM) data which may contain some non-asbestos fibers.

**Response:** The data from the worker safety monitors ranges from non-detect to the highest levels noted in the comment. Also, as noted in the comment, the worker PCM data includes non-asbestos fibers so the results should not be correlated with the perimeter monitoring results. Modeling could be done to estimate the dispersion and dilution as the fibers move from the source area out into the neighborhood. However, that is beyond the scope of EPA’s assessment of ongoing operations and exposure. However, the levels measured at the worker source area are within worker safety limits and would be lower at the project boundary. Also, as stated in the response above, EPA believes that the three plus years of perimeter monitoring data collected during construction are the best indicators of conditions at the site.

c. **Collect new or research similar activity samples:** There is a database of information about activity-based asbestos fiber release from naturally occurring asbestos (NOA). Eldorado Hills, Clear Creek, Garden Valley, and Slow Dusty Road are sites that have been studied. An investigation into whether any of the data collected for those sites is applicable to Hunters Point grading/earth moving and truck related activities.
undertaken between April and August 2006 should be undertaken. If these data are not applicable, an activity-based sampling of grading/earth moving and truck related activities on another part of the Hunters Point site should be considered if the activities and soil/rock characteristics are similar to the situation in Parcel A.

Response: EPA and the State of California have done research in the past at the sites listed in the comment and lessons learned about dust mitigation and asbestos monitoring were used in developing the dust and asbestos control measures at Hunters Point. However, each site has unique work conditions, geology and weather. Thus, the data from those sites are not as applicable to an evaluation of conditions at Hunter Point as the three plus years when grading, excavating and earth moving activities were occurring with proper monitoring.

Comment 4: Asbestos fibers are not connected to the community health outcomes reported, such as headaches, bloody noses, adult onset asthma, respiratory symptoms, nausea and vomiting. In 2007 the California Department of Public Health (CDPH) stated the following in a public health report (CDPH, September 10, 2007):

“CDPH has reviewed the equipment being used to monitor dust and a limited set of the dust data. According to the manufacturer, the instrument that has been used to monitor dust at Parcel A is designed for personal/breathing zone monitoring, plant walk-through Hunters Point Asbestos Technical Advisor Report 4 surveys, remediation site worker exposure monitoring, and indoor air quality. The instrument being used is sensitive to moisture and is a passive sampler. Dust monitors that are approved for PM 10 ambient air standards by the California Air Resources Board are all active samplers. Further, there are dust monitors available that are designed for outdoor applications where moisture is present. Due to the novel application of the equipment for fence line monitoring, CDPH is not able to interpret whether dust exposures in the community occurred that would explain some of the community health complaints such as headaches, bloody noses, adult onset asthma, respiratory symptoms, nausea, and vomiting. We recommend using dust monitors that have been certified for fence line monitoring.”

Response: EPA called the manufacturer of the dust monitoring equipment and the equipment is appropriate for outside use at this site. The only effect of moisture would be to make the equipment report a result that is higher than the true value. This is because the dust monitoring equipment uses a light beam to measure changes in opacity due to incoming particulates, and moisture would increase the opacity. Thus, the only error would lead to more protective and conservative results. EPA agrees with the comment that asbestos would not be expected to cause any of the effects claimed by several members of the community.

Comment 5: It is uncertain whether additional air monitoring was performed for dust or other non-asbestos contaminants. The community has shared metal concentrations analyzed from wipes reportedly taken near the site in 2007. Some of the metals concentrations are above the reporting limits listed on the data sheets. Data for these and other contaminants might explain the health consequences reported by community members.
Response: The TASC contractor provided results to EPA from a community supplied wipe sample taken from a car parked near Parcel A. EPA has no information what process was followed to collect the samples. The samples were analyzed by Micro Analytical Laboratories, which is a certified lab. EPA developed screening criteria for evaluating home wipe sampling as part of the 9/11 response. The comparison below shows that all of the results from the Hunters Point wipe sample except lead are far below EPA’s health screening criteria. The lead in this sample is not likely to be related to development work because lead concentration in the soil is much lower than several other metals such as arsenic and nickel, and those metals are present in the wipe sample at concentrations less than the lead concentration. The lead is also not likely to be related to Navy excavations because the Navy monitors airborne dust at all excavations for lead and the results are below health based screening criteria. The Detection Limit listed in the Table represents the lowest concentration that the laboratory is capable of detecting and is not related in any way to a health based screening level. Note that EPA has changed the term Reporting Limit from the comment to Detection Limit.

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Analysis Results ug/sq. ft</th>
<th>Detection Limit ug/sq. ft</th>
<th>EPA Screening Criteria ug/sq. ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>&lt;5.0</td>
<td>5.0</td>
<td>36</td>
</tr>
<tr>
<td>Barium</td>
<td>24</td>
<td>5.0</td>
<td>10,219</td>
</tr>
<tr>
<td>Chromium</td>
<td>7.9</td>
<td>5.0</td>
<td>437</td>
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<tr>
<td>Copper</td>
<td>19</td>
<td>2.5</td>
<td>5,825</td>
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<tr>
<td>Nickel</td>
<td>11</td>
<td>2.5</td>
<td>2,917</td>
</tr>
<tr>
<td>Lead</td>
<td>14</td>
<td>2.5</td>
<td>2.3</td>
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<tr>
<td>Silver</td>
<td>4.5</td>
<td>1.3</td>
<td>728</td>
</tr>
<tr>
<td>Vanadium</td>
<td>2.7</td>
<td>0.5</td>
<td>938</td>
</tr>
<tr>
<td>Zinc</td>
<td>81</td>
<td>10</td>
<td>43,664</td>
</tr>
<tr>
<td>Mercury</td>
<td>0.07</td>
<td>0.05</td>
<td>42</td>
</tr>
</tbody>
</table>

Specific Recommendations from the TASC Report:

Recommendation 1: Further investigate community concerns regarding work stoppages not occurring when exceedence alarms were triggered. The failure to follow and implement the protocols established in the Asbestos Dust Mitigation Plan could limit its effectiveness and seriously impacts the community’s perceptions about the effectiveness.

Response: EPA confirmed with the Air District inspector that the work stoppages are enforced when samples results are above the trigger level. To clarify the process: The asbestos filters are in place collecting asbestos for 24 hours. They are collected daily and sent to an off-site laboratory for analysis. The results then come back one day after the measurement. EPA has investigated shortening this timing but because of the complexity of measuring asbestos, there is no way to speed this process. Work stops when the results above the trigger level come back from the lab and may not start again until there is a day when all monitoring stations in the Asbestos Dust Mitigation Plan are below the trigger level. Even though the work stoppage occurs after the event, the sampling still serves the intended function of enforcing the Asbestos
Dust Mitigation Plan by providing feedback on the effectiveness of the dust mitigation efforts and providing a strong incentive for compliance. As a side note, there are no alarms on any of the monitors.

**Recommendation 2:** Review the monitoring frequency for each station to ensure that the mitigation plan is being followed. Whether monitoring should take place during periods when no official work is being done on the site (including weekends) should also be reviewed.

**Response:** Nine out of the ten stations are monitored daily during work activities. One station, HV-8, is monitored one day per week on a random basis. This is specified in the Asbestos Dust Mitigation Plan because HV-8 represents up-wind conditions. The data tables show that the monitors are operating on the required days. EPA agrees with the Air District that monitoring is appropriate during work days and is not necessary on non-work days. Even on work days, the vast majority of results are non-detect and 98% of the results are below the trigger level. EPA’s expectation is that non-work days would have a lower possibility of dust and asbestos generation. While there is no monitoring on non-work days, the requirements for soil management such as stockpile control are still the same as on work days.

**Recommendation 3:** Using one of the procedures outlined above (community air sampling, modeling or extrapolation), estimate asbestos fiber release from the grading/earth moving and truck related activities that occurred between April and August 2006.

**Response:** EPA believes that use of the three and a half years of existing data to represent the three month data gap is the most representative of conditions at the site. See the Response to Comment 3 above for additional detail.

**Recommendation 4:** Revise the conclusions of EPA’s Draft Technical Summary (last paragraph) to more specifically reflect what is supported by the analysis.

**Response:** Agreed, this comment is addressed in the final version of the Report.

**Recommendation 5:** Investigate asthma and nosebleed concerns raised by local residents and determine whether these health issues may be related to non-asbestos contaminants (particularly metals and particulates).

**Response:** Residents in the BVHP neighborhood experience higher rates of asthma hospitalization and emergency room visits than most other neighborhoods in San Francisco. These higher hospitalization rates have been observed for about 15 years that data have been collected and pre-date the development work at Parcel A. There are a variety of social and environmental conditions in the community outside the shipyard that contribute to these disparities. While the asthma rates in Hunters Point are relatively higher than the rest of the city, the rates have also decreased in BVHP substantially over the last fifteen years due to coordinated City asthma policy and action on clinical and environmental factors.
There are no health data available concerning nosebleeds in Hunters Point. Members of the community have asked about chromium and nosebleeds at public meetings. Workers in plating shops exposed to chromic acid mist can develop deterioration in nasal tissues. However, this effect is caused by industrial exposure to high levels of chromic acid mist and chromium in soil has not been found to cause this problem. Finally, the chromium in soil at Hunters Point is the type called Cr(III). This is much less hazardous than hexavalent chromium, or Cr(VI). The particulate concentrations measured at the work site are less than EPA’s national ambient standards.

**Recommendation 6:** On a minor note, it is also recommended to use the same units for expressing asbestos quantities in reports. There is some confusion caused by the various ways in which the air sample data are presented. Asbestos air monitoring data is usually expressed as asbestos structures per cubic centimeter (str/cc). Exceedence reports use structures per cubic meter and the EPA Draft Technical Summary uses scientific notation. An example of the conversion is: 16,000 str/cubic meter = 0.016 str/cc = 1.6E-2 str/cc. It would be much clearer if all used the same method of expressing the data.

**Response:** Agreed, this comment is incorporated in the final version of the Report.
Exhibit 20-9

Letter to San Francisco Board of Education regarding Health Concerns Related to the Asbestos and Dust Control Program at HPS, from Mayor’s Shipyard Citizen’s Advisory Committee, October 2007
October 17, 2007

President Mark Sanchez
San Francisco Board of Education
555 Franklin Street Room #106
San Francisco, CA 94102

Dear President Sanchez:

I write at the direction of the Mayor’s Hunters Point Shipyard Citizens Advisory Committee (CAC) to express our collective disappointment with your recent resolution regarding the purported public health hazards of shipyard redevelopment. While the Board has a responsibility to protect the health of its students and staff, we do not see how your action will do so. We believe the Board’s action was taken absent the minimal homework that could and should have informed its deliberation and decision taking.

In calling for an “independent study” of the dust issue, the School Board ignored the activity of six regulatory agencies: US EPA; the Agency for Toxics Disease Registry (an arm of the U.S. Centers for Disease Control); California Dept. of Toxic Substances Control; California Dept. of Health Services; the Bay Area Air Quality Management District; and the San Francisco Department of Health. US EPA and California DTSC approved the transfer of Parcel A for residential development. The other agencies (staffed by at least four public health physicians), participated in developing the dust control and monitoring regimens, and have recently reviewed those regimens, the monitoring data and the health risks associated with the known exposures, and other possible exposures reasonably inferred where data is not 100% reliable.

Additionally, two private physicians, Dr. John Balmes and Dr. Sarah Jule, associated with the University of California and experts in the area of asbestos exposure, as well as the CAC’s own environmental consultant, Arc Ecology (which has studied shipyard contamination for over 25 years), have also reviewed the environmental data. Collectively, all parties which have reviewed the monitoring regime and the data agree on the following conclusions:

1.) The threshold standard for airborne asbestos established by the Bay Area Air Quality Management District is the strictest in the State of California. To protect public health, the standard requires the halting of project work when the threshold standard is exceeded.

2.) Lennar’s mandated dust/asbestos control plan is also the strictest in California and has been made more stringent over time. Off-site stations have been added to on-site air monitoring stations, plus increased watering, perimeter water mists, and on-site dust marshals.
2.) Lennar’s mandated dust/asbestos control plan is also the strictest in California and has been made more stringent over time. Off-site stations have been added to on-site air monitoring stations, plus increased watering, perimeter water misters, and on-site dust marshals.

3.) Despite monitoring gaps in the first three months of activity, and intermittent problems with the maintenance of the dust/asbestos control program, overall compliance has been protective of public health with respect to dust and airborne asbestos generated by construction on Parcel A.

All of the agencies and expert advisers acknowledge and are troubled that many residents of Hunters Point Hill and the Bayview Hunters Point community suffer poor health relative to other San Francisco neighborhoods. What they challenge are scientifically unsupported, primarily anecdotal claims that dust and asbestos from Parcel A grading activity caused or significantly exacerbated these problems. The CAC is not aware of any credible medical evidence or expert opinion to confirm a causal rather than circumstantial relationship of symptoms to shipyard development.

The CAC considers the conclusions of the regulators and other experts at this point to be definitive. We would suppose that the Board, itself a public agency, would by any reasonable standard consider those Federal, State and municipal agencies to be independent, trustworthy sources of environmental technical assessment. As for the others; admittedly, the physician experts were engaged by Lennar on behalf of a group of neighborhood pastors; and ARE Ecology’s consulting contract is with the Redevelopment Agency. But we think it unlikely that those respected physicians and that organization would knowingly deceive the public and thereby risk their professional credibility for a nominal consulting fee.

We further question the Board’s assertion that this is a failure of environmental justice. Serpentine rock is ubiquitous throughout San Francisco and the entire state. Yet virtually no other community in this city or in California has an equivalent asbestos and dust program. Even with intermittent compliance problems this project provides far greater protection to Hunters Point Hill and Bayview residents than is offered any other neighborhood in the City. These careful provisions result from our environmental justice concerns.

The Board’s invocation of the precautionary principle here is also questionable. Halting construction pending further study will harm Bayview Hunters Point economically. 80 Bayview Hunters Point residents and 35 local service providers and contractors are at work on the project. Layoffs and demobilization will not only hurt Lennar but also cut employees’ incomes by 60% (or more if they don’t qualify for unemployment compensation). Even if Lennar fully paid its workforce during a lay off, as some suggest, the delay in starting housing construction would postpone hundreds of desperately needed, long awaited construction jobs for residents. We would argue that poverty and the lack of access to healthcare continue to be the main cause of public health problems in the neighborhood. Implementing the Board’s resolution to stop the project has much greater potential to cause tangible, versus speculative, harm.

Since 1991, the CAC has been involved in every aspect of shipyard redevelopment planning and implementation. We participated in drafting the Health Code ordinance focusing precisely on Parcel A development, as well as the initial dust control procedures. We constantly review and have continuously improved the dust control plan. We have sponsored seven public workshops on such matters, the first occurring six months ahead of earthmoving and construction activity. On September 10, the CAC sponsored a community forum on the issue wherein a panel
Among members of your Board, only the author of the resolution called a CAC member to discuss this matter. The conversation, reported to have lasted about 10 minutes, occurred just hours before the Board's vote. The Board would have benefited from consulting any of several knowledgeable parties, and conducting a more thoughtful, thorough investigation, prior to voting on its well intended but misinformed resolution.

The Board's action further muddied the waters of this debate by yielding to politics where the science of public health should be deferred to. Sound science (or any proposition) can be made to seem suspect or ridiculous by selective dissection and determined rhetorical assault. The public relies on its officials and representatives to make reasoned judgments as to what are matters of facts or matters of opinion. The issue has come before both the Board of Supervisors and the Redevelopment Commission on several occasions. After weighing the science against the public testimony, heartfelt though it was, of a fraction of the community, both bodies declined to take any action on the claims of imminent peril and long term risk. Your Board, acting on what it believed to be true, did what it believed to be right. Unfortunately what you've taken to be true is completely contrary to the judgment of every expert evaluating the facts as they are known. What you've done will at best do very little about real problems. At worst it will sow more fear and distrust, and delay the reaping of such positive benefits as shipyard redevelopment may bring to the community.

The facts were and are readily available to you, and we strongly urge you to consult them in any future action you may take on this subject. I have enclosed copies of the most recent information for your reference.

Very truly yours,

Scott Madison
CAC Chairman

cc. Mr. Norman Yee, San Francisco Board of Education Commissioner
    Ms. Jane Kim, San Francisco Board of Education Commissioner
    Mr. Eric Mar, San Francisco Board of Education Commissioner
    Ms. Kim-Shree Mauftas, San Francisco Board of Education Commissioner
    Ms. Melynda Mendoza, San Francisco Board of Education Commissioner
    Ms. Jill Wynne, San Francisco Board of Education Commissioner
    Mr. Fred Blackwell, San Francisco Redevelopment Agency, Executive Director
    Mr. Michael Cohen, Director, Bay Area and Development Mayor's Office of Economic
    and Workforce Development
Attachment 21

Proposition P and the Precautionary Principle
Proposition P was approved by the voters of San Francisco on November 7, 2000 and called upon the Navy to remediate the Shipyard to the highest levels practical to ensure flexible reuse of the property. The Board of Supervisors subsequently passed Resolution 634-01, adopting Proposition P as official City policy and urging the Navy and USEPA to take actions to implement Proposition P. The Resolution recognizes that the unrestricted cleanup standard called for in Proposition P identifies a cleanup level acceptable to the community; urges the Navy and regulatory agencies not to rely on barriers to protect future occupants and the public from exposure to pollution, unless other remedies are technically infeasible, and urges the Navy to clean up the Shipyard in a manner fully consistent with the Reuse Plan and with remedies that do not make implementation of the Reuse Plan economically infeasible.

Proposition P is a general statement of policy for a desired result for the Navy and regulators to achieve in implementing the Shipyard cleanup. Three years after the passage of Proposition P, the Redevelopment Agency Commission approved the Conveyance Agreement with the Navy. The Conveyance Agreement is a legally binding agreement that sets forth specific cleanup standards for each parcel, and requires the Navy to obtain concurrence from the regulators that the property is safe for its intended use. The Conveyance Agreement was produced with substantial community input. The Conceptual Framework for the integrated planning adopted by the Board of Supervisors in May 2007 reaffirmed the Conveyance Agreement cleanup standards, stating, “there is an urgent need for the Navy to fulfill its obligations under the Conveyance Agreement to remediate and convey this land to the City as quickly as possible in a condition that is consistent with the City’s reuse plan” [emphasis added]. Eight years after the voters passed Proposition P related to the Shipyard, they passed Proposition G, “The Bayview Jobs, Parks and Housing Initiative,” related to the redevelopment of the Project area, including the Shipyard. One of the stated objectives set forth in Proposition G is to “transform the contaminated portions of the Shipyard property into economically productive uses, or public open space, as appropriate”. Proposition P was approved by 87 percent of the voters in reference to the provisions in CERCLA (Attachment 3) related to community acceptance as a criteria in selecting a cleanup remedy. While “community acceptance” is required to be factored into these cleanup decisions, Proposition P does not supersede the regulations that the Navy and regulators must follow in implementing CERCLA. These regulations are collectively referred to as the National Contingency Plan and set forth nine criteria that must be considered in selecting a cleanup remedy: two “threshold criteria” (overall protection of human health and the environment, and compliance with other applicable or relevant legal requirements); five “balancing criteria” (long-term effectiveness and permanence; reduction in toxicity, mobility or volume through treatment; short-term effectiveness; implementability; and cost) and two “modifying criteria” (state acceptance and community acceptance).
acceptance is an important criterion considered in remedy selection, but it is one of nine criteria and is typically evaluated based on comments received from the public during the public comment period for the Proposed Plan. It would be appropriate for members of the public to cite Propositions P or G as evidence of community sentiment in public comments submitted to the Navy and regulatory agencies on Proposed Plans during the remedy selection process.

**Precautionary Principle Policy Statement**

In July 2003, the Board of Supervisors adopted Precautionary Principle Policy Statement that “the Board of Supervisors encourages all City employees and officials to take the Precautionary Principle into consideration and evaluate alternatives when taking actions that could impact health and the environment, especially where those actions could pose threats of serious harm or irreversible damage.” (Chapter 1 of the San Francisco Environment Code, Section 104.) The policy statement sets forth the key elements of the Precautionary Principle approach to decision-making as (1) Anticipatory Action to prevent harm; (2) Right to Know of the community about “potential human health and environmental impacts associated with the selection of products, services, operations or plans”; (3) Alternative Assessment designed to select the alternative with the least potential impact on human health and the environment; (4) Full Cost Accounting to consider all the reasonably foreseeable costs, including raw materials, manufacturing, transportation, use, cleanup, eventual disposal, and health costs; and (5) Participatory Decision Process, with decisions applying the Precautionary Principle being transparent, participatory, and informed by the best available science and other relevant information (Chapter 1 of the *San Francisco Environment Code*, Section 101).

The ordinance adopting the Precautionary Principle Policy Statement expressly provides, “This ordinance does not impose specific duties upon any City employee or official to take specific actions.” (Chapter 1 of the *San Francisco Environment Code*, Section 104). The Precautionary Principle of the City by its terms applies only to City employees and officials and does not apply to the Navy or federal or state regulators overseeing the cleanup of the Shipyard. The “right to know” aspects of the Precautionary Principle are addressed through the notification protocols and requirements (See Attachment 13, Public Participation and Notification Requirements).
Attachment 22

Residential Use Areas Table and Map
HUNTERS POINT SHIPYARD
San Francisco, California

RESIDENTIAL USE AREAS

Date 7/1/2013  Project 730384802  Figure 22-1

Notes:
1. Parcels boundaries are considered to be approximate; updated December 2012.
2. Data and information provided by San Francisco Department of Public Health and Kleinfelder.
<table>
<thead>
<tr>
<th>Remediation Requirement</th>
<th>Required for Residential Areas</th>
<th>Required for Commercial Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Soil Remedy</strong></td>
<td>Yes</td>
<td>Yes - same as residential areas</td>
</tr>
<tr>
<td>Physical Barrier = Building or Street or Sidewalk or Park area cover (2’ clean soil)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Groundwater Remedy</strong></td>
<td>Yes</td>
<td>Yes - same as residential areas</td>
</tr>
<tr>
<td>Most areas - nothing required. Some small areas with vapors - special foundations for buildings</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Regulatory Oversight</strong></td>
<td>Yes</td>
<td>Yes - same as residential areas</td>
</tr>
<tr>
<td>Continues throughout project</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Attachment 23

Sea Level Rise
Attachment 23
Sea Level Rise

Typically, the design of coastal developments is conducted per Federal Emergency Management Agency (FEMA) and local agency guidelines to set interior grades throughout a community such that the elevation of the first floor of inhabitable space would be above the present-day Base Flood Elevation (BFE) or 100-year return period water level. Improvements along shorelines are required only to protect structures and facilities adjacent to the shoreline against storm wave run-up and overtopping. The flood elevation along the shoreline as specified by FEMA is the 1% Annual Chance of Occurrence Event. FEMA maps flood zones based on this present day flood stage caused by rainfall, or a combination of rainfall, tides, storm surge, and waves.

Over the past century, the National Oceanic and Atmospheric Administration (NOAA) estimates SLR has been approximately 8 inches and was within the allowances that traditional coastal developments included in their design. Based on climate change studies over the past two decades, the rate of SLR appears to be accelerating and climate change models are predicting greater rates of SLR in the future in response to warmer temperatures and melting ice caps.

California Executive Order S-13-08, issued on November 14, 2008, recognized the impact that SLR may have on coastal development in California and directed state agencies to plan for SLR and coastal impacts. The executive order also requested the National Research Council (NRC) to issue a report on SLR to advise California on planning efforts. A State of California Sea-Level Rise Interim Guidance Document was released from the Sea-Level Rise Task Force of the Coastal and Ocean Working Group of the California Climate Action Team (CO-CAT) in 2010 and the final report, Sea-Level Rise for the Coasts of California, Oregon, and Washington, was released from NRC in June 2012. The State of California Sea-Level Rise Guidance Document was updated by CO-CAT member agencies in March 2013. These reports advise California State agencies how California communities should plan for SLR. The 2013 report projects SLR of 5 to 25 inches by 2050 (using 2000 as the baseline year).

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http://www.nap.edu/catalog.php?record_id=13389

In reviewing development proposals regarding public infrastructure, regional and local agencies have taken a more proactive approach. The San Francisco Bay Conservation and Development Commission (BCDC) is recommending that bayfront developments consider a 16-inch SLR value by 2050 (mid-term) and a 55-inch SLR value by 2100 (long-term)\textsuperscript{12}. The California State Coastal Conservancy (SCC) (the "Conservancy") has issued a similar guidance policy\textsuperscript{13}, with the same mid-term and long-term values. Although no guidance policy related to SLR has been adopted by federal, state, or local agencies, the Shipyard development plan incorporates a variety of design and policy measures to prevent future flooding or loss of infrastructure resulting from shoreline erosion.

**Approach to Address Sea Level Rise Effects on Flooding**

A specific SLR study for the Shipyard which included an assessment of shoreline conditions was prepared to develop planning and design guidance through the various phases of the project\textsuperscript{14}. The studies included an assessment of the existing shoreline and shoreline structures; a coastal engineering analysis of tidal, wind-wave, and storm-wave processes for the vicinity; a review of published literature on SLR to develop future SLR allowance estimates; a review of state and regional guidance and policy documents to establish design parameters for shoreline elevation and grades for development areas and open-space; and developing a strategy to address SLR at the Shipyard.

The primary factors which influence coastal flooding are water levels driven by tides and storm surges, and wave overtopping caused by wind waves. These factors are present at any given time and it is necessary to estimate the frequency of their combined occurrence. Tidal information was analyzed to estimate the BFE for buildings and open space within the development using methods recommended by FEMA and the Technical Advisory Committee on Flood Defense. Perimeter elevations were then developed based on allowable overtopping rates to achieve safe conditions for pedestrians during the 1% chance run-up event. Allowances for SLR were then added to the minimum required grades in the interior and along the shoreline, and a strategy for the future was then developed for even higher SLR estimates such that the level of protection provided at construction continues into the future.

A summary of the most commonly quoted estimates of SLR in the scientific and planning literature, with particular reference to California and San Francisco Bay is presented in Table 23-1.

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\textsuperscript{12} BCDC (San Francisco Bay Conservation and Development Commission). 2011. Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline, Staff Report. Approved on 6 October.


Table 23-1
Summary of Reviewed Documents
on Sea Level Rise Estimates

<table>
<thead>
<tr>
<th>Document</th>
<th>Sea Level Rise Estimate/Projection</th>
<th>Time frame (years)</th>
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</thead>
<tbody>
<tr>
<td>California Climate Action Team (CO-CAT), 2013</td>
<td>17 to 66</td>
<td>0.42 to 1.67</td>
</tr>
<tr>
<td>California Climate Change Center, 2009</td>
<td>24 to 55</td>
<td>0.6 to 1.4</td>
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<td>CALFED Bay-Delta Program, 2007</td>
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<td>National Research Council, 1987</td>
<td>20, 39, and 59</td>
<td>0.5, 1.0, and 1.5</td>
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Summary and Adopted Approach

Estimates of SLR vary widely, from an observed value of 8 to about 35-inches per century based on Intergovernmental Panel on Climate Change high estimates. Empirical studies and news articles have stated that SLR over the next 100 years could be substantially higher and could be as much as 55 inches by 2100. Through 2009, high-resolution altimetry data indicate that global mean sea level has risen at a rate close to projections that correspond to an increase in global mean sea level of around 10 inches by 2050 and 30 inches by 2100. It is clear is that the science of climate change and SLR is evolving, making it prudent to develop community designs that can accommodate various levels of SLR over the development planning horizon rather than design to a specific report or estimate.
The strategy for the Shipyard uses mid-term (16 inches) SLR values for the shoreline edge and storm drainage system. For long-term planning beyond 50 years from now, the evolving nature of climate change and SLR science needs to be recognized and no single SLR value should be relied upon at this point in time. Instead, an adaptive management strategy will be put in place such that improvements for SLR beyond the mid-term planning horizon can be designed and implemented as sea levels rise.

**Adaptive Management Strategy**

For shoreline protection, it is not practical to build a high wall around the Shipyard for a condition that may not happen for several decades as it would pose a visual obstruction and limit public access. It is also not prudent to build to present sea level conditions and continue to elevate the development as sea levels rise. Therefore, an interim SLR estimate for the year 2050 of 16 inches, as put forth by BCDC and the Conservancy, was selected as the design criteria to use for design and initial construction. If SLR tracks according to current projections, these design criteria will ensure that adaptive management construction activities are not triggered until at least the year 2050. The storm drain system will be constructed with an initial SLR allowance of 16 inches, and will be adaptable to higher levels of SLR with minimal intervention. It will function as a gravity-drained system until about 2050, beyond which the Adaptation Strategy will be implemented that will consist of installing storm drain pumps using funds generated by the development.

All buildings and entrances to subterranean parking and streets would be set at an elevation that is 36 inches higher than the present day BFE and an additional 6 inches of freeboard will establish the finished floor elevations for buildings. This would ensure that even if no shoreline protection improvements are undertaken, or in the event of a slope failure along the shoreline, neither buildings nor transportation infrastructure would be flooded when water levels rise 42 inches higher than current BFE. Additionally, this allowance provides subterranean parking a minimum of approximately 36 inches between parking finish floor and present groundwater levels. This increase in elevation would provide flood protection beyond 2080 time frame according to the most aggressive SLR projections. Implementation of mitigation measures would require that all housing be elevated out of the floodplain by grading and fill, that the City’s Interim Floodplain Maps be updated to reflect finished grade elevations, and that open space setbacks be put in place to allow protection against future SLR. It is important to note that due to the topography of the site and the proposed grading program to accommodate the new development program, most if not all, of the developed footprint will be constructed at elevations that will accommodate the long term projection of 55 inches in SLR. As a part of FEIR mitigation measures, a project-specific SLR Adaptive Management Plan will be implemented that will provide guidance, identify relevant stakeholders, define appropriate management actions and triggers, and establish a project-specific funding mechanism. It would be administered by an entity created for the Project that would have taxing authority and funding responsibility.
The strategy envisions incorporating ongoing measurements of SLR from the scientific community into a Monitoring Program that would guide the decision-making process for future improvements. The Monitoring Program will include protocol to compare observed changes in sea level with the as-built perimeter elevations. This would use updates of changes in sea level provided by the NOAA, National Geodetic Survey, or other appropriate agency. The monitoring program would be administered by a Geologic Hazard Abatement District (GHAD), Community Facilities District (CFD) or other public entity with similar funding responsibility. This entity would guide the decision-making process for implementation of future improvements, such as raising the perimeter.

The Adaptive Management Plan will define specific triggers for action, based on observed changes in sea level. The Plan will require 5- or 10-year updates based on observed changes in sea levels as well as any other effects of climate change (e.g., more or less extreme storm wave conditions). The initial strategy, as well as any updates, will be coordinated with relevant stakeholders including the City and County of San Francisco, State Parks, FEMA, and BCDC.

Proposed development setbacks will enable a variety of future perimeter modifications to accommodate the 55-inch long term projection. The adaptive management strategy described above is based on elevation and structural characteristics of the shoreline along the project boundaries. The varied nature of this shoreline, ranging from protected and unprotected slopes, beaches, seawalls, and wharves, may require a multitude of potential adaptive management measures.

**Sea Level Rise Effects on Movement of or Exposure to Toxics**

SLR creates a potential for residual chemicals in the ground to interact with groundwater. As described in Attachment 4 Parcel-by-Parcel Summary and Expected Transfer Dates, there are ongoing remediation programs related to former Navy operations. The Navy is providing soil and groundwater remediation (cleanup) to reduce chemical concentrations to meet cleanup levels approved by federal and state regulatory agencies. If the potential for the interaction with groundwater were to present a risk to human health or the environment, then further remedial activities would be required by law. Additionally, the institutional controls placed on areas with residual contaminant, would enforce action to maintain the protection to the environment and prevent human exposure.

Residual chemicals in soil will largely consist of certain specific metals, which are typically associated with the rock and soil that were historically used to fill in the Bay to expand the Shipyard. They are not part of a “spill” or “release” of contaminants, but reflect metals concentrations normally associated with Franciscan Formation bedrock found in fill used during the period when areas of the Shipyard were filled. These metals are not readily soluble and will not dissolve into groundwater at concentrations of concern to human or ecological health. Thus, a rise in the groundwater level caused by a rise in sea level would not mobilize these metals (see Figures 23-1 and 23-2).
will be a strict prohibition against pumping groundwater for domestic, commercial, industrial or irrigation purposes.

**Mitigation Measures for Other Potential Sea Level Rise Hazards**

Anticipated SLR is being taken into account as part of the development design process to ensure that planned land uses can be achieved. Specific building designs will take the anticipated SLR into consideration. The Shipyard and Candlestick Point Design for Development documents, which establish design standards for vertical construction, require that buildings be designed for the anticipated groundwater levels to prohibit groundwater from entering basements or parking structures.

Residual chemicals that may remain in soil after cleanup will be located under a physical barrier (e.g. pavement, building, or 2 feet of clean soil) that prevents human exposure to the residual chemicals. This requirement to install a physical barrier on the entire site to prevent access to this residual contamination is a part of the Navy CERCLA cleanup documents (Attachments 3 and 4), which have been approved by the USEPA, DTSC and the RWQCB. Furthermore, the requirement to maintain a physical barrier will be a requirement of each and every landowner within the former Shipyard. SLR is not expected to compromise covers and/or engineered caps that may be placed on top of an area of known or suspected residual contamination (see Figures 23-1 through 23-3). Figure 23-4 shows how these physical barriers relate to measures the project is taking to address SLR. Operation and maintenance plans for these covers and engineered caps will be carried out to monitor and repair potential breaches. Emergency response plans will be carried out following major flooding events, at which time engineered caps and covers will be investigated for potential breaches and repaired.
Parcel E-2 Protections Against Sea Level Rise

Under CCR Title 27, Section 21090, all closed landfills are required to have an engineered landfill cap if landfill materials are left onsite. The landfill cap is intended to maintain a protective seal and keep moisture and rain from penetrating the landfill waste and prevent human and environmental exposure to the disposed waste. The Navy has selected an engineered cap remedy for Parcel E-2 landfill to prevent unsafe exposures from chemicals allowed by the regulators to be left in place. Operation and maintenance plans will be developed and carried out to monitor for and repair potential breaches should they occur. Any breach of cover would be repaired so that no long-term health risks would occur. SLR is not expected to compromise the landfill cap because the many layers of the cap are robust enough to endure saturation and submersion. In addition, the operation and maintenance plan will continue to require ongoing inspections and repairs will be implemented as needed (see Figure 23-3).

Sea Level Rise and Residual VOCs

Existing groundwater contamination will be remediated prior to development to levels that will allow safe reuse. After cleanup, there may still be low levels of residual VOCs in groundwater and soil that could potentially produce vapor intrusion into buildings constructed over these areas. To address this potential, the Navy will sample subsurface soil vapor to define areas where vapor intrusion may be an issue. If soil vapor sampling results indicate areas where vapor intrusion could be an issue, vapor mitigation systems will be designed and constructed within and underneath building foundations. These vapor mitigation systems are common, well tested, and protective of residential or commercial building occupants. These soil vapor sampling programs, defining areas requiring vapor controls and the design and installation of vapor mitigation systems will be overseen and further approved by the regulators (USEPA, DTSC, and RWQCB). Soil vapor mitigation systems will be subject to periodic inspection and maintenance to ensure proper operation. VOC vapors occur in soil that is not saturated with water. Therefore, if sea level were to rise and if there was an associated rise in groundwater, the volume of VOC vapors under a building might be reduced; however a rise in groundwater might cause VOC vapors to migrate from impacted soil and groundwater into soil pore spaces which would become saturated due to this higher groundwater level. If the potential for the interaction with groundwater were to present a risk to human health or the environment then further remedial activities would be required by law. Additionally, the Institutional Controls placed on areas with residual contamination would enforce action to maintain the protection to the environment and prevent human exposure.
Attachment 24

Seismic Hazards and Liquefaction
The Shipyard and the entire San Francisco Bay Area are in a seismically active region and active nearby faults could potentially generate an earthquake. As evidenced by the level of development throughout the San Francisco Bay, successful building construction is possible in a seismically active zone and can be readily accomplished even where seismic hazards exist through the implementation of appropriate structural and foundation design and/or ground improvement measures. Seismic activity associated with a large earthquake on a nearby fault could potentially result in seismic hazards at the site such as ground shaking, fault rupture, liquefaction, lateral spreading, ground settlement, ground oscillation, and seismic slope instability. These seismic hazards and their likelihood of occurring at the Shipyard are described below.

- Ground shaking is expected to occur at the Shipyard during a large earthquake on one of the nearby faults. The intensity of seismic shaking or strong ground motion during an earthquake at any particular location is dependent on a number of factors, including the distance and direction of the site from the earthquake epicenter, the earthquake magnitude, and the geologic conditions at and in the vicinity of the site. Site-specific seismic and geotechnical studies will be undertaken prior to final building design to evaluate the peak ground acceleration from an earthquake expected at the site and the structure will be designed to accommodate the anticipated ground shaking under the peak ground acceleration.

- No known active faults cross the site, rendering hazards from fault rupture at the site unlikely.

- Earthquake-induced settlement, other than that which occurs only in soil below the groundwater level, could potentially occur in areas where loose sand is present above the groundwater (differential compaction). The upper fill layer at the Shipyard has been characterized as a heterogeneous mix of gravel, sand, silt, and clay that contains varying amounts of debris (wood, glass, etc.). There could be zones of soil within this layer above the groundwater level that contain loose sand. Because of the heterogeneous nature of the fill layer, settlements resulting from differential compaction could occur both uniformly and differentially, unless mitigation measures such as ground improvement and/or structural/foundation solutions are implemented.

- Portions of the Shipyard have been mapped in a zone designated to have the potential for seismically induced landslides. Hazards associated with seismically induced landslides can be mitigated using methods generally accepted by California Certified Engineering Geologists (CEG) and California Registered Geotechnical Engineers (GE), including ground improvement and/or structural/foundation solutions.
• Ground oscillation is a phenomenon where the surface soil layer, riding on a buried liquefied layer, is thrown back and forth by the shaking and can be severely deformed. While areas of the site have been identified as containing potentially liquefiable soils, there is no evidence of a broadly spanning buried liquefiable layer (with the possible exception of one area of the Parcel D/E shoreline area – described below) above or below the existing groundwater table on which the surface layer could be oscillated. Therefore, the potential for this hazard at the Shipyard would be considered low. Furthermore, mitigation measures, which would be implemented where liquefiable soils are identified, would also reduce the risk of damage to structures from ground deformation.

**Site-Specific, Design-Level Geotechnical and Seismic Studies**

The Seismic Hazard Mapping Act was passed in 1990 following the Loma Prieta earthquake to reduce threats to public health and safety and to minimize property damage caused by earthquakes. The Act requires site-specific geotechnical investigations to identify potential seismic hazards and formulate corrective measures prior to permitting of developments designed for human occupancy within the Zones of Required Investigation. The Seismic Hazard Map for the City and County of San Francisco (Figure 24-1) shows large portions of the Shipyard to be within a Zone of Required Investigation for liquefaction potential similar to the majority of the downtown SF, Mission Bay and eastern neighborhoods that are all built on fill material. For projects in a hazard zone, the DBI requires that the geologic and soil conditions of the Project site be investigated and appropriate mitigation measures, if any, incorporated into development plans. The Navy has already performed some site specific studies as part of their design studies and results indicate that there is no evidence of a broadly spanning buried liquefiable layer (with the possible exception of one area of the Parcel D/E shoreline area – described below) above or below the existing groundwater table on which the surface layer could be oscillated.

Site-specific, design-level geotechnical and seismic studies, must be performed prior to issuance of any building permits to identify the potential for seismic hazards at the Shipyard. These studies will consist of geotechnical investigations with site-specific seismic analysis and will provide ground improvement/mitigation and/or foundation design recommendations to address potential seismic hazards, should they exist. Seismic studies will evaluate the anticipated site-specific peak ground accelerations that will induce ground shaking so that the structure (foundation and superstructure) can be designed to accommodate the anticipated shaking. All structural designs will incorporate and conform to the requirements and recommendations in the site-specific geotechnical and seismic investigations. Furthermore, the City's DBI permit application, review, and inspection process ensures that structures will be designed and built to requirements contained in Title 24, Part 2 of the California Code of Regulation (California Building Code [CBC]). The geotechnical engineer will review Project plans and specifications and observe ground improvement and foundation installation to check for conformance to the geotechnical and seismic recommendations and requirements.
Date 7/1/2013  Project 730384802  Figure 24-1

Notes:
1. Liquefaction & landslide hazard data provided by California Geological Survey (CGS), as of October 26, 2012. No guarantee of accuracy or completeness.
Mitigation Measures to Address Potential Seismic Hazard

Mitigation measures to address potential seismic hazards include structural measures and ground improvement. All structures, including the foundation (below ground portion) and superstructure (above ground portion), will be designed to accommodate the anticipated ground shaking under the peak ground acceleration (as determined by the site-specific seismic study) and other potential seismic hazards, including earthquake-induced ground settlement. Foundation mitigation measures could include the construction of deep foundations, which transfer building loads to competent soil or rock below the zone where seismic densification/differential compaction could potentially occur, or use of a structural, sufficiently-reinforced mat foundation and/or a geotextile/geogrid beneath structures to distribute loads and reduce the potential for damage to the structure from earthquake-induced ground settlement. Ground improvement measures could include (1) overexcavation and replacement of soil potentially subject to earthquake-induced settlement with engineered compacted fill; (2) dynamic compaction (such as deep dynamic compaction or rapid impact compaction) to densify the loose soil; and (3) stone columns, soil-cement columns, or rammed aggregate piers to densify the loose soil and provide additional bearing support beneath building foundations.

If the design-level, site-specific geologic, seismic, and geotechnical studies identify the presence of landslides that could be triggered by an earthquake, recommendations for slope stabilization procedures will be provided and implemented. Slope stabilization procedures could include (1) use of retaining walls, rock buttresses, screw anchors, or concrete piers; (2) provision of slope drainage or removal of unstable materials; (3) provision of rockfall catch fences, rockfall mesh netting or deflection walls; (4) provision of setbacks at the toe of slopes; and/or (5) avoidance of highly unstable areas.

Amplification effects can occur when seismic waves travel through soft soils underlain by shallow bedrock. During the design-level site-specific seismic hazards assessment, appropriate attenuation relationships will be selected to account for amplification affects. All structures and improvements will be designed based on the appropriate seismic design parameters based on the seismic hazards assessment.

Liquefaction Potential and Associated Hazards

The Shipyard, like the Marina, Embarcadero, Financial District, South of Market Street, and Mission Bay neighborhoods, is in an area of San Francisco that has been designated as potentially liquefiable (Figure 24-1). However, many buildings and structures have been successfully constructed within potentially liquefiable zones through the implementation of proper foundation design and/or ground improvement.

The majority of the Shipyard is covered by artificial fill, which is a heterogeneous mix of gravel, sand, silt, and clay that contains varying amounts debris (wood, concrete, glass, etc.). There could be zones of soil within this layer that contain loose granular soil that
may be susceptible to liquefaction. However, because of the heterogeneous nature of the fill, liquefaction within the fill is expected to occur in random layers and pockets, limiting the extent of seismically induced settlement and lateral spreading\textsuperscript{15} to localized zones within the fill. There is a hydraulically placed sand fill in the vicinity of the southeast-facing shoreline of Parcels D and E at the Shipyard Phase II that consists of a thick unit of predominantly uniform loose, dredged sand and is, therefore, more susceptible to liquefaction. Other than this unit, the Navy has already performed some site specific studies as part of their design studies and results indicate that there is no evidence of a broadly spanning buried liquefiable layer above or below the existing groundwater table on which the surface layer could be oscillated.

Evidence of liquefaction includes: flow failure, lateral spreading, differential settlement, loss of bearing strength, ground fissures, and sand boils (see Figures 24-2 through 24-4). Based on existing data, there is little or no risk of large translational ground movements at the Shipyard as a result of liquefaction. However, should liquefaction occur, there are five common liquefaction-associated hazards, which site-specific, design-level studies should address. Mitigation measures require that structures be designed to accommodate potential liquefaction-associated hazards or ground treatment/site improvement techniques are implemented prior to construction. The specific potential liquefaction-associated hazards are (1) potential foundation bearing failure, or large foundation settlements caused by ground softening, (2) potential structural and/or site settlements, (3) localized lateral displacement; “lateral spreading” and/or lateral compression, (4) flotation of light structures with basements, or underground storage structures, and (5) hazards to lifelines (utilities critical to emergency response). The regulatory scheme that exists in California to address these liquefaction hazards and how the project will mitigate hazards is described below.

**Site-Specific, Design-Level Liquefaction Studies**

California Public Resources Code Division 2, Chapter 7.8 (the Seismic Hazards Mapping Act) and the CBC contain regulations protecting the public from geo-seismic hazards, such as liquefaction. The Seismic Hazard Mapping Act was passed in 1990 following the Loma Prieta earthquake to reduce threats to public health and safety and to minimize property damage caused by earthquakes.

The Act requires site-specific geotechnical investigations to identify potential seismic hazards and formulate corrective measures prior to permitting of developments designed for human occupancy within the Zones of Required Investigation. The Seismic Hazard Map for the City and County of San Francisco (Figure 24-1) shows large portions of the Shipyard to be within a Zone of Required Investigation for liquefaction potential. The Navy has already performed some site specific studies as part of their design

\textsuperscript{15} Lateral spreading is a phenomenon in which surficial soil displaces along a shear zone that has formed within an underlying liquefied layer. Upon reaching mobilization, the surficial blocks are transported downslope or in the direction of a free face by earthquake and gravitational forces.
studies and results indicate that there is no evidence of a broadly spanning buried liquefiable layer (with the possible exception of one area of the Parcel D/E shoreline area – described above) above or below the existing groundwater table on which the surface layer could be oscillated. For projects in a hazard zone, the DBI requires that the geologic and soil conditions of the Project site be investigated and appropriate mitigation measures, if any, incorporated into development plans. Measures that can be employed, depending on the specific site conditions, include (1) over excavation and replacement of potentially liquefiable soil with engineered compacted fill, (2) compaction grouting to densify the loose, potentially liquefiable soil, (3) dynamic compaction (deep dynamic compaction or rapid impact compaction) to densify the loose, potentially liquefiable soil, (4) vibro-compaction (also known as vibro-flotation) to densify the loose, potentially liquefiable soil, (5) stone columns to provide pathways for pore pressure to dissipate in potentially liquefiable soil, thus reducing the potential for liquefaction-induced settlement, and (6) soil-cement columns to densify the loose, potentially liquefiable soil and provide additional bearing support beneath building foundations. Alternatively, if appropriate and depending on the specific site conditions, structures can be designed to accommodate the potential liquefaction-associated hazards, such as ground settlement.

Site-specific, design-level liquefaction studies will be performed prior to issuance of any building permits. These studies will consist of geotechnical investigations with site-specific seismic analysis and will provide ground improvement and/or other mitigative recommendations to address potential liquefaction-related ground hazards, should they exist. The recommendations will identify the specific recommended techniques for achieving the site-specific performance goals to mitigate liquefaction-related hazards (e.g., performance standards for specific ground improvement techniques, such as the level of densification to which the soil needs to be improved to mitigate liquefaction). Available, possible techniques include overexcavation and replacement of liquefiable soil, compaction grouting, deep dynamic compaction, vibro-compaction and stone or soil-cement columns. All project structural designs will incorporate and conform to the requirements and recommendations in the geotechnical investigations. Furthermore, the geotechnical engineer will review project plans and specifications and observe ground improvement and foundation installation to check for compliance to the geotechnical recommendations and requirements.

**Seismic and Liquefaction Effects on Movement or Exposure to Toxics**

As described in Attachment 4, Parcel-by-Parcel Summary and Expected Transfer Dates, there are ongoing remediation programs related to former Navy operations. The Navy is providing soil and groundwater cleanup to reduce chemical concentrations to meet cleanup levels approved by federal and state regulatory agencies. Surface covers (e.g., physical barriers) will be installed as part of the cleanup to support the development (e.g., building slabs, pavement for roads, concrete for sidewalks, 2 feet of clean soil for landscaped areas) and minimize exposure to background metals. These physical barriers will limit exposure and protect humans from long-term health risks even if breaches in the barriers temporarily occur. Operation and maintenance plans for these barriers will
be carried out to monitor and repair any breaches. Therefore, if ground rupture were to occur, contaminants should not be released at levels presenting a concern to human or ecological health (see Figures 24-2 and 24-3). Additionally, the land use restrictions placed on these areas would enforce action to maintain protection of the environment and prevent human exposure.

Under CCR Title 27, Section 21090, all closed landfills are required to have an engineered landfill cap if landfill materials are left onsite. The engineered landfill cap is intended to maintain a protective seal and keep moisture and rain from penetrating the landfill waste and prevent human and environmental exposure to the disposed waste. In accordance with the Parcel E-2 ROD an engineered cap will be constructed on top of the Parcel E-2 landfill to prevent unsafe exposures from chemicals allowed by the regulators to be left in place, operation and maintenance plans will be developed and carried out to monitor for and repair potential breaches should they occur due to seismic events or liquefaction (see Figure 24-4). Any breach of the engineered cap would be repaired so that no long-term health risks would occur.

**Sea Level Rise Effects on Liquefaction Potential**

If sea level should rise in the future, it is anticipated that the groundwater table elevation would also rise. As liquefaction can only occur in saturated soils located below the groundwater table, this would cause soil not currently beneath the groundwater table to become saturated and potentially susceptible to liquefaction in the future. Site design will accommodate a future SLR of 36 inches. To account for the future impact of SLR, design-level liquefaction analysis and modeling will be based on a groundwater table elevation that assumes groundwater is 36 inches higher than present conditions. Since liquefaction occurs only in soil below the groundwater table and the groundwater table would be higher because of SLR, depending on the site-specific soil conditions, the thickness of the liquefiable layer and corresponding liquefaction-induced settlement could be increased. Another, mitigating consideration, however, is that as the groundwater level rises, the thickness of soil that would potentially be subject to seismically induced differential compaction settlement (loose non-saturated sand above the groundwater level) would decrease. Depending on site-specific soil conditions, the settlement of soil induced by liquefaction (saturated soil below the groundwater) and the settlement of soil induced by differential compaction (non-saturated soil above the groundwater) would be expected to be of similar magnitude; therefore, the overall impact on the site from liquefaction would be unaffected or negligibly affected by SLR (see Figures 23-1 through 23-3). Thus, the net effect of SLR on seismically induced settlement (increased thickness of potentially liquefiable layer and decreased thickness of layer subject to differential compaction) is expected to be minimal.

**Mitigation Measures to Potential Liquefaction-Related Hazards**

Mitigation measures can reduce or avoid potential liquefaction-related hazards and include structural measures and ground improvement methods. Structural measures
could include the construction of deep foundations, which transfer building loads to competent soil or rock below the potentially liquefiable zone, or use of a structural, sufficiently reinforced mat foundation to distribute loads and reduce the potential for damage to the structure from liquefaction-induced ground settlement with flexible utility connections to allow some settlement beneath the buildings. If liquefaction estimates are such that these treatments would not address liquefaction and settlement-related impacts adequately, ground improvement measures could include (1) over excavation and replacement of potentially liquefiable soil with engineered compacted fill, (2) compaction grouting to densify the loose, potentially liquefiable soil, (3) dynamic compaction (deep dynamic compaction or rapid impact compaction) to densify the loose, potentially liquefiable soil, (4) vibro-compaction (also known as vibro-flotation) to densify the loose, potentially liquefiable soil, (5) stone columns to provide pathways for pore pressure to dissipate in potentially liquefiable soil, thus reducing the potential for liquefaction-induced settlement, and (6) soil-cement columns to densify the loose, potentially liquefiable soil and provide additional bearing support beneath building foundations. Performance standards that must be achieved are set forth in the geotechnical report recommendations specific to the site-specific ground improvement technique.
Attachment 25

Acronym List
## Acronym List

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<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
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<td>Aircraft Components, Inc.</td>
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<td>ACM</td>
<td>asbestos containing materials</td>
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<td>ADMP</td>
<td>Asbestos Dust Mitigation Plan</td>
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<td>Agency</td>
<td>San Francisco Redevelopment Agency</td>
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<td>ARICs</td>
<td>Areas Requiring Institutional Controls</td>
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<td>GMP</td>
<td>gas monitoring probe</td>
</tr>
<tr>
<td>HASP</td>
<td>Health and Safety Plan</td>
</tr>
<tr>
<td>HRA</td>
<td>Historical Radiological Assessment</td>
</tr>
<tr>
<td>IR</td>
<td>Installation Restoration</td>
</tr>
<tr>
<td>LBP</td>
<td>lead-based paint</td>
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<tr>
<td>LUC RD</td>
<td>Land Use Control Remedial Design</td>
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<tr>
<td>LUCs</td>
<td>Land Use Covenants</td>
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<tr>
<td>MMRP</td>
<td>Mitigation Monitoring and Reporting Program</td>
</tr>
<tr>
<td>Montrose</td>
<td>Montrose Chemical Corporation</td>
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<tr>
<td>NOAA</td>
<td>National Oceanic and Atmospheric Administration</td>
</tr>
<tr>
<td>NRC</td>
<td>National Research Council</td>
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<tr>
<td>OCII</td>
<td>Office of Community Investment and Infrastructure</td>
</tr>
<tr>
<td>Acronym</td>
<td>Definition</td>
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<tr>
<td>---------</td>
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<tr>
<td>RI</td>
<td>Remedial Investigation</td>
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<tr>
<td>RMP</td>
<td>Risk Management Plan</td>
</tr>
<tr>
<td>ROD</td>
<td>Record of Decision</td>
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<tr>
<td>RWQCB</td>
<td>Regional Water Quality Control Board</td>
</tr>
<tr>
<td>SCC</td>
<td>California State Coastal Conservancy</td>
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<tr>
<td>SFDPH</td>
<td>San Francisco Department of Public Health</td>
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<td>Shipyard</td>
<td>Hunters Point Shipyard</td>
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<tr>
<td>SLR</td>
<td>Sea Level Rise</td>
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<td>SVE</td>
<td>soil vapor extraction</td>
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<tr>
<td>UC</td>
<td>Utility Corridor</td>
</tr>
<tr>
<td>USEPA</td>
<td>United States Environmental Protection Agency</td>
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<tr>
<td>VOC</td>
<td>volatile organic compound</td>
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<tr>
<td>ZVI</td>
<td>zero-valent iron</td>
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