Final
NAVAL AIR STATION ALAMEDA
Restoration Advisory Board (RAB) Meeting Minutes

March 13, 2014

www.bracpmo.navy.mil
950 West Mall Square, Alameda City Hall West
Room 140, Community Conference Room
Alameda Point
Alameda, California

The following participants attended the meeting:

Co-Chairs:

Derek Robinson	Base Realignment and Closure (BRAC) Program Management Office (PMO) West, BRAC Environmental Coordinator (BEC), Navy Co-chair
George Humphreys	Restoration Advisory Board (RAB) Community Co-chair

RAB Members

Susan Galleymore; Carol Gottstein, M.D.; Daniel Hoy; James Leach; Skip McIntosh; Bert Morgan; Dale Smith; Jane Sullwold; Michael John Torrey

Community Members/Public Attendees

Gretchen Lipow; Trish Spencer

Navy

Bill McGinnis, Lead Remedial Project Manager, BRAC PMO-West

Regulatory Agencies

James Fyfe, California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC)
Xuan Mai Tran, US EPA
John West, Water Board

City of Alameda

Peter Russell, Russell Resources/City of Alameda (City)

Contractors

Bruce Marvin, Geosyntec
Neven Matasovic, Geosyntec
Jessica O'Sullivan, Tetra Tech
Tommie Jean Valmassy, Tetra Tech

MEETING SUMMARY

I. Welcome and Introductions

George Humphreys (RAB Community Co-Chair) called the March 2014 former Naval Air Station Alameda (Alameda Point [AP]) RAB meeting to order, and initiated a round of introductions. Derek Robinson (RAB Navy Co-Chair) reviewed the agenda. The meeting agenda is provided as Attachment A.

II. Co-Chair Announcements

Mr. Humphreys provided a list of documents he received in in January and February 2014 (Attachment B). Mr. Humphreys also submitted official RAB comments on the IR Site 1 Remedial Design (Attachment C). He said the comments generally state concern over the lack of a rodent barrier; the bulkhead is designed to slide sideways, which means there could be a major displacement; and the document did not have an executive summary, which would have been helpful. Mr. Humphreys said he could not locate the Proposed Plan (PP) for Site 1, other than the one for the burn area. Mr. Robinson said there is a PP for all of Site 1. After additional characterization, the remedial design for the burn area had to be changed, which is why there is a second, more recent PP just for the burn area.

Mr. Robinson said he would like to start planning the summer site tour. He asked if the RAB preferred a smaller tour, just for RAB members, like the one done last year. Susan Galleymore (RAB member) said she would prefer to open the tour to a group larger than just the RAB. Dale Smith (RAB Member) said she would like to see the Site 2, Site 1, and the cans area, where the wind turbines will be located. Carol Gottstein (RAB member) said she would like to see the compass rose, which is currently not accessible. Mr. Robinson asked RAB members to let Mr. Humphreys know any other sites they would like to see during the tour. The sites will be listed and voted on at the May RAB meeting; the tour will be held sometime in July.

III. Community and RAB Comment Period

Ms. Smith asked for more information about “soil tack” because she is concerned about its environmental side effects. John West (Water Board) said the Water Board requires that soil tack be used at Site 2 for erosion and dust control. He added there have been numerous studies on soil tack. Mr. West will email Ms. Smith some study information, including the breakdown products of soil tack.

Mr. Humphreys raised a point of interest for the RAB. He said there is a three-way land swap taking place in Alameda. The school district will receive 20 acres on Alameda Point, including the Bachelor Officer Quarters, in exchange for giving up 12 acres near Encinal High School.

IV. Seismic Evaluations

Mr. Robinson introduced Dr. Neven Matasovic (Geosyntec) to present an evaluation of seismic issues at Alameda Point (Attachment D). Dr. Matasovic said he is a geotechnical engineer. He selected three representative sites at Alameda Point to evaluate. Dr. Matasovic showed a video of a magnitude 9.0 earthquake, recorded in Japan. The RAB asked what the maximum credible earthquake would be in Alameda. Dr. Matasovic said the maximum credible earthquake would be 7.0 on the Hayward fault. Mr. West asked if liquefaction stops when the shaking stops. Dr. Matasovic said shaking is typically 20-30 seconds, while liquefaction can last for 1-2 minutes.

Skip McIntosh (RAB member) said the Marsh Crust is composed of a material that is not likely to liquefy.

During the review of slide 9, Ms. Galleymore asked how large are the shaking tables that were used during simulation. Dr. Matasovic said the one he was referring to is 30 feet by 30 feet. University of California (UC) San Diego in La Jolla has the largest shaking table, and UC Davis has the largest centrifuge, which is also used for seismic simulations.

The first representative site Dr. Matasovic discussed is Operable Unit (OU) 5. During the review of slide 19, Mr. Humphreys said he is concerned that higher concentrations at the bottom of the benzene and naphthalene plume will rise during liquefaction. Dr. Matasovic said that, from a mechanical point of view, the Marsh Crust cannot rise. It is a thick clay layer. Dr. Matasovic said that the greatest perturbations occur in the top 3-4 feet of the groundwater table. Mr. Humphreys theorized that if water spurts to the surface, there could be a circulation effect. Dr. Matasovic said that from experience, this effect is not observed or expected.

Next Dr. Matasovic reviewed OU-2B. He noted this area will be remediated, likely within three years. He said he does not see anything unique at this site. Dr. Matasovic said liquefaction is a surficial problem, and there is less liquefaction with increasing depth. Mr. West asked if having multiple aquifers makes a difference; Dr. Matasovic said it does not. Mr. Humphreys noted the clock for a 140 year seismic event started in 1865. The current cleanup schedule may not be in time before the next seismic event. Dr. Matasovic said it is difficult to say when an earthquake could happen.

The third representative site Dr. Matasovic reviewed was the IR Site 2 landfill. Dr. Matasovic said of all three sites he reviewed, this would be at the bottom of his list of concerns. He said the landfill is thick and goes below the groundwater level. The landfill cap is like an engineered crust. In addition, waste does not liquefy, so it serves as somewhat of another crust. Ms. Smith asked about lateral spread at the landfill. Dr. Matasovic said that California landfill design engineers are required to account for lateral spread when designing a landfill cover. Bill McGinnis (Navy) explained that the Site 2 landfill design would not expose waste to people or the environment in the event of an earthquake, but there may be some lateral spreading that would have to be fixed. During the review of Slide 21, Skip McIntosh (RAB member) asked about the report listed on the cross section. It is labeled “AECOM [2011]”. Mr. Robinson said he will locate the AECOM 2011 document referenced.

Mr. Robinson asked where a sand boil would most likely be expected at Site 2 in the event of an earthquake. Dr. Matasovic said a sand boil is most likely to occur in an area closest to the shore, where there is no waste, just sand. Mr. Humphreys stated that the remedial action work plan for IR 1 has a waste isolation barrier that is designed to slide sideways as a unit some 15 feet or more during a major seismic event. He asked what the effect on the barrier would be if only a section of the wall moved and the rest stayed in place. Mr. Humphreys requested that this be added to the list of action items. Dr. Matasovic replied that he was unfamiliar with closure design, but that it would have to meet state of California closure regulations. Dr. Gottstein suggested that the landfill operations ceased before the closure regulations went into effect.

During the review of the path forward on slide 26, Mr. Robinson said the Navy is adding groundwater sampling for OU-2B in the event of an earthquake. Mr. Humphreys said he is concerned that it could take the Navy months to repair something that is damaged in an earthquake. Mr. Robinson said the Navy would be able to get emergency funding for something to protect

human health. Peter Russell (City) asked if a 7.0 earthquake would be likely to damage a monitoring well. Dr. Matasovic said that would be unlikely, since the wells are in the ground and will move along with the movement of the ground.

V. OU-2A Fieldwork Update

Mr. Robinson presented the OU-2A fieldwork update (Attachment E). He said there had been a delay in the start of fieldwork, so he does not have many photos yet. Ms. Smith asked how long the planned direct push injections will last. Mr. Robinson said the initial phase of treatment will last 8-10 months, then monitoring will take place for a couple years. Dr. Gottstein asked if the storage units are in use; Mr. Robinson confirmed they are. The field crew is working to allow renters access when needed; road sections are closed for a day at a time, in order to be less intrusive.

Mr. Humphreys asked about the vent lines. He said the recent report shows the vent lines above the surface, bringing in air then venting. He asked if this could be causing a release of ethylbenzene that could affect nearby residents and the school. Mr. Robinson said he will send photos of the OU-2A vent pipes once they are installed, along with the plan drawings and an explanation of how they should work.

VI. Approval of Meeting Minutes/Review Action Items

Mr. Humphreys asked for comments on the draft January 2014 meeting minutes.

Ms. Smith made the following comments:

- Page 2, Section II, first paragraph five lines up from the bottom: after the sentence ending "it is a major event." add "She stated this exercise was a total waste of money, and Mr. Bangert concurred."
- Page 4, Section V, second paragraph: add these sentences to the end of the paragraph "Ms. Sabedra suggested an alternative to a rodent barrier, such as shooting or trapping the rodents. Mr. Bangert was against poisoning animals because of potential effects on other animals. Other RAB members suggested it was a barbaric solution of unnecessary pain."

Mr. Humphreys made the following comment:

- Page 2, Section II, third paragraph: Strike the last sentence, beginning "However, Mr. Humphreys believes…" replace with "The contractor is relying on the persistence of aerobic conditions to keep contaminant levels low. Because the original conditions of the plume were anaerobic, Mr. Humphreys expects the conditions to return to anaerobic after cessation of air sparging. Mr. Humphreys believes monitoring should be done for two years because that is how long it takes landfills to go from aerobic to anaerobic after air sparging."

Mr. Robinson reviewed the action items; see updated table.

The minutes were approved with the preceding changes incorporated. The next RAB meeting will be held on Thursday, May 8, 2014.

Action Items:	Previous Item #/ Action Item Status/ Action Item Due Date:	Initiated by:	Responsible Person:
1. Request for Presentations: a. OU-2A Tarry Refinery Waste and Rail Cars b. Liquefaction during a seismic event	a. Pending b. Complete	a. RAB b. RAB	Mr. Robinson
2. Navy to look into video-conferencing capabilities at various Alameda locations	Ongoing	RAB	Mr. Robinson
3. OU-5/FISCA IR-02 Navy to investigate whether a return to anaerobic conditions after cessation of biosparging will result in contaminant concentrations at the groundwater/soil interface	Pending	Mr. Humphreys	Mr. Robinson
4. Navy to locate the Loma Prieta seismic report for AP (Pacific Earthquake Engineering Report ([PEER])	Pending J. Leach was unable to locate the report	Ms. D. Smith	Mr. Robinson
5. Let Mr. Humphreys know any other sites RAB members would like to see during a tour.	New	Mr. Robinson	RAB
6. Mr. West will email Ms. Smith some study information, including the breakdown products of soil tack.	New	Ms. Smith	Mr. West
7. Mr. Robinson will send photos of the OU-2A vent pipes once they are installed, along with the plan	New	Mr. Humphreys	Mr. Robinson

Action Items:	Previous Item #/ Action Item Status/ Action Item Due Date:	Initiated by:	Responsible Person:
drawings and an explanation of how they should work			

ATTACHMENTS

NAVAL AIR STATION ALAMEDA
RESTORATION ADVISORY BOARD MEETING ATTACHMENTS

A. Naval Air Station Alameda Restoration Advisory Board Meeting Agenda, March 13, 2014 (1 page)

B. Documents Received January/February 2014 – provided by George Humphreys (1 page)

C. RAB Comments on the Draft Remedial Design and Remedial Action Work Plan, IR Site 1– provided by George Humphreys (7 pages)

D. Seismic Evaluations (27 slides)

E. OU-2A Fieldwork Update (5 slides)

RESTORATION ADVISORY BOARD

NAVAL AIR STATION, ALAMEDA

AGENDA

MARCH 13, 2014, 6:30 PM

ALAMEDA POINT – 950 WEST MALL SQUARE, ALAMEDA CITY HALL WEST
SUITE 140/COMMUNITY CONFERENCE ROOM
(FROM PARKING LOT ON W. MIDWAY AVENUE, ENTER THROUGH MIDDLE WING)

TIME	SUBJECT	PRESENTER
6:30 – 6:35	I. Welcome and Introductions	Community and RAB
6:35 – 6:45	II. Co-Chair Announcements	Co-Chairs
6:45 – 7:15	III. Community and RAB Comment Period*	Community and RAB
7:15 – 8:00	IV. Seismic Evaluations	Dr. Neven Matasovic Geosyntech
8:00 – 8:15	V. OU2A Fieldwork Update	Navy Representative
8:15 – 8:30	VI. Approval of Minutes	RAB
8:30	RAB Meeting Adjournment	

* If there is time at the end of the agenda, additional comments will be taken.

List of Documents Received During January and February 2014

1. "Draft, Remedial Design and Remedial Action Work Plan, Installation Restoration Site 1", Dec. 20, 2014 (actually received Jan. 9, 2014), prepared by AMEC Environment & Infrastructure, Inc. for BRAC Program Management Office West.
2. "Upcoming Deliverables, November 2013, Alameda Point, CA" (received January 23, 2014).
3. "Draft Remedial Design and Remedial Action Work Plan, Installation Restoration Site 1", Dec. 2013, prepared by AMEC for NAVFAC, revised CD and pages 1 through 4 of Appendix drawings, Jan. 23, 2014.
4. "Draft 2014 Annual Groundwater Monitoring Report", Jan. 23, 2014, prepared by (Sealaska?) for NAVFAC, CD only.
5. "Draft, Task Management Plan, Fill Importation and Stockpiling, Installation Restoration Site 1, Alameda Point, Alameda, California", prepared by AMEC Environmental & Infrastructure, Inc. for BRAC Program Management Office West, Feb. 11, 2014 (received Feb. 13, 2014).
6. "Draft, Storm Water Pollution Prevention Plan for Remedial Design and Remedial Action at Installation Restoration Site 1, Alameda Point, Alameda, California", prepared by AMEC Environmental & Infrastructure, Inc. for BRAC Program Management Office West, Feb. 11, 2014 (received Feb. 13, 2014).
7. "Final, Remedial Action Completion Report, Installation Restoration Site 34, Alameda Point, Alameda, California", February 21, 2014, (received February 24, 2014), prepared by ERS Joint Venture, 3550 Watt Avenue, Unit 140, Sacramento, CA, 95821 for NAVFAC, Base Realignment and Closure, Program Management Office West, San Diego, CA.

Restoration Advisory Board, Alameda Point
c/o 25 Captains Drive | Alameda, CA 94502-6417

Mr. Derek Robinson, P. E.
Base Environmental Coordinator
U. S. Department of the Navy
Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, CA 92108-4310

February 22, 2014

Subject: Draft, Remedial Design and Remedial Action Work Plan, Installation Restoration Site 1, Alameda Point, Alameda, California, Dec. 31, 2013, with revised pages Jan. 23, 2014

Dear Mr. Robinson:

The Restoration Advisory Board (RAB) has reviewed the above document. The undersigned members submit the following comments on the report.

Our comments fall into four general categories:

(1) **Cost**
- the Navy's apparent intent to transfer major future costs for maintenance of the closure to the transferee (City or Park District)

(2) **Public Safety and Visual Appeal**
- detrimental aspects of the waste isolation bulkhead (WIB) from the standpoint of public safety and visual appeal

(3) **Environment**
- the lack of a barrier to prevent burrowing animals from penetrating the dirt cover
- the wetlands plan

(4) **Geotechnical**
- liquefaction and seismic risks

(1) Cost:

Transfer of Major Costs to the New Owner

One example of this is the Waste Isolation Bulkhead (WIB). The report gives the minimum life of the bulkhead as 50 years, with an expected life with proper inspection and maintenance of 100 years. The estimated initial construction cost of the WIB was given as $6 million at the January 2014 RAB meeting. Many of the toxic chemicals and radioactivity will remain dangerous for hundreds of years. Radium-226, for instance, has a half-life of 1620 years. Furthermore, concentrations of these materials in the buried waste cells and in the burn area are much greater than surface cleanup levels. Therefore, it is unreasonable to assume that the WIB and containment cover will not be needed after 50 or 100 years. The $6 million initial construction cost of the WIB would escalate to $40 million after 50 years, and $300 million after 100 years (assuming a 4% annual inflation rate for construction costs).

If some entity, such as the Navy were to set aside $6 million as a sinking fund invested at a fixed interest rate of 4 %, after 50 or 100 years, there would be money available for the first replacement of the WIB. The Navy, however, does not plan to set up such a fund, but rather to transfer the liability to the future owner. Further, this would only pay for the first replacement and many replacements of the WIB may be necessary before the contaminants could be safely released to the environment. The Navy has argued that replacing the wall would be less expensive than the initial construction. In fact, the cost probably would be greater because not only would a new WIB have to be constructed, but also the old wall would have to be demolished and waste materials in back of the wall would have to be temporarily removed during construction and later backfilled. The most likely scenario is that after 50 years periodic patching and repairs would be required, followed by full replacement after 100 years. If these future costs are not properly budgeted, the City or Park District is going to be hit with a sudden requirement of coming up with say $40 million or more to replace the waste isolation bulkhead after 50 years.

The same type of argument can be made about maintaining the waste isolation cover (WIC), especially after seismic events. Although the transferee is receiving the land free from the Navy, recreational open space is not a large revenue producer and the transferee will be saddled with high potential future costs for maintenance and replacement of the waste containment system.

Perhaps the tacit assumption being made is that the WIB will not be needed after 100 years. If so, this should be stated as an explicit criterion. We believe that the buried wastes will still pose a hazard after 100 years. This means containment will still need to be maintained. The trajectory of global warming can be expected to continue even if humanity suddenly takes draconian measures to curb greenhouse gas emissions. Sometime after 2100, sea level rise could inundate the site. This will not be manifested by a gentle rise in water levels with the contained wastes gradually being submerged. The site will be battered by storm surges and waves that could breach the WIB and erode behind the shoreline riprap causing toxics to be washed into the Bay.

(2) **Public Safety & Visual Appeal:**

Detrimental Aspects of Waste Isolation Bulkhead

The WIB, consisting of an open cell sheet pile wall, constitutes a 750-ft long escarpment, 13 ft high. Someone falling over the wall at low tide could be seriously injured. At mean high water, the individual would fall into 9 ft deep water and have to swim over 100 yards to reach a steep rubble-covered escape area. This represents a real danger especially for small children; Drawing S4, "Open Cell Waste Isolation Bulkhead, Typical Wall Sections," of Appendix H, shows a fence/barrier to be "provided by others". Such a barrier would obstruct the beautiful view that is one of the prime attributes of the site. The wall may also present an attractive target for taggers and graffiti artists. Finally, while a fence or railing along the top of the WIB might reduce the danger of persons falling over the wall, it would present an obstacle to those trying to escape from the Bay.

(3) Environment:

Protection Against Burrowing Animals

At the January 2014 meeting of the RAB, dissatisfaction was expressed about the lack of a plastic grid barrier, like the one being installed at IR Site 2, to protect against burrowing rodents. The Navy's response was that two different consultants had arrived at disparate design solutions. It seems apparent that the Navy and responsible regulators should have exercised some guidance to assure that there was a logical consistency between the rodent protection measures used for closure of the two very similar landfill sites. It doesn't make any sense to allow the presence of burrowing animals at IR Site 2 and to exterminate them at IR Site 1. At the January RAB meeting when queried as to why a rodent barrier wasn't included, the presenter informed the community that control would be up to the transferee as determined in the Operations and Maintenance Plan. The RAB will not see the operations and maintenance plan until at least May 2015 when that document is scheduled to be completed. The subject work plan will have been finalized before the RAB and other community members can comment on the rodent control methods proposed by the transferee.

After reviewing the subject document, we can find no mention of rodent controls. There are limited measures that could be selected by a future owner/transferee. These include rodenticides (second generation anticoagulants), filling surface holes with a cement/sand mixture, trapping, patrolling the area with terriers, flooding of burrows and fumigation . Rodenticides are environmentally unacceptable because raptors and scavengers might consume dead rodents, thereby spreading the rodenticides and any other toxics (including radioactivity) into the environment and wildlife protection area. The use of a plastic grid barrier, like that used at IR Site 2, is the superior choice for rodent control.

The IR Site 1 Remedial Design, described by the subject document, allows for partial failure of the cover system as a result of a major seismic event. Surface cracks up to 2.25 inches wide and 18 inches deep are allowed by the design criteria following a major seismic event. It may be that the plastic grid barrier was rejected because it would not withstand such seismic

displacements. If that was the reasoning, a barrier with overlapping sheets or expansion joints/linkages could be used.

At one time, the Navy stated that no ground squirrels are present at Alameda Point. The subject document, however, acknowledges the presence of squirrels and jackrabbits at IR Site 1 (Appendix B, page 2-5). The statement was also made that squirrels only burrow 18 inches deep. That may be the rationale for a 3-ft cover. However, the validity of this assertion is highly questionable. Ground squirrels are known to make much deeper holes - perhaps up to 6 ft. Moreover, "squirrels dig holes, then dogs chase the squirrels and make the holes bigger. The burrowing erodes the landfill cover and causes toxins to leach into San Francisco Bay. The problem is they might be threatening the water quality." (See San Francisco Chronicle, "Park squirrels, gophers have to go." February 19, 2014.) In any event, other burrowing animals such as gophers, skunks, and jackrabbits make deeper holes and borrowing owls are known to enlarge squirrel holes. San Francisco Bay Regional Water Quality Control Board states that the holes cause "garbage juice" to leak into the bay. Garbage juice is a murky stew of metals, petroleum and other toxins." The problem with not providing a barrier is that anyone observing an animal burrow with surrounding dirt mound would have to assume that the dirt might be contaminated with toxic chemicals and/or radioactivity. Operators of a surface recreation facility or park should not be expected to analyze or scan every mound of dirt brought to the surface by burrowing animals.

It was suggested at the RAB meeting that a protective barrier might not be needed for those portions of Site 1 covered by concrete runways This appears feasible unless contaminated soil from the beach areas and from along the Bay shoreline south of the Waste Isolation Bulkhead is excavated and placed on top of the runway. In that case, a barrier would still be needed for the runway area, because toxic materials would be on top of the concrete, rather than underneath. From Figure C-9, Appendix H, it appears that foundation material (as much as 5 ft) will be placed on top of the runway concrete. This foundation material must be free of contaminants or a rodent barrier would be needed under the 3-ft soil cover.

Wetlands Mitigation Plan (Appendix B)

The plant species selected for the wetlands mitigation plan should use those native plants adapted to seasonal rather than year-round wet soil conditions. Will the deep dynamic compaction of the soil along the estuary damage the historic training wall or affect draining in the wetlands mitigation area?

(4) Geotechnical

Liquefaction and Seismic Risks

Leaving the toxic wastes in the ground over a "highest risk area for liquefaction" and at a location in close proximity to the Hayward Fault – offering the highest risk of earthquakes in the near future – presents significant risks that are not addressed. (See ABAG liquefaction risk maps and USGS and ABAG seismic risk maps for the Bay Area.)

The document discloses that the substrate beneath the waste and fill is Bay Mud, a relatively impermeable barrier above the water saturated, confined Merritt Sand. This is a perfect scenario for liquefaction induced subsidence and eruption of "sand volcanoes" where sand and

water erupt through the confining mud and flow to the surface, entraining any contaminants encountered along the way and leaving pathways for liquids to migrate back to contaminate the aquifer after the subsidence-related sand and water venting has ceased. For example, at the Port of Richmond, it took weeks for sand volcanoes triggered by the Loma Prieta Earthquake to cease. Liquefaction with the accompanying subsidence potentially will lower the surface of areas of the western portion of the former NAS Alameda subjecting near surface sediments to new erosional conditions.

From Appendix I, "Stability Commentary and Calculations, PND Engineers Inc., July 19, 2013", page 3 of 3, during liquefaction caused by a major seismic event, the entire WIB structure will move as a unit. The liquefaction case imposes no additional force on the wall, as the slip plane is under the toe of the face sheets. Conversely, the WIB imposes no force on the soil mass as the wall is moving with the sliding mass. All of the material will be contained within the bulkhead. The question can be asked, "How far will the WIB move laterally toward the Bay?" The "Remedial Design and Remedial Action Work Plan" does not highlight that number in the tables of performance objectives (Table 4-4) and stability design criteria (page 5-15). However, from Appendix I, PND's analysis gave the horizontal displacement as 16 to 20 feet. This agrees well with the earlier 2002 Foster Wheeler study that estimated 15 ft. displacement. Thus, it appears that although the WIB will remain intact, it would move at least 15 ft toward the Bay as a result of a major seismic event. Before 2100, it is probable that two major seismic events will occur (one on the Hayward Fault and one on the San Andreas Fault). The resulting 30 to 40 ft of lateral movement of the WIB probably would require its replacement before the estimated 100-year life based on corrosion considerations.

During the lateral movement of the WIB, caused by seismically induced liquefaction, there should also be rotational movement imposed on the wall, with the toe of the wall moving out with respect to the top. There would be subsidence of the soil in back of the wall after each major seismic event. Potential weak areas exist at the transition of the WIB and the deeply compacted soil at both ends of the wall. Cracks and gullies could be created in these transition zones. During liquefaction, what happens to the WIB if one section of the bank slides and the adjacent section(s) stay(s) in place?

With respect to the near shore environment, particularly the contaminated sediments at the skeet range, the current bay shoreline is a sloping surface armored by scrap concrete and similar solid debris. This shoreline serves to dissipate and disperse wave energy. The replacement, a vertical wall of metal plates, will have the opposite effect, reflecting wave energy back and potentially disturbing and remixing the shallow contaminants incorporated into the near shore sediments in the skeet range areas.

You told us at a RAB meeting in 2013 that the Treasure Island skeet range sediments are too toxic to leave in place and the responsible agency requires them to be removed. It is reasonable to expect that a similar requirement may be applied to the Alameda skeet range contamination. How would the presence of this disruptive WIB limit the potential removal of contaminated skeet range sediments? Removing support from the toe of the structure seems to be an act likely to reduce WIB stability, an alleged stability already questionable as the result of the significant seismic risk in this area and the liquefaction potential of the local sediments.

Specific Comments

(1) At most places in the report, the cover thickness is stated to be 3 ft. (e.g. Table 4-4, page 4-4); however, in Appendix J, Seismic Stability Analysis September 2010, page 2 of 8, the thickness in given as 4 ft. Why was the thickness reduced?

(2) In Appendix I, Seismic Stability Analysis, page 8 of 8, it is stated that cracks from an earthquake are approximately 2.25 in. thick and 24 in. deep. (See also Table 4-4 Remedial Action Performance Objectives and Criteria, page 4-10.) However, on page 5-15, Stability Design Criteria, it is stated that ground fissures should be limited to 18 in., or half the cover thickness. Please explain why the cover thickness was reduced from 4 ft. to 3 ft.

(3) The seismic stability analysis (IR Site 1- 60% remedial design), page 2 of 8 states that IR Site 1 is an unlined disposal facility planned to be converted into an "adult" recreational area. Does this mean that children will not be allowed in the recreation area?

(4) All the figures in Appendix B are missing.

(5) In Appendix I, Table 5.2, the caption at the top of the right-hand column should read "Liquefaction Induced Horizontal Displacement" not "Settlement".

(6) Appendix J mentions both Maximum Probable Earthquake (MPE) and Maximum Credible Earthquake (MCE). Which design standard was used by the Navy? Why?

We appreciate the opportunity to comment on the IR Site Remedial Design and Remedial Action Work Plan.

Please note: RAB member Dale Smith is submitting a separate comment letter dealing primarily with the vegetation plan for the waste area and the wetlands mitigation areas. It seems appropriate that those comments be submitted separately as they deal with a different subject matter than that of this comment letter.

Sincerely,

George B. Humphreys
RAB Community Co-chair

Susan Galleymore
RAB Community Vice Co-chair

Jim Sweeney

Bert Morgan

Daniel Hoy

Richard Bangert

Jane Sullwold

Kurt Peterson

James Leach

William "Skip" McIntosh

William Smith

Michael John Torrey

CAROL GOTTSTEIN

Copies to:

Ms. Xuan-Mai Tran, U.S. EPA
Mr. Christopher Lichens, U.S. EPA
Mr. James Fyfe, DTSC
Mr. John West, RWQCB
Dr. Peter Russell, Russell Resources
Ms. Jennifer Ott, City of Alameda
Mr. Tony Daysog, City of Alameda

Seismic Evaluation Revisited

Representative IRP Sites
Alameda Point, California

Presented to Restoration Advisory Board by:

Neven Matasovic, Ph.D., P.E., G.E.

Prepared for:

13 March 2014

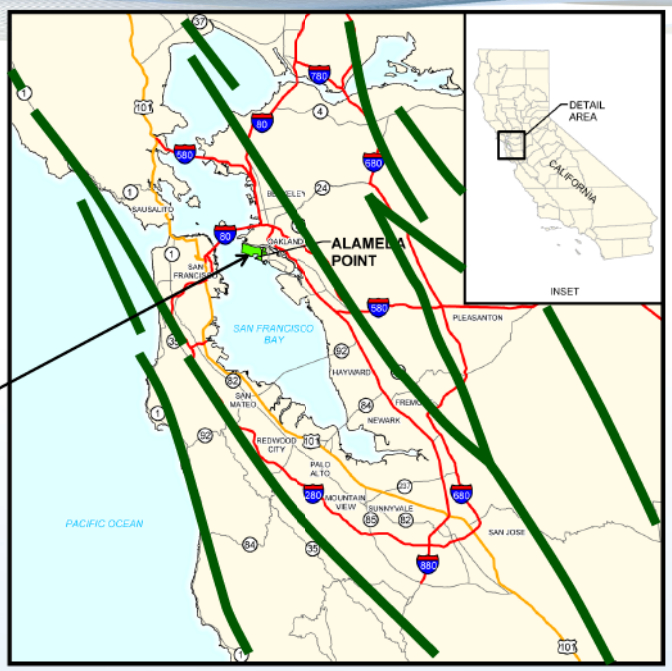
Battelle
The Business of Innovation

Geosyntec consultants

Outline

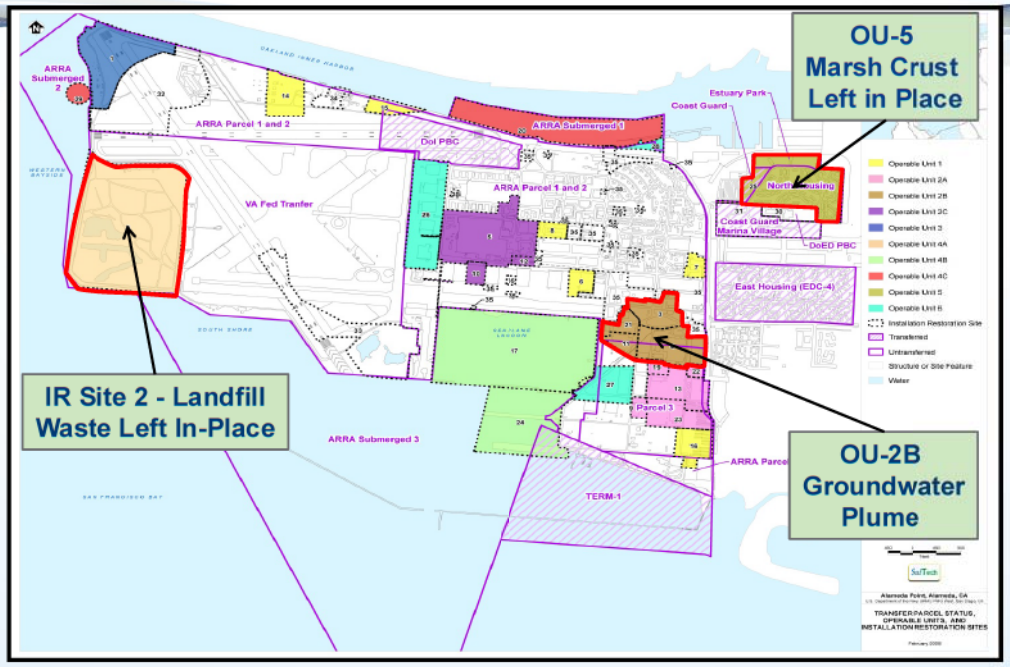
- Introduction
- What can go Wrong?
- How to Address the Concerns?
- Representative Sites
- Path Forward

Alameda Point



Alameda Point

Representative Sites

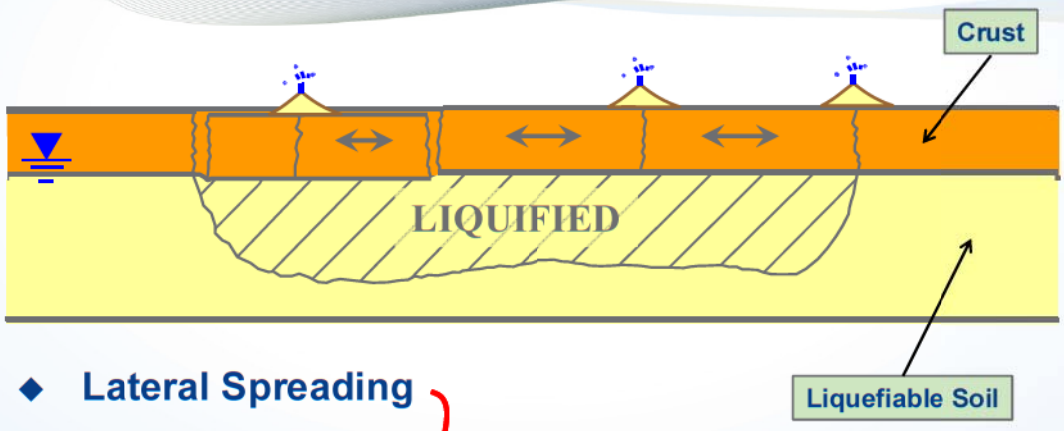


Hydraulic Fill / Groundwater 6 – 12 ft b.g.s.

What Can Go Wrong?

Video – 2011 M 9.0 / Chiba City, Japan
(Hydraulic Fill / Groundwater 1.5 – 2.0 ft b.g.s.)

Navy's Concerns

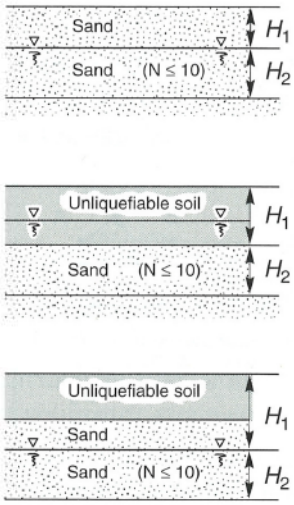


- Lateral Spreading
- Cracking
- Sand Boils
- Settlement …

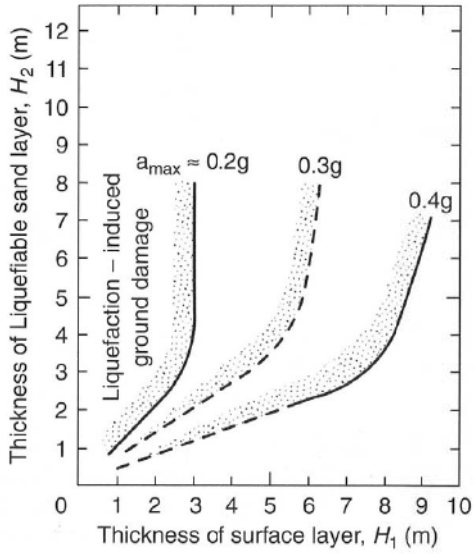
} Release of Contaminants?

How to Address the Concerns ?

Empirical Correlations

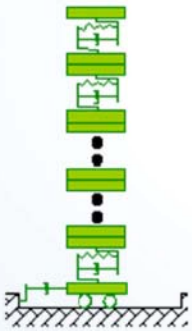


Ishihara (1985)

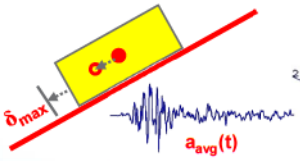


How to Address the Concerns ?

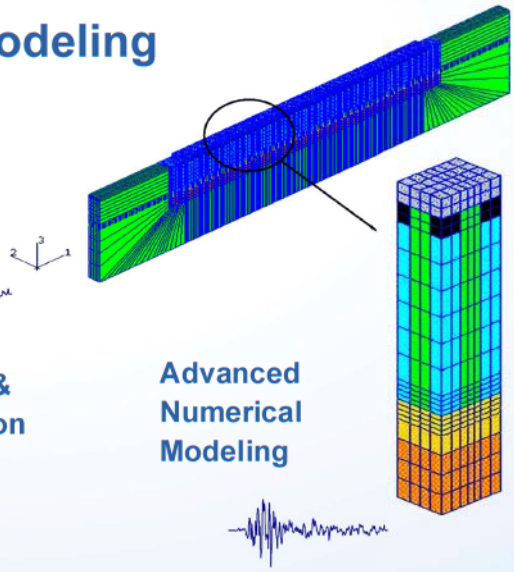
Numerical Modeling



Site Response Analysis

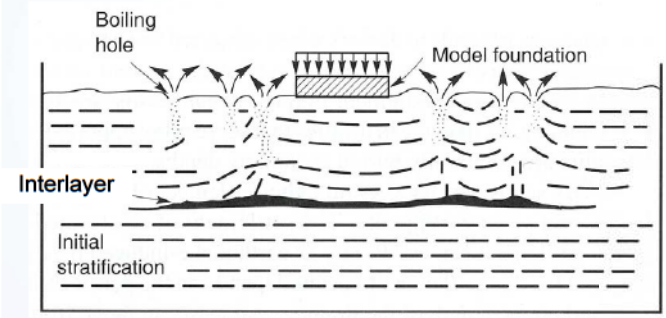


Lateral Spreading & Seismic Deformation Analysis



Advanced Numerical Modeling

How to Address the Concerns ?



Physical Modeling:

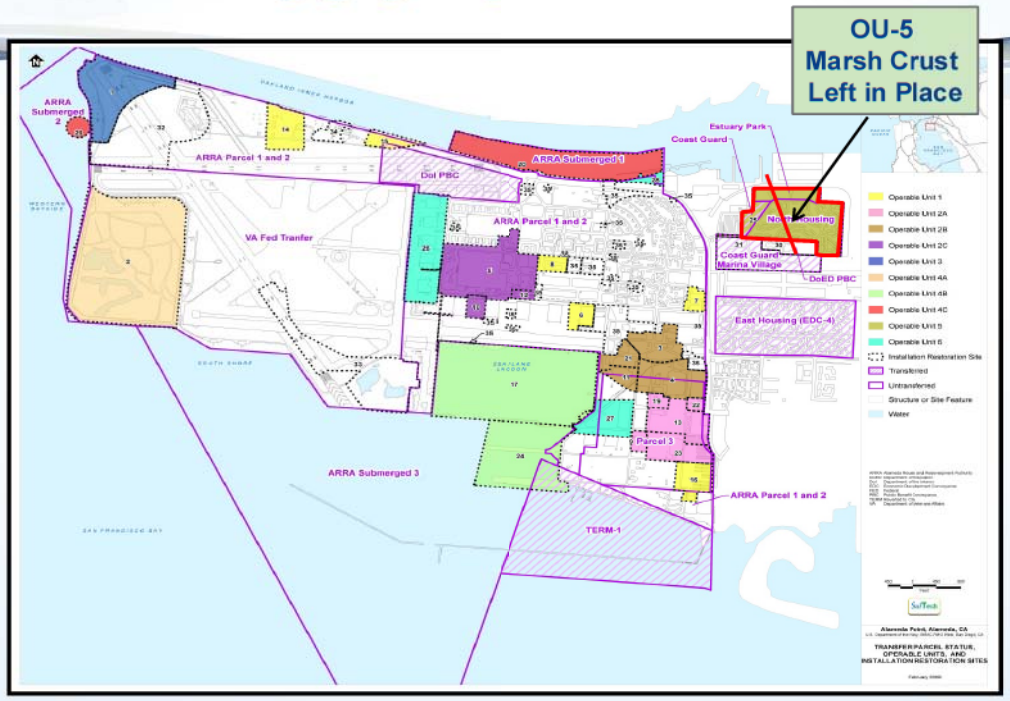
- Geotechnical Centrifuge
- Shaking Table Test
- "Simple" Models

What is Applicable ?

- Operable Unit 5 (OU-5; IR 25) (42 acres)
- Operable Unit 2B (OU-2B) (46 acres)
- IR Site 2 (OU-4A) (77 acres)

} Representative Sites

OU-5 – Overview



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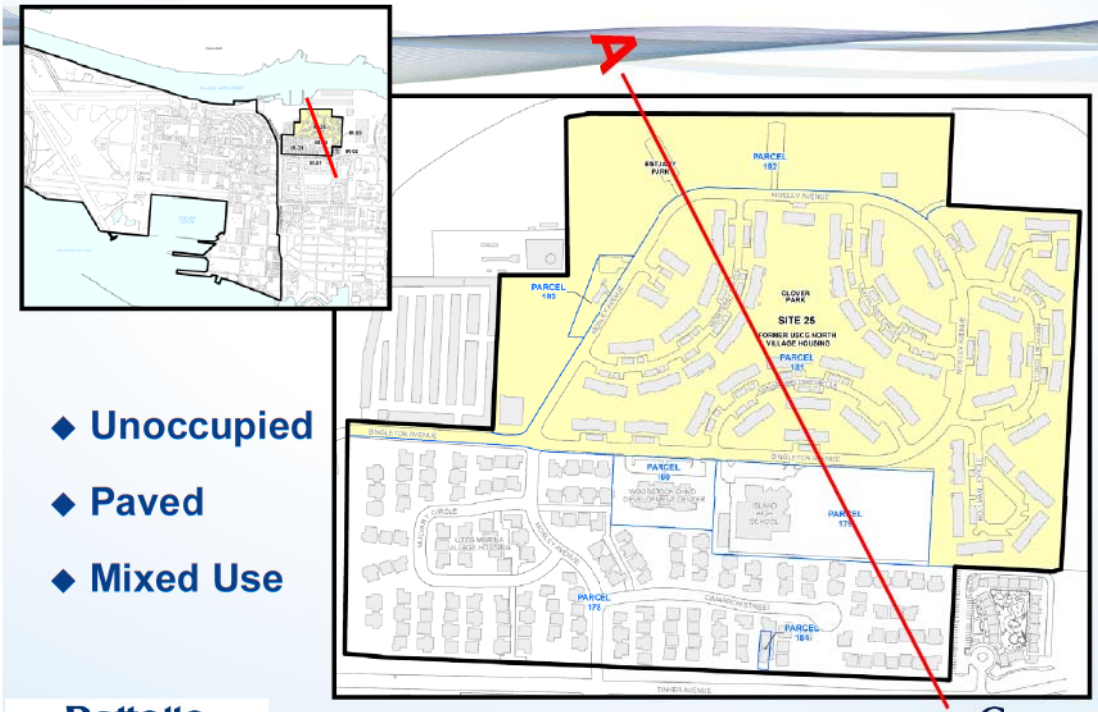
OU-5 – Plan View



- Unoccupied
- Paved
- Mixed Use

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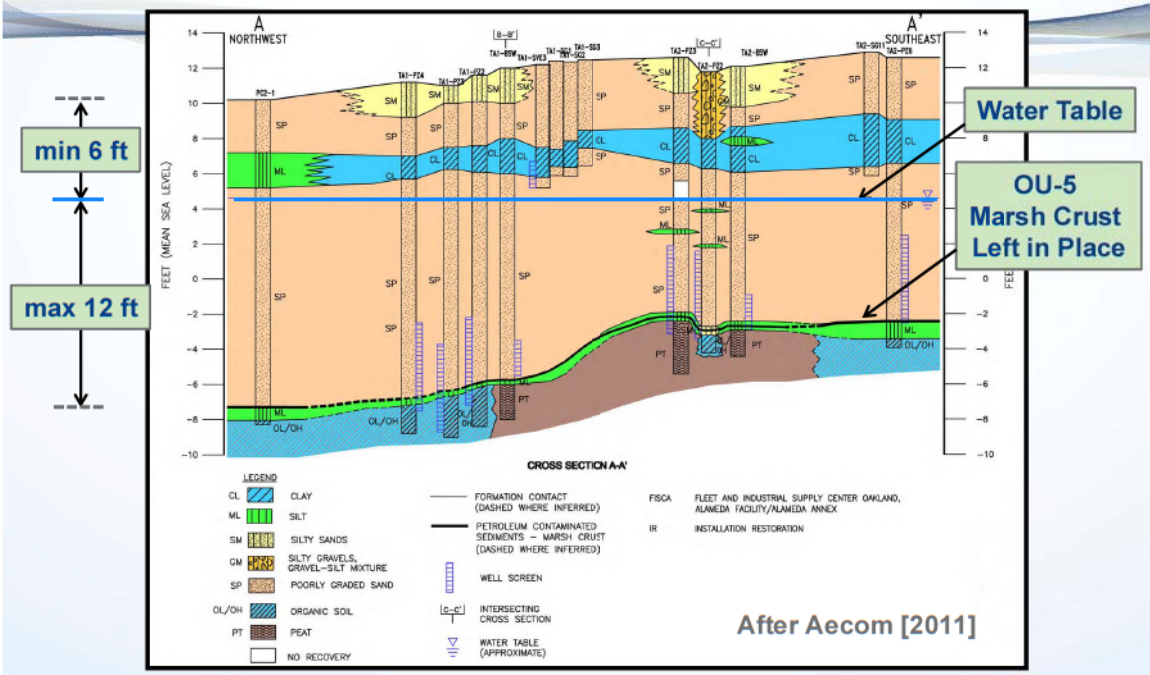
OU-5 - Cross Section



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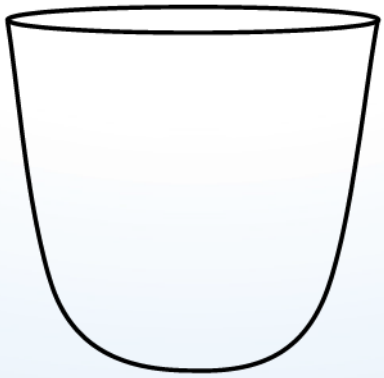
OU-5 – Physical Modeling

Can Marsh Crust Propagate to the Surface?



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OU-5 – Physical Modeling

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OU-5 – Physical Modeling

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OU-5 – Physical Modeling

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OU-5 – Physical Modeling

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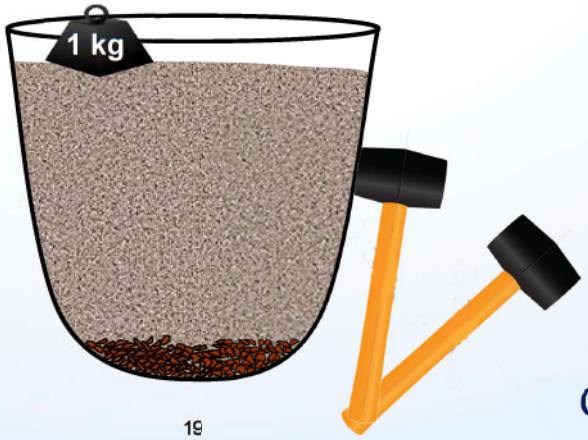
OU-5 – Physical Modeling



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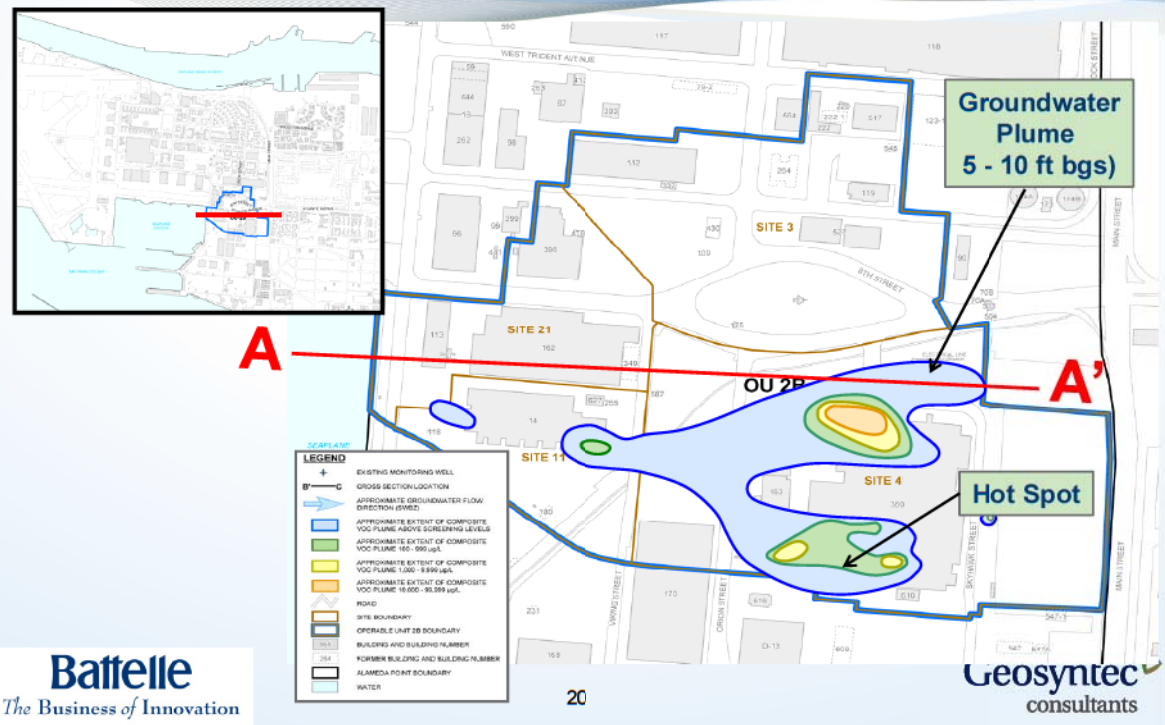
OU-2B – Overview and Plan View



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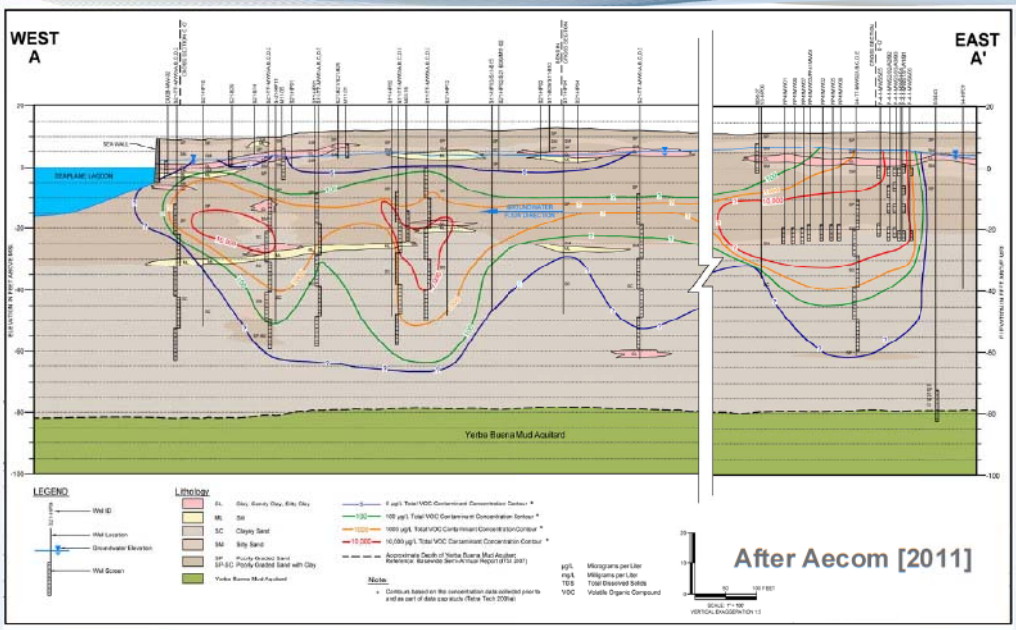
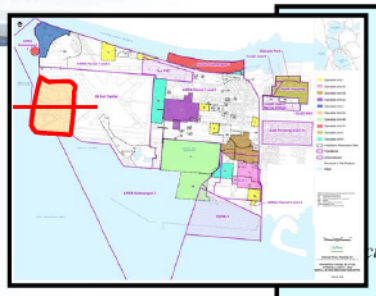
OU-2B - Cross Section

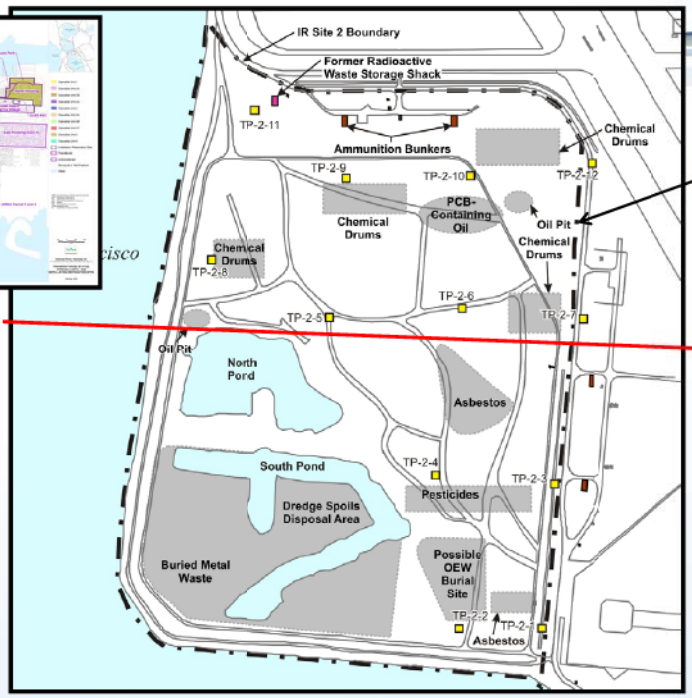


OU-2B – Groundwater Treatment

Can Plume "Bubble" to the Surface in an Earthquake ?

IR - Site 2 – Overview and Plan View





Sand Boils in 1989 M 6.9 Loma Prieta Earthquake (R = 60 miles)

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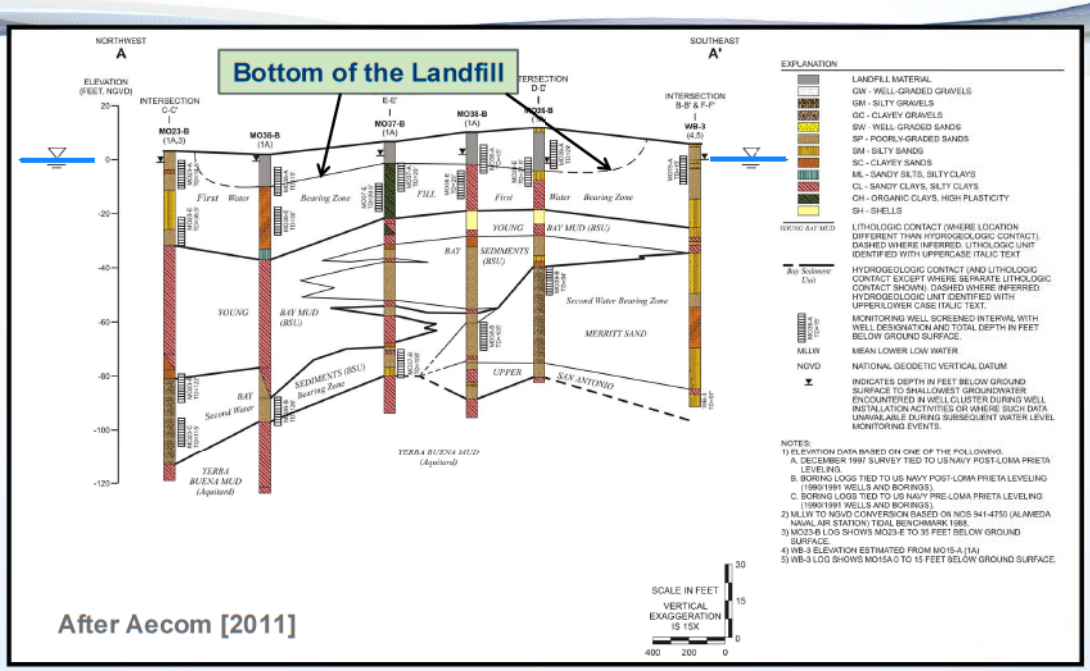
IR - Site 2 - Cross Section



After Aecom [2011]

Landfill cap (soil cover) 98% completed

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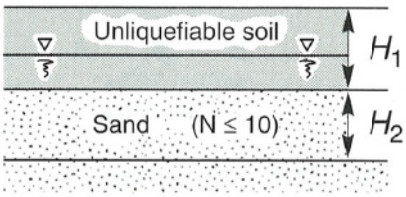
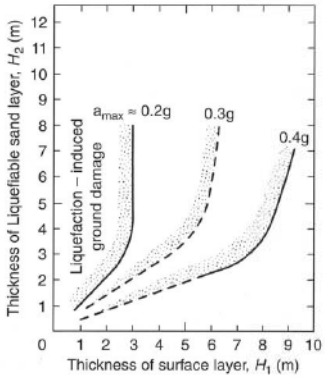
IR - Site 2 – Landfill Cap

Is Landfill Cap "Crust" of Sufficient Thickness?





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Path Forward

- OU-5 (Marsh Crust) - No further action with respect to the Marsh Crust (fish bowl simulation).
- OU-2B (Treatment ongoing) – Institutional Control (Sample/test groundwater after the event …); Conduct post-earthquake reconnaissance during groundwater treatment.
- IR Site 2 (Landfill) – Evaluated extensively/cap almost in place – No further action, but cap will be inspected following (significant) earthquake event.

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Questions?

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OU2A Fieldwork Update

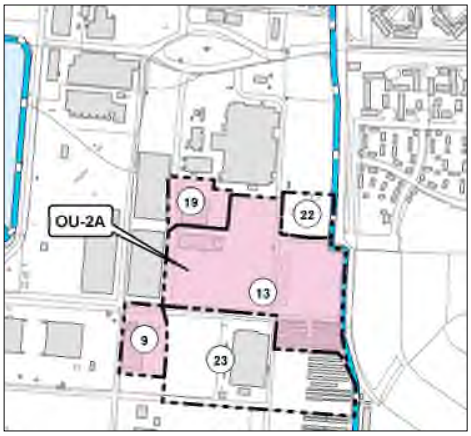
Alameda RAB Meeting
Alameda Point

Navy BRAC PMO West
March 13, 2013

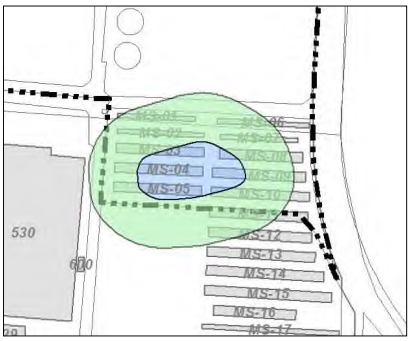
1

Site 13 Area

OU2A Location



Site 13 Plume Area



2

Site 13 In-situ Bio Remedial Action

Mobilization to Site: March 17

- Monitoring well (4) installation
- Biovent well (54) installation
- Auger boring (23) emplacement

- Direct push injections
- Phase 1: March (calcium peroxide)
- Phase 2: July (Klozur CR)
- Phase 3: December (calcium peroxide)

Monthly bio-vent operations and maintenance will begin in April 2014. Groundwater performance monitoring will be conducted quarterly to evaluate effectiveness.

3

Preparing for Injections

4

Calcium Peroxide Injection

5