



**Naval Facilities Engineering Systems Command Southwest  
Base Realignment and Closure  
Program Management Office West  
San Diego, California**

**FINAL  
Restoration Advisory Board  
Meeting Minutes, Meeting Number 216**

Former Naval Station Treasure Island  
San Francisco, California

February 6, 2024

**Approved for public release: distribution is unlimited.**



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Prepared for:

Department of the Navy  
Naval Facilities Engineering Systems Command Southwest  
BRAC PMO West  
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**FINAL  
MEETING MINUTES  
RESTORATION ADVISORY BOARD  
FORMER NAVAL STATION TREASURE ISLAND  
6 February 2024**

**Meeting Number 216  
Virtual Meeting Number 16**

Community Restoration Advisory Board (RAB) Members in attendance:

Alice Pilram, Dale Smith, and Nathan Brennan

Department of the Navy (Navy) and Regulatory Agency RAB Members in attendance:

Lora Battaglia, Navy, Base Realignment and Closure (BRAC) Environmental  
Coordinator

Dave Clark, Navy, Lead Remedial Project Manager

Janet Lear, Navy

Peyton Ward, Department of Toxic Substances Control (DTSC)

Jeff White, San Francisco Bay Regional Water Quality Control Board (Water Board)

RAB Support and Consultant Representatives in attendance:

Marsha Maloof, Maloof & Associates, Meeting Facilitator

Christine Niccoli, Court Reporter

Megan Kranz, Trevet-Bay West Joint Venture (Trevet-Bay West)

Ricci Delsigne, Trevet-Bay West

Public Guests in attendance:

Carol Harvey, Journalist

James Pepper, Blogger

Andrea M.

## **Welcome Remarks and Agenda Review**

Marsha Maloof (Maloof & Associates), the meeting facilitator, opened the February 6, 2024, RAB meeting for Former Naval Station Treasure Island (NSTI), held virtually on Microsoft Teams. Introductions were initiated, and the agenda was reviewed ([Attachment A](#)).

Dave Clark (Navy) introduced Lora Battaglia, the Navy's new NSTI BRAC Environmental Coordinator. She was a remedial project manager from 2009 to 2013 at NSTI, Hunter's Point, Alameda, and Concord.

## New Business— Environmental Program Overview

Mr. Clark presented an overview of the environmental program ([Attachment B](#)). Information and status updates were provided on Site YF3 and Installation Restoration (IR) Site 12; the per- and polyfluoroalkyl substances (PFAS) program and treatment technologies; explanation of significant differences (ESD); land use control remedial design (LUC RD); five-year review (FYR) documents; and groundwater and soil gas monitoring activities.

Mr. Clark discussed petroleum program Site YF3 on Yerba Buena Island, the location of the last remaining Navy pipeline site. During the three decades since the initial site inspection (SI) from 1994 to 2000, the Navy has continued to conduct investigations at the site. Several fuel lines and a former aboveground storage tank were located at YF3, and the former piers were historically used for fueling operations. The Navy began an additional soil and groundwater investigation in 2012 to determine the nature and extent of weathered petroleum. The compounds identified during the investigation are the highly weathered, heavier petroleum carbon chains. From 2015 to 2019, the Navy conducted a risk assessment evaluating the impacts of weathered petroleum byproducts on aquatic life, benthic invertebrates, birds, and mammals.

In 2020, corrective action alternatives were evaluated. Long-term monitoring, capping with LUCs, or excavations were the three alternatives considered. The Navy concluded that additional data was needed to quantify the amount of weathered petroleum remaining.

To evaluate the feasibility of a removal action, the Navy will need to acquire more information about the depth to bedrock and the lateral and vertical extent of impacted soil and groundwater. Future activities will include additional surveying and a geophysical study to define the physical boundaries.

Actions to be completed in support of future work at YF3 include the final data gaps work plan in August 2024 followed by the final data gap evaluation report in October 2025. The corrective action plan is scheduled for distribution in October 2027. Fieldwork can commence thereafter and be finished by 2028, when a post-construction summary report will be completed.

Multiple excavations, sampling events, and studies have been completed over the last three decades at IR Site 12 1400 Series Housing Area. The 2017 record of decision (ROD) documented selection of impacted soil excavation and groundwater monitoring as the remedial action. The fieldwork was completed in 2021 and groundwater monitoring for petroleum and arsenic is ongoing at Gateview Avenue. The IR Site 12 conceptual site model was updated in 2023 to refine the housing construction grading depth. In the northern and southern portions of the 1400 Series Housing Area, the agencies concluded no further action addressing radiological contamination was needed.

The main components of IR Site 12 include the landfill areas, which are the solid waste disposal area (SWDA) and the central rubbish area, the areas outside the landfill areas, and the 1400 Series Housing Area.

Addendum #2 to the IR Site 12 feasibility study (FS) will be initiated and will evaluate additional potential remedies that address the remaining non-RAD contamination within SWDA and RAD-impacted areas across the site that are outside of the 1400 Series Housing Area. The focus will be on the remedy. Part of the process will be a request for the applicable or relevant and appropriate requirements, also called ARARs, from the regulatory agencies in February 2024.

The FS is critical to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process because potential remedial action alternatives are evaluated and compared to nine criteria that fall into three categories: threshold, primary balancing, and modifying criteria.

Threshold criteria must be met for an alternative to be eligible for selection and include (1) overall protection of human health and the environment and (2) compliance with ARARs.

Balancing criteria are used to compare alternatives and include (1) long-term effectiveness and permanence; (2) reduction of toxicity, mobility, or volume through treatment; (3) short-term effectiveness; (4) implementability of a remedial design or technology; and (5) cost. The Navy will collaborate with the regulatory agencies in evaluating alternatives using these seven criteria to arrive at an informed decision.

Modifying criteria are of equal importance to balancing criteria and include (1) state acceptance and (2) community acceptance of the preferred alternative. When the FS is completed and a preferred alternative has been selected, the Navy issues a proposed plan for public comment. A public meeting will be scheduled to discuss the proposed remedy and address any community concerns, thereby fulfilling the requirements of the modifying criteria.

Mr. Clark said that other factors are considered by the Navy when selecting remedies for IR Site 12. For example, the impact of sea level rise is integrated into the environmental program's FYR process. Also, anticipated future reuse is a consideration. Redevelopment plans following property transfer can be a factor, although not one that drives the Navy's selection of a remedy.

Addendum #2 to the FS addresses the additional excavation work planned for the IR Site 12 Empty Lot Area between the northern and southern 1400 Series Housing Area. Residual underground contamination will be removed during the excavation.

Mr. Clark reviewed the IR Site 12 schedule. The draft FS is scheduled for review in January 2025. Other scheduled activities include completing the proposed plan in March 2026, holding the public meeting in June 2026, producing the draft ROD in 2027, and finalizing the ROD in 2028.

The Navy's PFAS program focuses on the long-lasting chemicals found in household products such as Teflon and Scotchgard, as well as industrial materials such as firefighting foams. The progress to date includes the completed basewide PFAS preliminary assessment, and the basewide PFAS SI. The IR Site 6 and basewide remedial investigation (RI) studies are in progress. The nature and extent of PFAS in soil and groundwater will be evaluated during the RI process.

The status of PFAS documents conforming to the CERCLA process was reviewed. The draft IR Site 6 PFAS RI report was submitted to the agencies for review and comments. The work plan for additional sampling at Site 6 will be developed in 2024. A basewide RI work plan is also being developed. The Navy is continuously tracking and evaluating the evolving PFAS guidance and policy addressing screening value proposals and changes, human and ecological risk assessment factors, and laboratory analysis methods and developments.

Mr. Clark reviewed upcoming PFAS fieldwork activities. The Navy is currently establishing ambient PFAS concentrations in the Bay resulting from outside sources that are not naturally occurring. Also planned is the IR Site 6 PFAS reactive barrier pilot test using the PlumeStop technology. The pilot test will evaluate the technology's potential as a containment remedy.

Cleanup technologies for treating PFAS in groundwater and soil were discussed. Private industry and the Navy are currently using these technologies, although no treatment system is in place at NSTI.

Sorption, membrane filtration, coagulation and electrochemical oxidation are examples of technologies used to treat PFAS. The sorption process removes contaminants by filtering them through substances such as granular activated carbon (GAC) or clay minerals, or through ion exchange resin. GAC treatment is an effective method capable of removing 90 to 99 percent of PFAS. No chemical degradation occurs, meaning PFAS is not destroyed, only contained. GAC is made from raw materials such as bituminous coal or coconut shells and is highly porous. Membrane filtration employs reverse osmosis and nanofiltration for PFAS removal. Electrochemical oxidation uses synthetic plastics with a positive charge to bind with the negatively charged PFAS molecules.

Other technologies for treating PFAS in soils include in situ stabilization, excavation and disposal, and thermal methods. Stabilizing PFAS in soil can be achieved by applying certain mineral additives or modified carbon. Excavating impacted soil removes PFAS from the local environment but does not destroy it. Thermal removal treatments potentially could break down PFAS contaminants in the soil.

Mr. Clark recapped key points related to current technology treatments. GAC is a practical groundwater pump and treat method, although it is costly and does not destroy PFAS. Carbon may outperform coconut shells as a raw material for GAC, but its effectiveness is site-specific. Disposing of excavated soil presents challenges related to choosing an appropriate location for the impacted soil after removal. The Navy uses pilot studies to determine the best treatment technology for addressing specific site conditions.

Mr. Clark provided IR Sites 6, 12, and 24 ESD and LUC RD document updates. The ESD and LUC RD documents incorporate recommendations from the FYR and the addendums. The final IR Site 6 ESD was distributed in October 2023. The draft IR Site 6 LUC RD is scheduled for review in March 2024. Recent groundwater monitoring data will be presented and used to assess the extent of the plume and its boundaries. The final IR Site 12 ESD is scheduled for distribution in February 2024, and the draft LUC RD will be submitted for regulatory agency review in April 2024. The final IR Site 24 ESD was issued in April 2023.

Following collection of the additional soil gas monitoring data, the draft IR Site 24 LUC RD will be distributed.

Mr. Clark discussed the upcoming third FYR. The FYR report is an important part of the environmental program, because the results of the implementation and performance evaluation of site-specific in-place remedies is presented. The FYR process includes four steps: document review, site inspection, interviews, and protectiveness determinations. The third FYR includes IR Sites 6, 12, 21, 24, 27, and 30. The third FYR report is under development by the Navy. The draft FYR document will be submitted to the regulatory agencies in early 2025, and the target for distribution of a final report is August 2025.

The groundwater and soil gas monitoring program provides data for use in evaluating annual trends and making formal decisions during the FYR process. Groundwater data is collected from IR Sites 6, 12, and 24, and soil gas data from IR Sites 21 and 24. The final 2022 monitoring report is scheduled for distribution in April 2024.

Mr. Clark opened the floor to questions.

Nathan Brennan (RAB member) asked if anything remains when PFAS is destroyed by incineration. Mr. Clark replied that the Navy's objective is to destroy the chemicals and not create other issues. Incineration is not employed by the Navy as a treatment and no successful implementation on a Navy base has been undertaken.

Dale Smith (RAB member) inquired about the status of the Site YF3 shoreline cleanup. Mr. Clark replied that the Navy's objective is to protect the ecosystem and limit damage caused by excavation. Meeting this objective will include considering the National Environmental Policy Act and California Environmental Quality Act since this is a non-CERCLA area.

Ms. Smith asked about the depth of the upcoming IR Site 12 subsurface soil investigations. Mr. Clark replied that remedial action alternatives have not been identified yet so the depth of action is not known at this time.

Ms. Smith asked if the reuse plan for IR Site 12 has been prepared. Mr. Clark replied that the City and the Treasure Island Development Authority have made the development plans available on their website. He believes that they are currently considering a combination of open space and housing.

Ms. Smith asked if cost was going to be a consideration at IR Site 12. Mr. Clark replied that cost is one of five balancing criteria used under the CERCLA process to evaluate and compare cleanup alternatives.

Ms. Smith asked about the duration of the Navy's responsibility for the PFAS cleanup. Mr. Clark said that the Navy does not have an end to the timeline. PFAS has been identified by the Navy as an emerging contaminant, and the Navy is committed to following the CERCLA process when conducting PFAS investigations and responses. Ms. Smith asked if Site 24 will be investigated for PFAS. Mr. Clark confirmed it would be.

Ms. Smith asked whether new findings from the FYR process would be addressed immediately. Mr. Clark said the FYR recommendations are broad, and the CERCLA process allows flexibility in addressing them, depending on the circumstances.

James Pepper (Blogger) stated that chemical warfare training took place in 1969 adjacent to the school on the west side of NSTI as well as at the four-square buildings at 13th and Avenue E. He provided through Microsoft Teams chat a figure with a map of NSTI from the 2014 radiological survey showing radiation dosage for 24 hours a day over 365 days, as required by law for exposure. Each icon on the figure provides the exposure dosage for each apartment.

## **New Business—BRAC Cleanup Team Update**

Peyton Ward (DTSC) provided a DTSC activities and documents update for the period since the last RAB meeting in November 2023. She attended Treasure Island Development Authority's removal of a drip line at NSTI former Building 29 on January 16, 2024, and conducted air monitoring while there.

On January 30, 2024, Ms. Ward observed fence repair work at IR Site 6 and completed a Westside Drive SWDA area site walk. Her primary purpose at NSTI was to oversee the IR Site 12 tidal study in the Gateview Avenue petroleum area. The study is examining the effect of tides on groundwater levels at IR Site 12.

The monthly BRAC Cleanup Team (BCT) meetings were held on November 15, 2023, December 6, 2023, and January 17, 2024. The next BCT meeting is in person on February 14, 2024. The Technical Working Group meetings specifically dedicate time to addressing IR Site 12 and PFAS and have recently been incorporated into the regular BCT meetings rather than being held separately.

DTSC will focus its efforts in 2024 on basewide and IR Site 6 PFAS RIs, IR Site 12 FS addendum #2, and the third FYR.

DTSC has reviewed the following final documents that are now available on EnviroStor: the IR Site 6 ROD ESD, PFAS SI Report, IR Site 12 Tidal Study Work Plan, and 2023 Site Management Plan. Documents nearing completion include the IR Site 12 ROD ESD, IR Site 6 PFAS RI Report, and IR Site 12 Phase IV Non-Time Critical Removal Action Post-Construction Summary Report. DTSC has provided the Navy with IR Site 6 PFAS Pilot Study Work Plan, Reactive Barrier Pilot Study, and 2022 Basewide Monitoring Report comments.

Jeff White (Water Board) said that the Water Board also reviewed the documents that the DTSC has reviewed. He visited the SWDA Westside site on December 30, 2023, to better understand stormwater and SWDA Westside contamination transport to the bay.

## **Old Business—Community Comments**

Carol Harvey (Journalist) asked about the Navy's projection for return of IR Site 12 to the City of San Francisco. Mr. Clark said the selection of a remedy is targeted for 2028 or 2029, after the FS, proposed plan, and ROD have been finalized. After the remedy is selected, several years will be required to implement it.

Ms. Harvey asked about the Navy's preferred PFAS remediation method. Mr. Clark replied that PFAS remediation treatment technologies are still under evaluation and selection of

a preferred treatment is not yet viable. The Navy will identify the best option for preventing migration into the Bay by undertaking and evaluating pilot studies. The selection of a treatment method at any specific location will depend on site specific conditions.

Ms. Harvey asked about the number of people on Mr. Clark's NSTI cleanup team. Mr. Clark and Lora Battaglia (Navy) explained that a large Navy BRAC team, including contractors, is involved in environmental restoration activities and property transfers.

## **Old Business—RAB Meeting Minutes Approval Meeting No. 215**

Ms. Maloof asked for comments on the November 2023 RAB meeting minutes.

Mr. Brennan stated that in the second to last sentence, first full paragraph on page 3, "creating a barrier and capturing PFAS in groundwater," should be changed to "PFAS from groundwater."

Mr. Brennan stated that in the second sentence, second full paragraph on page 5, "Not buildings appear" should be changed to "No buildings appear."

Ms. Smith stated that in the second sentence, paragraph 5 on page 2, "The most recent five-tear review" should be changed to "The most recent five-year review."

Ms. Smith stated that in the last sentence, paragraph 6 on page 2, "remedial investigation that evaluate" should be changed to "remedial investigation to evaluate."

Ms. Smith stated that in paragraph 5 on page 3, "which is farther along" should be changed to "which is further along."

Ms. Smith stated that the first sentence, paragraph 6 on page 3, should end after "data collection," and a new sentence should begin by adding "Also."

Ms. Smith noted that in the second sentence, paragraph 7 on page 3, "whereas green indicates" should be changed to "while green shapes indicate."

Mr. Brennan moved to accept the minutes as amended. Alice Pilram (RAB Community Co-Chair) seconded the motion. The November 2023 meeting minutes were approved.

## **Action Items from November 2023 RAB Meeting**

No action items resulted from the November 2023 RAB meeting.

## **Co-Chair Announcements and Future Agenda Items**

Mr. Clark said the next virtual RAB meeting is scheduled for May 7, 2024.

## **Action Items**

No new action items were reported.

## **Adjournment**

The meeting adjourned at 9:01 pm.

## 6 February 2024 RAB Meeting Handouts

- Attachment A: [NSTI RAB Meeting No. 216 Agenda](#)
- Attachment B: [Environmental Program Overview Presentation](#)

## **Attachment A.      NAVSTA TI RAB Meeting No. 216**

### **Agenda**

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## ENVIRONMENTAL RESTORATION ADVISORY BOARD MEETING AGENDA

FORMER NAVAL STATION TREASURE ISLAND

Tuesday, 06 February 2024 at 7:00pm

**Join by computer** Download the Microsoft Teams App to your desktop, phone, or tablet and use Meeting Link:

**[Click here to join the meeting](#)**

**Meeting ID: 224 777 243 352**

**Password: L6dpzp**

**Or Click or Type in: <http://tinyurl.com/TI-RAB-FEB-2024>**

**Join by telephone** Toll Free: 1-833-258-6146, Enter the meeting ID: 265 131 562#

### MEETING NO. 216

#### I. WELCOME REMARKS AND AGENDA REVIEW

**7:00 – 7:05 Welcome, Introductions**

Marsha Maloof, Meeting Facilitator

**7:05 – 7:10 Meeting Guidelines and Agenda Review**

Marsha Maloof, Meeting Facilitator

Alice Pilram, Community Co-Chair

#### II. NEW BUSINESS

**7:10 – 8:00 Environmental Program Overview**

David Clark, Lead Remedial Project Manager

Q&A: RAB

Q&A: Community

**8:00 – 8:15 Break**

**8:15 – 8:25 BRAC Cleanup Team Update**

Peyton Ward, Department of Toxic Substances Control

Jeff White, Regional Water Board

#### III. OLD BUSINESS

**8:25 – 8:40 Community Comments**

Marsha Maloof, Meeting Facilitator

Q&A: RAB

Q&A: Community

**8:40 – 8:45 RAB Meeting Minutes Approval Meeting No. 215**

David Clark, Lead Remedial Project Manager

**8:45 – 8:50 Action Items from November 2023 RAB Meeting**

David Clark, Lead Remedial Project Manager

**8:50 – 9:00 Co-Chair Announcements and Future Agenda Items**

Alice Pilram, Community Co-Chair and David Clark, Lead Remedial Project Manager

**9:00 Adjourn**

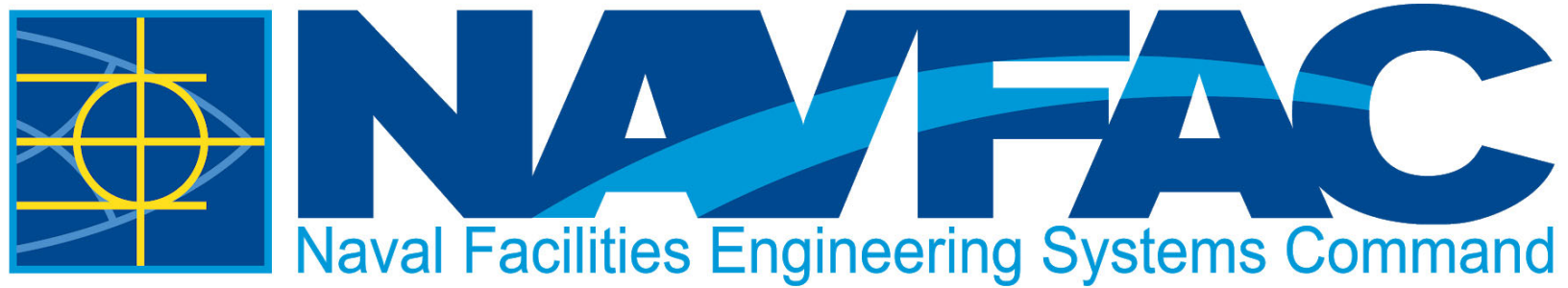
***The Next RAB Meeting will be held virtually on 7 May 2024 at 7:00pm***

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## **Attachment B. Environmental Program Overview Presentation**

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# Environmental Program Overview

**Treasure Island Restoration Advisory Board Meeting**

6 February 2024

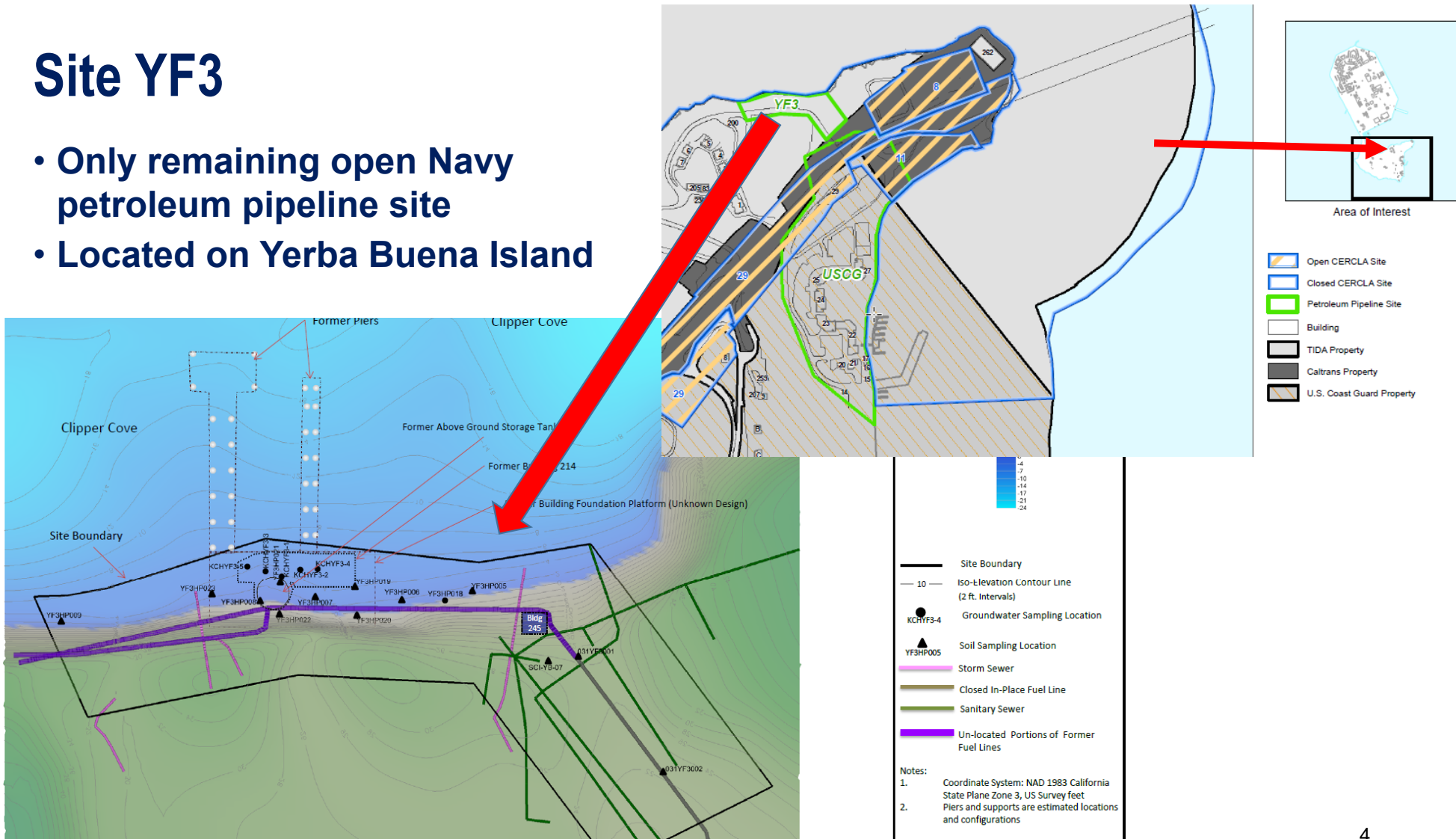
# Presentation Topics

- **Site YF3**
- **Site 12**
- **Navy BRAC Treasure Island PFAS Program**
  - (Per and Polyfluoralkyl Substances)
- **PFAS Treatment Technologies Overview**
- **Explanations of Significant Difference (ESD) & Land Use Control – Remedial Designs (LUC-RD)**
- **Five Year Review**
- **Groundwater and Soil Gas Monitoring**

# Petroleum Site YF3

# Site YF3

- Only remaining open Navy petroleum pipeline site
- Located on Yerba Buena Island



# YF3 Site Assessment History

## **1994-2000 Petroleum Site Investigations:**

- At YF3, two fuel lines and two former Above Ground Storage Tanks were identified along piers used for historical fueling operations.

## **2012 Soil & Groundwater Investigation:**

- Conducted soil and groundwater sampling.
- Identified contaminants: Weathered Petroleum – (lighter petroleum chains degrade first, leaving heavier compounds) , Polyaromatic Hydrocarbons and Volatile Organic Compounds.

## **2015-2019 Data Collection and Risk Assessments**

- Assessed aquatic life, benthic invertebrates (living in sediments) , birds, and mammals.
- Re-confirmed presence of weathered petroleum.
- Supported initial evaluation of potential cleanup alternatives.

# Corrective Action Alternatives Evaluation - 2020

## Alternatives Considered

- Long-Term-Monitoring – No disturbance of site.
- Capping with land use controls.
- Excavation.
- Concluded that additional data was needed to quantify amount of weathered petroleum left in place.



## Future Investigation - Additional Data Collection

- **Land Surveying and Geophysical Study:** Determine the physical boundaries - further characterize the depth to bedrock.
- **Soil and Porewater Assessment:** Attempt to fill in data gaps of the horizontal and vertical extent of residual petroleum contamination.
- Data will be collected and analyzed to supplement existing site data and inform corrective action evaluation.



## YF3 Path Forward

- **Final Data Gaps Workplan**
  - **August 2024**
- **Final Data Gap Evaluation Report**
  - **Oct 2025**
- **NEPA/CEQA Evaluation**
  - **Oct 2026**
- **Corrective Action Plan (CAP)**
  - **Oct 2027**
- **CAP Post Construction Summary Report**
  - **Dec 2028**

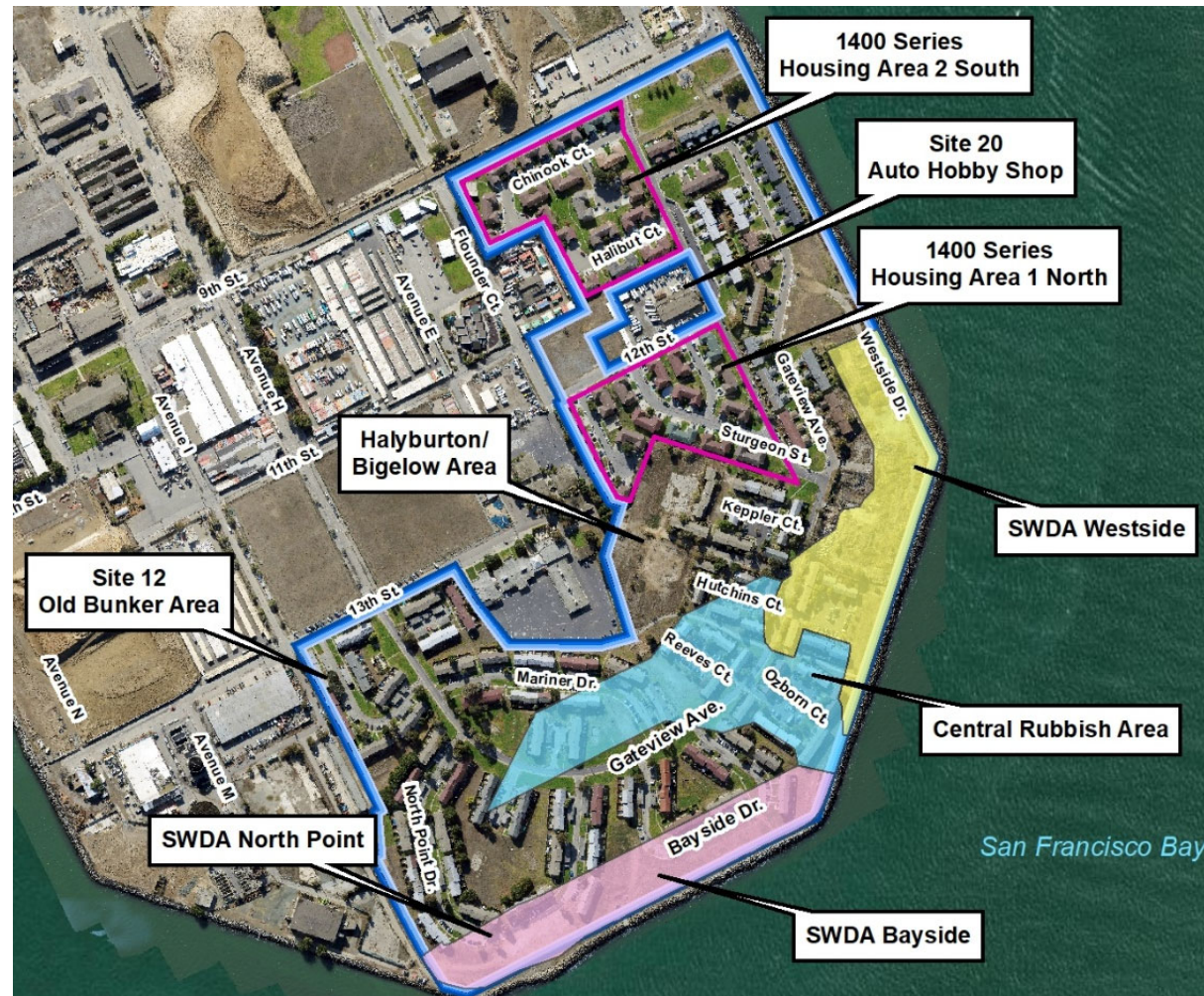
## Site 12 – Housing Area

## Site 12 - Brief History

- Multiple projects (excavations, sampling, studies) over the last 30 years.
- Extensive radiological scans of the site.
  - Focus of future cleanup is to address remaining discrete objects
- 2017 ROD Remedial Action - Fieldwork Complete - 2021
- Conceptual Site Model Update – Complete 2023
  - Refined housing construction grading depth
- 1400 Housing Series Rad No Further Action – Complete 2023

## Site 12 Parts At a Glance

- Site consists of several major components
  - Landfill Areas
    - SWDAs and CRA\*
  - Areas outside of landfill areas
  - 1400 Series Housing Area



\*Solid Waste Disposal Area – Central Rubbish Area

## Site 12 Next Steps – Feasibility Study Addendum #2

- Initial Feasibility Study (FS) and Addendum (#1) Focused on non-radiological chemicals outside of Solid Waste Disposal Areas (SWDA)
- Feasibility Study (FS) Addendum (#2) will present an evaluation of *additional* potential remedies for Site 12
  - Remaining non-rad contamination within the SWDAs
  - Radiological impacted areas across IR Site 12 (*outside of 1400 series housing*)
- Request Applicable or Relevant and Appropriate Requirements (ARARs)
  - Request – January 2024

## FS Criteria

- Threshold Criteria
  - Overall protection of human health and the environment.
  - Compliance with ARARs.
- Balancing Criteria
  - Long-term Effectiveness and Permanence
  - Reduction in Toxicity, Mobility or Volume Through Treatment
  - Short-term Effectiveness
  - Implementability (technical and administrative)
  - Cost
- Modifying Criteria
  - State Acceptance
  - Community Acceptance – Done at the PP Phase Public Meeting

# Other Factors for Consideration

- **Sea Level Rise (SLR)**
  - Navy will evaluate SLR during development of remedial alternatives.
  - Navy will continue to monitor remedy relative to SLR.
    - Tied to the Five-Year Review process
- **Reasonably Anticipated Future Reuse**
  - Navy's remedy *is not redevelopment* but (at BRAC bases) the environmental cleanup team takes into account what the property may be used for after transfer.

## Additional Work Planned in Support of FS Addendum #2

- **Additional excavation in Site 12, (empty lot area)**
  - Extend previous excavation to remove residual PAH/TPH-contaminated soil
  - Workplan Spring 2024



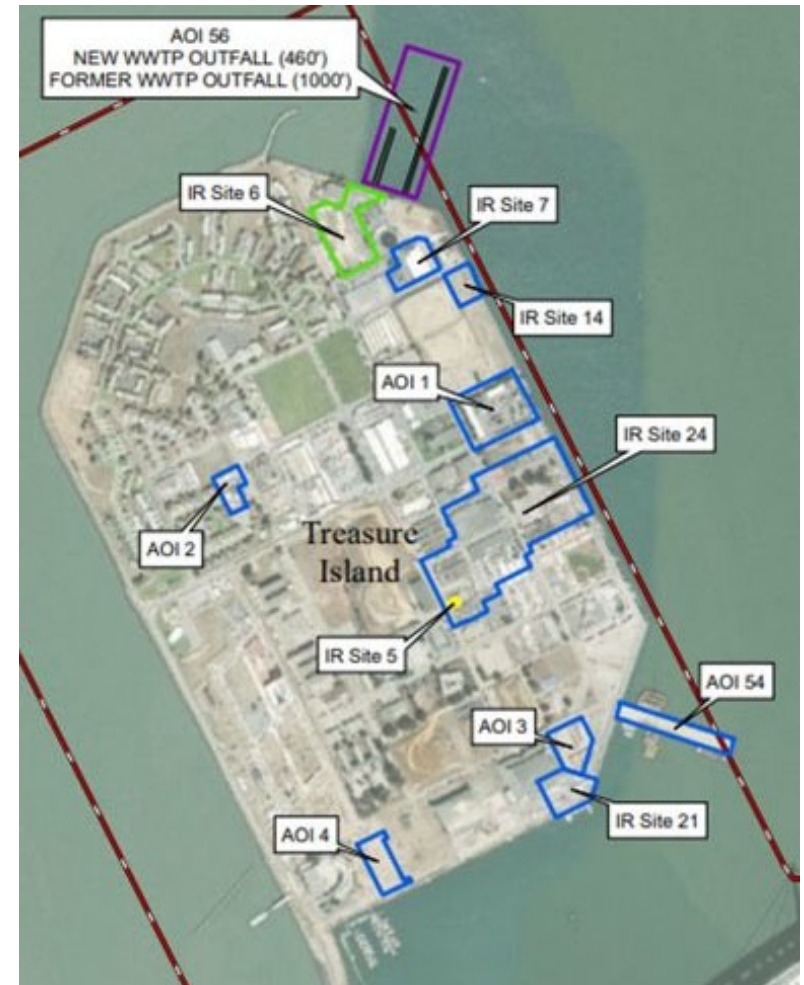
## Site 12 Schedule

- **ARARs Request January 2024**
- **Draft FS – Jan 2025**
- **Final FS – June 2025**
- **Proposed Plan – March 2026**
- **Public Meeting June 2026**
- **Draft Record of Decision – February 2027**
- **Final ROD 2028**

# Navy BRAC – Treasure Island PFAS Program

## PFAS Progress To Date:

- Finalized Preliminary Assessment (PA) for Site 6
- Finalized the Basewide PA and Site Investigation (SI)
- Initiated Remedial Investigation studies for Site 6 and Basewide sites



# Current Status of PFAS CERCLA Documents

- **Draft Reporting for the initial IR Site 6 PFAS RI**
  - Additional sampling workplan to be developed in 2024
- **Planning underway for Basewide RI**
  - Broader evaluation (data collection) of PFAS nature/extent
- **Tracking Evolving Guidance/Policy**
  - Screening Values
  - Risk Assessment Guidance
  - Laboratory Analysis
  - Climate related topics

# Planned PFAS Fieldwork Activities - 2024

- Establish Ambient (current non-naturally occurring) Concentrations of PFAS in the Bay
  - Sediment – Porewater – Surface Water
- IR Site 6 PFAS Reactive Barrier Pilot Test
  - Testing a potential containment remedy



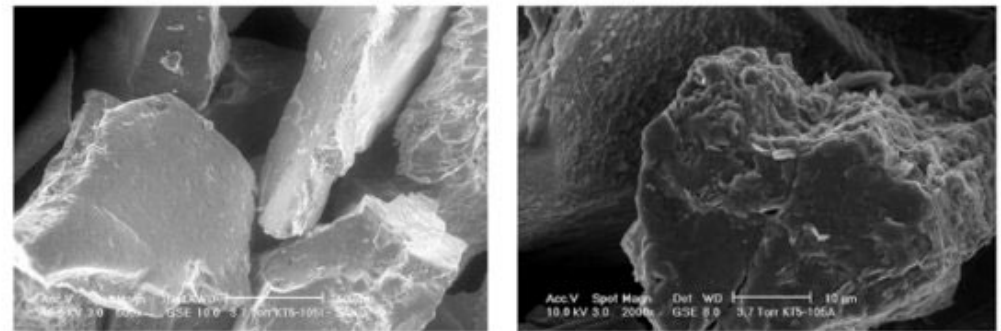
PlumeStop/Liquid Activated Carbon stock

# **RAB Requested Info: Introduction to Various PFAS Technologies – Used and Under Evaluation**

# PFAS Technologies – Groundwater – Pump and Treat

- **Sorption**
  - Activated Carbon
  - Ion Exchange Resin
  - Clay Minerals
- **Membrane Filtration**
  - Reverse Osmosis and Nanofiltration
- **Coagulation\***
- **Electrochemical\***

\* *Not as established as other technologies.*



**A Scanning Electron Microscope (SEM) Image of Sand Grains With and Without a Coating of Carbon**

## Granulated Activated Carbon (GAC)

- Made from bituminous coal or coconut
- Highly porous – large surface area
- Adsorption on surface – no chemical degradation
- Capable of 90- 99% removal efficiency



## Electrochemical

- Synthetic plastics with positively charged exchange areas
- Removes PFAS binding to negatively charged PFAS molecule
- Can be regenerated or used one time
- Can have higher and faster capacity than GAC



## PFAS Technologies – Groundwater – Continued

- **Sono-chemical - Sonolysis \***

- Interaction with high-frequency sound vibrates liquids at high speeds.
- Produces tiny ruptures known as cavitation.
- The implosion of these acoustic cavities can produce locally extreme temperatures, helping to break down PFAS.

- **Super Critical Water Oxidation \***

- Leverages the supercritical phase of water that is achieved by increasing temperature and pressure.
- In this phase oxygen is fully soluble, resulting in rapid and complete oxidation of organics leading to PFAS destruction.

\* *\* Not as established as other technologies.*

# PFAS Technologies – Soil

- **In Situ Stabilization**
  - **Modified Carbon**
  - **Minerals**
- **Excavation Disposal**
  - **Landfill**
  - **Incineration**
- **Thermal**

# Key Points

- **GAC still a very practical treatment for GW**
  - But you have pump and treat which can be costly and continues in perpetuity.
- **Carbon may perform better than coconut but depends on site conditions (pilot study!)**
- **Ion exchange an option, but may be more expensive.**
- **Soil disposal still posing challenges.**

# **Explanations of Significant Difference (ESD) Land Use Controls Remedial Design (LUC RD)**

## Site 6 – Fire Fighting Training Facility

- **ESD**
  - Revised groundwater arsenic RG for construction worker from 250 micrograms/liter (ug/l) to 35 ug/l
  - Final Oct 2023
- **LUC RD**
  - Review recent groundwater monitoring data
    - determine if plume extent is bounded
  - If not, expand monitoring well network to delineate plume boundary
  - Revise as needed, area requiring institutional controls (ARIC)
    - Draft March 2024

## Site 12 – Gateview Ave Petroleum Area

- **ESD**
  - Revised groundwater arsenic RG for construction worker from 250 ug/l to 35 ug/l
  - Final Feb 2024
- **LUC RD**
  - Establish an area requiring institutional controls
  - Implement contaminated groundwater management plan to be followed during construction activities
  - Evaluate land use controls as needed
  - Draft April 2024

## Site 24 – Dry Cleaning Facility

- **ESD**
  - ESD revised chlorinated solvent soil gas RGs for residential and commercial/industrial workers
  - Final issued April 2023
- **LUC RD**
  - Collect additional soil gas monitoring data determine if plume extent is bounded
  - Revise area requiring institutional controls (ARIC) if needed
  - Draft document to be issued after additional data collected from the site

# Treasure Island Five-Year Review

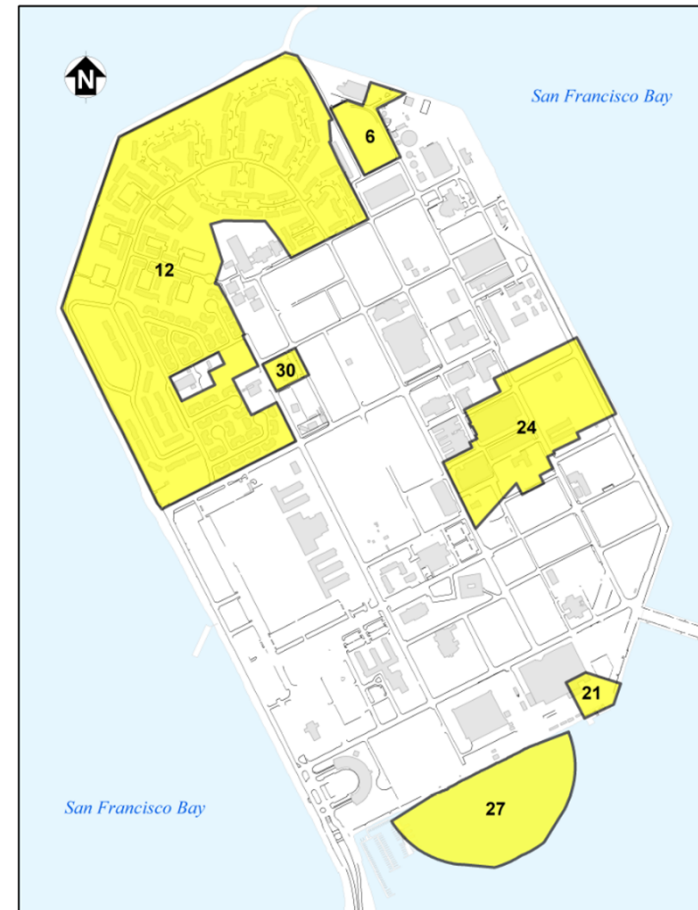
## Focus of the Five Year Review – 3rd Volume

- **To evaluate the implementation and performance of in-place remedies for subject sites.**
  - Determine whether the remedy is, or in the future, will be protective of human health and the environment.



## Five Year Review Sites (2<sup>nd</sup> & 3<sup>rd</sup> FYR)

- **Six sites will be evaluated for the 3<sup>rd</sup> FYR:**
  - **IR Sites 6, 12\*, 21, 24, 27, and 30**
    - \*For Site 12, the evaluation will include the remedy for groundwater within the Gateview Arsenic/TPH area, as well as the implemented soil remedy.



## Five Year Review Process

Step	Purpose
Document Review	<ul style="list-style-type: none"> <li>Review of records of decision, remedial action designs, work plans, completion and monitoring reports, and annual site inspection reports</li> <li>Confirm remedial action is working as designed and/or how the remedial action is currently functioning</li> </ul>
Site Inspection	<ul style="list-style-type: none"> <li>Document current site conditions to evaluate visual evidence of the protectiveness of the remedies at each site</li> </ul>
Site Interviews	<ul style="list-style-type: none"> <li>Complete interviews of cross-section stakeholders to identify any problems or concerns with the remedies that remain to be addressed</li> <li>Stakeholders include: DTSC, Waterboard, TIDA, residents, and local community members</li> </ul>
Protectiveness Statement	<ul style="list-style-type: none"> <li>Establishing if the remedy for each site is protective of human health and the environment</li> </ul>

## 3<sup>rd</sup> FYR Schedule

- **2024 – Develop Internal Draft\***
- **Early 2025 – Draft Completed**
- **May 2025 – Concurrence on RTCs and RLSO**

\*Any new rules or regulations should be provided by early 2024

# Groundwater/Soil Gas Monitoring

# Groundwater and Soil Gas Monitoring

- **Ongoing Monitoring at four sites**
  - Groundwater – Sites 6, 12, and 24
  - Soil Gas – Sites 21 and 24
- **2022 Monitoring Report – Draft October 2023**
  - Final April 2024
- **2023 Report – Draft TBD**

## Questions?

