INITIAL STUDY/ MITIGATED NEGATIVE DECLARATION

ONEKA DESALINATION BUOY PILOT PROJECT DESCRIPTION

Applicant	CITY OF FORT BRAGG
Lead Agency	CITY OF FORT BRAGG
Prepared By	MILLER MARINE SCIENCE & CONSULTING, INC. AND TWB ENVIRONMENTAL RESEARCH AND CONSULTING, INC.
Date	MARCH 2025

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1 INTRODUCTION

1.1 Project Title

City of Fort Bragg (CFB) Oneka Desalination Buoy (Iceberg) Pilot Project.

1.2 Regulatory Guidance

The CFB proposes to deploy a single Iceberg buoy (Iceberg) in Mill Bay offshore of the City's wastewater treatment plant (WWTP). This deployment will test the Iceberg and its new technology to produce and deliver desalinated water to the CFB without the need for any electricity from shore to power pumps and other similar systems typically required by seawater reverse osmosis systems (SWRO). The pilot project will allow for the collection of empirical data from within California waters that could be used to inform the design and permitting of a future, utility-scale array of Icebergs to augment the CFB water portfolio.

The Iceberg will be deployed on sovereign lands offshore of Mendicino County, California. The California State Lands Commission (CSLC) has jurisdiction over these sovereign lands, or lands held in public trust by the State of California, which include the tide and submerged lands adjacent to the entire coast and offshore islands of the State from the mean high tide line to three nautical miles offshore. During consultation with the CSLC staff, the CFB was determined to be the lead agency on this project review in compliance with the California Environmental Quality Act (CEQA). The CSLC is reviewing the pilot project proposal and its supporting information in a lease application (#A0000004774) submitted on August 14, 2024.

In order to take action on the CFB's application for a lease to implement the proposed Project, the CFB, must address the potential environmental effects associated with the Project. Therefore, in accordance with CEQA, the CFB has prepared this Initial Study/Mitigated Negative Declaration (IS/MND), which includes a discussion of the Project's potential effects on the existing environment, and the identification of avoidance, minimization, and mitigation measures. The purpose of this document is to present to decision-makers and the public the potential environmental consequences of implementing the Project.

1.3 CEQA Lead Agency

Under CEQA, the lead agency is the public agency with principal responsibility for carrying out or approving a project which may have a significant effect on the environment. Because implementation of the Project will occur offshore of the CFB WWTP, the CFB is the lead agency for the Project.

Lead Agency Name and Address	Contact Person
City of Fort Bragg 416 N. Franklin Street Fort Bragg, CA 94537 707-961-2823	Mr. John Smith Director of Public Works City of Fort Bragg jsmith@fortbragg.com

1.4 Project Applicant Name and Address

City of Fort Bragg
Mr. John Smith, Director of Public Works
416 N. Franklin St.
Fort Bragg, CA

1.5 Summary of Findings

The Project would avoid most temporary and permanent environmental impacts; however, some impacts from the proposed project's construction could result. These impacts could be reduced to less than significant levels with the incorporation of mitigation measures. The following brief discussion lists the anticipated level of impact for each issue area.

Based on the issues evaluated it has been determined that the Project would have no impact, less than significant impact, or less than significant impacts after the incorporation of mitigation measures (Table 1).

Table 1. CEQA Initial Study checklist categories determined impact classification.

No Impact	Less than Significant Impact	Less than Significant Impact with Mitigation
Agriculture and Forest Resources	Aesthetics	Biological Resources
Air Quality	Geology and Soils	Cultural Resources
Energy	Greenhouse Gas Emissions	Tribal Cultural Resources
Land use planning	Hazards and Hazardous Materials	
Mineral Resources	Hydrology and Water Quality	
Population and Housing	Noise	
Public Services	Mandatory Findings of Significance	
Recreation		
Transportation		
Utilities and Service Systems		
Wildfire		

1.6 Public Review and Comment

Consistent with the direction provided in the State CEQA Guidelines sections 15072 and 15073, this IS/MND is being circulated to local and State agencies and to interested individuals who may wish to review and comment. Written comments may be submitted to the CFB during the 30-day public review period. Prior to taking action on adoption of the MND and approval of the Project, the CFB will consider the proposed IS/MND along with all comments received. Written comments should be sent to:

City of Fort Bragg
Community Development Department
C/o Ms. Maria Flynn
416 N. Franklin St.
Fort Bragg, CA
mflynn@fortbragg.com

1.7 Permits, Approvals, And Regulatory Requirements

In August 2024, the CFB applied to the CSLC for a lease agreement governing the subtidal lands of California needed for the Iceberg mooring system and conveyance pipeline to shore. It is anticipated that review of the lease will be completed in 2025. In addition to the CSLC's jurisdiction, a Notice of Intent to comply with the terms of Order No. R1-2020-0006 General NPDES No. CA0024902 for Low-Threat Discharges to Surface Waters in the North Coast Region (Low-Threat Permit) was submitted the North Coast Regional Water Quality Control Board (RWB) on October 11, 2024. The Project is subject to the review and approval of several other federal and State entities with statutory and/or regulatory jurisdiction over various aspects of the Project. Prior to implementing the Project, the permits and/or approvals in Table 1 may be required and are further discussed below.

Table 2. Permitting agencies and the anticipated approvals, authorizations, and regulatory requirements.

Permitting Agency	Anticipated Approvals, Authorizations, and Regulatory Requirements
Federal Agencies	
U.S. Army Corps of Engineers (USACE)	Section 10 of the Rivers and Harbors Act Authorization/Section 404 Clean Water Act
U.S. Coast Guard (USCG)	Local Notice to Mariners (LNM)
National Marine Fisheries Service (NMFS)	Essential Fish Habitat Assessment (with USACE), Marine Mammal Protection Act, Section 7 Consultation
California State Agencies	
California State Lands Commission (CSLC)	California Subtidal Lands Lease
California Coastal Commission (CCC)	Coastal Development Permit
North Coast Regional Water Quality Control Board (RWB)	CWC §13142.5(b) Determination, Low-Threat Permit, Clean Water Act Section 401 Water Quality Certification
California Department of Fish and Wildlife (CDFW)	Scientific Collecting Permit

1.7.1 Review, Authorizations and Requirements

1.7.1.1 FEDERAL

Federal Endangered Species Act of 1972 (ESA) – The ESA (7 United States Code [USC] 136, 16 USC 1531 et seq.) is administered in California by the national Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS). Species are listed as threatened, endangered, proposed for either category, or federal species of concern. The federal ESA prohibits the take of any listed species. Take includes "*to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct*." Harass is further defined as "*an intentional or negligent act or omission that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering*."

Federal Migratory Bird Treaty Act of 1918 – The federal Migratory Bird Treaty Act of 1918 (16 USC 703-712) bars the take, possession, purchase, sale, or barter of any migratory bird listed in 50 Code of Federal Regulations (CFR) Section 10 (50 CFR 10).

Magnuson-Stevens Fishery Conservation and Management Act and Sustainable Fisheries Act of 1996 – The Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801 et seq.) was intended to result in processes to conserve and manage fishery resources. Projects likely to affect federally managed fishery species are required to assess the project's likely impact on Essential Fish Habitat.

Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA) – The MPRSA (33 USC 1401-1445, 16 USC 1431-1447f, 33 USC 2801-2805) regulates the transport for disposal and subsequent dumping of material in the territorial seas and seaward including specific criteria and conditions for permissible dumping, including dredged material.

Marine Mammal Protection Act (MMPA) – The MMPA (16 USC 1361 et seq.) serves to protect and conserve marine mammals and their habitats in the U.S. territorial waters. Implemented by NMFS, MMPA prohibits the take of marine mammals without prior approval. "Take" under the Act is consistent with that defined for the federal ESA.

Rivers and Harbors Act – Section 10 of the Rivers and Harbors Act (33 USC 401) regulates construction and fill discharge into navigable waters of the U.S. Under the implementation of USACE, this regulation provides the authority to control and permit structural construction or vessel operation in the waters of the U.S. Nationwide Permits, used to authorize specific activities that have been previously assessed under the National Environmental Policy Act (NEPA), expedite the permitting process for more "routine" construction activities.

Federal Clean Water Act (CWA) – The CWA (33 USC 1251 et seq.) is comprehensive legislation that generally includes reference to the federal Water Pollution Control Act of 1972, the CWA of 1977, and subsequent amendments. As the U.S. primary law protecting water quality, the CWA sets water quality standards for surface water and discharge effluents into waters of the U.S. Implemented by the U.S. Environmental Protection Agency (EPA), often issued through the State Water Resources Control Board (SWB), Regional Water Quality Control Boards, and USACE. Permits are issued under CWA Section 404 (dredge and fill) and Section 401 (water quality certification).

Federal Clean Air Act Waiver – The EPA is the federal agency responsible for implementing the federal Clean Air Act (CAA) (42 USC 7401 et seq.). The U.S. Supreme Court ruled on April 2, 2007 that carbon dioxide (CO2) is an air pollutant as defined under the CAA, and that EPA has the authority to regulate emissions of greenhouse gases (GHGs). However, there are no federal regulations or policies regarding GHG emissions applicable to the Project or alternatives under consideration.

1.7.1.2 STATE

California State Lands Commission – CSLC authority is set forth in Division 6 of the California Public Resources Code and it is regulated by the California Code of Regulations, Title 2, sections 1900–2970. It is within the Commission's authority to lease sovereign lands held in the public trust, including subtidal lands located between the mean high tide line out to 3 nautical miles offshore.

Porter-Cologne Water Quality Control Act of 1969 – The Porter-Cologne Water Quality Control Act of 1969 (Cal. Water Code, § 13000 et seq.) mandates that State waters be protected and regulated to attain the highest quality. The State Water Resources Control Board (SWB) is charged with implementing the Porter-Cologne Water Quality Control Act and is delegated authority by the EPA to implement the CWA in waters of the State. The SWB is subdivided into nine Regional Water Quality Control Boards, including the North Coast Regional Water Quality Control Board (RWB), that have been delegated authority to issue permits or waive water quality conditions under Section 401 of the CWA and issue discharge permits in accordance with Federal and State policy.

Pursuant to federal law (33 USC 1341; CWA § 401), applicants for a federal license or permit for activities that may result in any discharge to waters of the United States must seek a Water Quality Certification (Certification) from the State in which the discharge originates. Such Certification is based on a finding that the discharge will meet water quality standards and other appropriate requirements of State law. In California, RWQCBs issue or deny certification for discharges within their jurisdiction. The SWRCB has this responsibility where projects or activities affect waters in more than one regional water board's jurisdiction.

In 1972, the SWB adopted the Water Quality Control Plan for Ocean Waters of California (COP) to provide Statewide guidance to regional water boards, including the RWB, for the issuance of discharge permits in accordance with Federal and State regulations. The COP implements California Water Code (CWC) §13142.5(b) requiring all seawater desalination facilities to receive a determination from the RWB that the new or expanded facility uses the best available site, design, technology, and mitigation measures feasible to minimize the intake and mortality of all forms of marine life.

The RWB adopted a general order to regulate low threat discharges from discrete point sources to the surface waters of the North Coast Region. Order No. R1-2020-0006 (NPDES No. CAG024902) governs select discharges including "Discharges of brine from small, portable, government-operated desalination facilities to ocean waters".

California Coastal Act of 1976 – The California Coastal Act (Pub. Resources Code, §30000 et seq.), administered by the CCC, was established to protect the ecological balance of the coastal zone and prevent its deterioration and destruction. The Coastal Act requires project review and approval, and issuance of a coastal development permit or waiver prior to initiating any development projects in the California coastal zone. Under the California Coastal Act, the CCC has permitting authority for development within a land-side and water area mapped by the State legislature. The Coastal Act requires anyone who proposes any development in the coastal zone to secure a coastal development permit from either the CCC or local jurisdiction with a certified Local Coastal Plan.

California Endangered Species Act (CESA) – The CESA (Fish & Game Code, § 2050 et seq.) designates a number of laws and programs designed to protect fish and wildlife resources and is administered by CDFW.

Marine Life Protection Act of 1999 – The Marine Life Protection Act of 1999 (Fish & Game Code, § 2850 et seq.) directs CDFW and the Fish and Game Commission to redesign California's Marine Protected Area system to function as a network.

1.8 Document Organization

The document is organized as follows:

Section 1 introduces the environmental review process. It describes the purpose and organization of this document and presents a summary of findings.

Section 2 presents an analysis on a range of environmental issues identified in the CEQA Initial Study Checklist. From this analysis, the following identifications are made:

- The existing setting for each issue;
- The corresponding range of impacts that would result; and
- A discussion of various project changes and/or mitigation measures that, if incorporated into the project, would mitigate or avoid such impacts, such that no significant effect on the environment would occur.

The range of impacts includes no impact, less than significant impact, less than significant impact with mitigation, or a potentially significant impact.

Section 3 presents the Mitigation and Monitoring Program.

Section 4 lists the references used in preparation of this IS/MND.

Appendices - The appendices include plans, data, and other information submitted by the Applicant and analyzed in this IS/MND

2 CEQA INITIAL STUDY CHECKLIST

2.1 Environmental Factors Potentially Affected

Project Title: City of Fort Bragg (CFB) Oneka Desalination Buoy (Iceberg) Pilot Project

Lead agency name: City of Fort Bragg

Address: 416 North Franklin Street, Fort Bragg, CA 95437

Contact person: John Smith, Director of Public Works

Phone number: 707-961-2823

Project Location: Approximately 6.3 acres of seaspace located approximately 0.5 miles offshore of the CFB WWTP in Mill Bay, plus a conveyance pathway to shoreline.

General plan description: Coastal Zone (CZ)

Zoning: Coastal Zone (CZ)

Description of project:

As a pilot test to determine functionality, operability, and environmental effect, a single Oneka Iceberg wave-powered seawater desalination buoy will be deployed in Mill Bay offshore of the CFB's WWTP. Desalinated water (permeate) will be conveyed to shore via a submerged pipeline that will lie on the seafloor (and on the existing WWTP concrete outfall encasement) extending through the surf zone and up the concrete stairway to the WWTP. Once on the WWTP property, the permeate will be available for testing and observation and ultimately disposed of via the existing WWTP outfall.

The evaluation of environmental impacts below is based, in part, on the environmental impact thresholds provided by State CEQA Guidelines Appendix G. An impact assessment matrix is provided as part of the evaluation for each environmental issue area. The column headings for each impact assessment matrix are defined below.

- **Potentially Significant Impact**. This column has been checked if there is substantial evidence that a project-related environmental effect would be significant. If there are one or more "Potentially Significant Impacts" an Environmental Impact Report (EIR) would be prepared.
- **Less than Significant Impact with Mitigation**. This column has been checked when the proposed Project may result in a significant environmental impact, but the incorporation of identified project-specific mitigation measures into the Project would reduce the identified effect(s) to a less than significant level.
- **Less than Significant Impact**. This column has been checked when the proposed Project would not result in any significant effects. The Project's impact would be less than significant even without the incorporation of a project-specific mitigation measure.
- **No Impact**. This column has been checked when the proposed Project would not result in any impact in the category or the category does not apply.

The environmental factors checked below would be potentially affected by this Project, involving at least one impact that is a "Less than Significant Impact with Mitigation" as indicated by the checklist in Section 2.2. However, the Project would not result in any "Potentially Significant Impacts" that cannot be reduced to a less than significant level.

☒ Aesthetics ☐ Agriculture and Forestry

☐ Air Quality ☒ Biological Resources

☒ Cultural Resources ☐ Energy

☒ Geology/Soils ☒ Greenhouse Gas Emissions

☒ Hazards and Hazardous Materials ☒ Hydrology/Water Quality

☐ Land Use/Planning ☐ Mineral Resources

☒ Noise ☐ Population/Housing

☐ Public Services ☐ Recreation

☐ Transportation ☒ Tribal Cultural Resources

☐ Utilities/Service Systems ☐ Wildfire

☒ Mandatory Findings of Significance

2.1.1 DETERMINATION

On the basis of this initial evaluation (choose one):

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Print Name	Signature	Date

2.3 Initial Study Checklist

Detailed discussions for each question follow for each checklist category when a CEQA determination other than "No Impact" is made for any of the questions within the category. When all CEQA determinations per category are "No Impact" no detailed discussion per question is provided.

2.3.1 AESTHETICS

Except as provided in Public Resources Code Section 21099:

Question	CEQA Determination
a) Have a substantial adverse effect on a scenic vista?	Less Than Significant Impact
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	No Impact
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	Less Than Significant Impact
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	Less Than Significant Impact

<u>Discussion</u>

Would the project:

a) Have a substantial adverse effect on a scenic vista?

Less Than Significant Impact. The proposed pilot project would have a less than significant (and temporary) impact on scenic vistas. The proposed pilot project would be comprised of offshore and onshore components; the potential for each to affect scenic vistas is described below.

<u>Offshore components</u>: The Iceberg buoy weighs 22 tons and measures 19.7 ft wide by 28.7 ft long. The Iceberg is 21.7 ft tall with 15.6 ft above the water line and 6.1 ft below the water line (Figure 1). From shore, the public would be able to see the Iceberg buoy floating on the surface of the Pacific Ocean; however, given the size of the buoy and its distance from shore, it would appear small. The secondary mooring system includes four marker buoys at the location of each of the four anchors (~ 150-250 ft from the Iceberg buoy) and four surface buoys approximately 40 ft from the Iceberg buoy (Figure 2). It is unlikely that any of these eight buoys would be visible from shore.

The buoy would be held in place with a concrete gravity anchor and mooring system – all of which would be submerged and therefore not visible from shore. Permeate water would be delivered to shore via an HDPE pipeline of up to six inches in diameter which would be held in place with concrete collar anchors – all of which would be submerged and therefore not visible from shore.

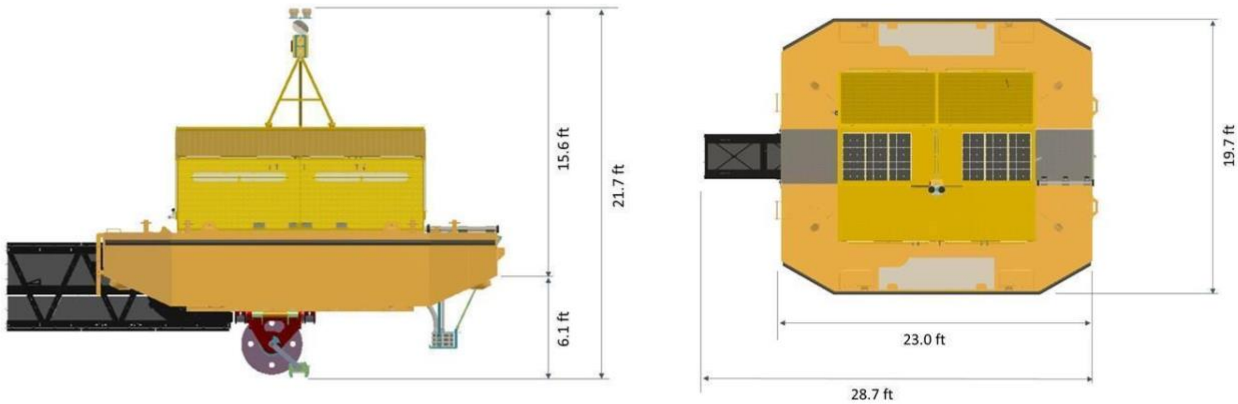

Figure 1. Dimensions of the Iceberg buoy.

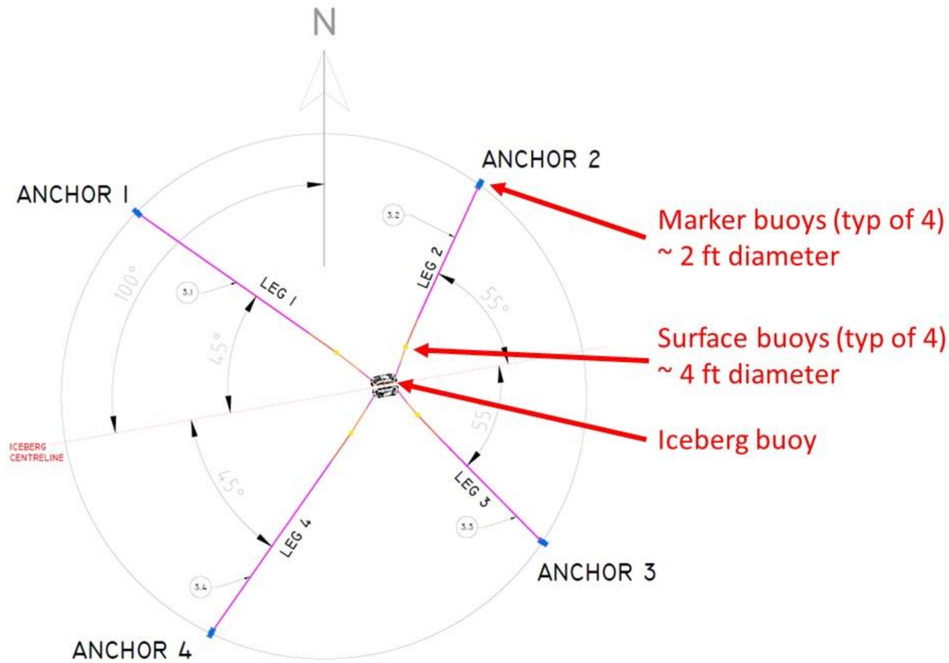

Figure 2. Plan view of proposed pilot project offshore components

Onshore components: The permeate pipe would connect to piping provided by the City on the WWTP property (an existing facility). None of the piping would be visible to the general public since the WWTP is already surrounded by a fence (Figure 3); therefore, there would be no additional obstruction of the scenic view beyond what already exists.

Heading seaward from the bluff on the WWTP property, the permeate pipe would be attached to the existing concrete slab and deck using u-clamps and fasteners (or similar). At the edge of the bluff, the permeate pipe would turn vertical and run down the face of the bluff, again being connected to the existing concrete bluff face using u-clamps and fasteners (or similar). At the bottom of the cliff, the permeate pipe would turn horizontal and run out across the shoreline to connect with the offshore portion of the permeate pipe. Figure 4 provides a schematic of the permeate pipeline alignment.

Figure 3. Fencing surrounding the Fort Bragg Wastewater Treatment Plant

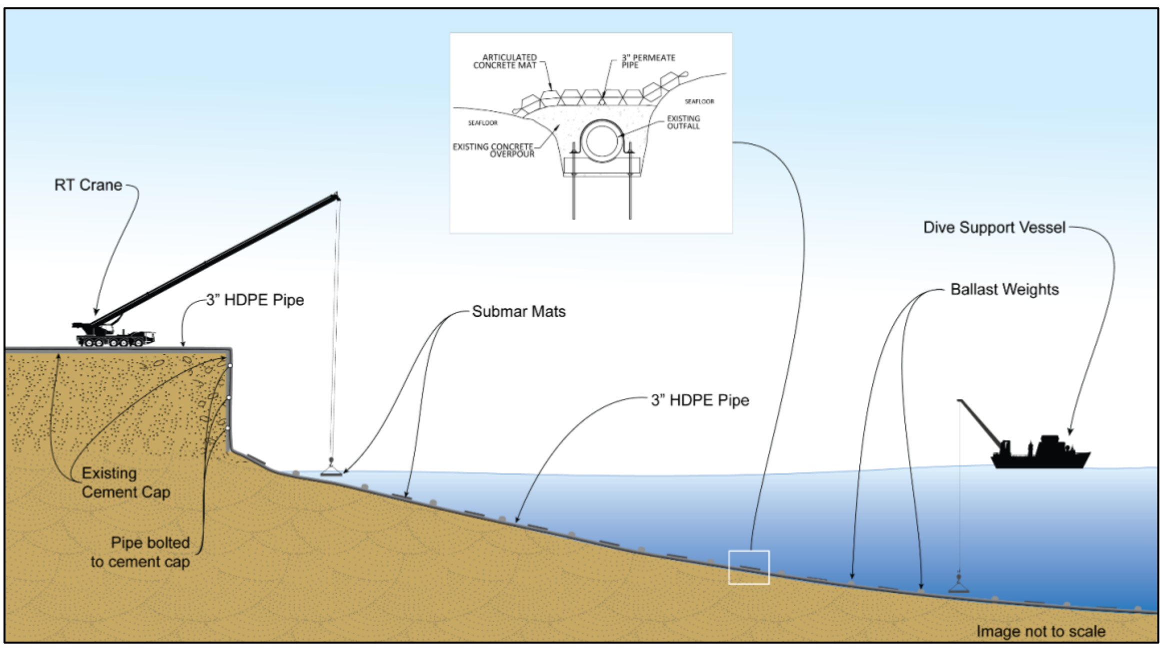

Figure 4. Plan view of pilot project onshore component (permeate pipeline).

In addition to the physical pilot project components, the proposed pilot project is also temporary in nature (planned for 12 months of operation); therefore, any potential effect on scenic vistas would be similarly limited, temporally. During commissioning and throughout the 12-month operational period, a vessel would make periodic trips to allow staff to commission, inspect, and maintain the buoy as well as collect environmental performance data. The periodic operation of a vessel in the area would not have an adverse impact on the scenic vista any more than the commercial and recreational fishing vessels which currently operate in the same offshore area.

b) ***Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?***

No Impact. The proposed pilot project is not located within a state scenic highway; it is limited to the coast, and, even more precisely, to an existing WWTP. None of the project components would be visible from the designated state scenic highway through the CFB (Route 1). The view looking west from Route 1 is shown below in the Google Maps Streetview (Figure 5). The WWTP (over 2,000 ft away) cannot be seen from the highway.

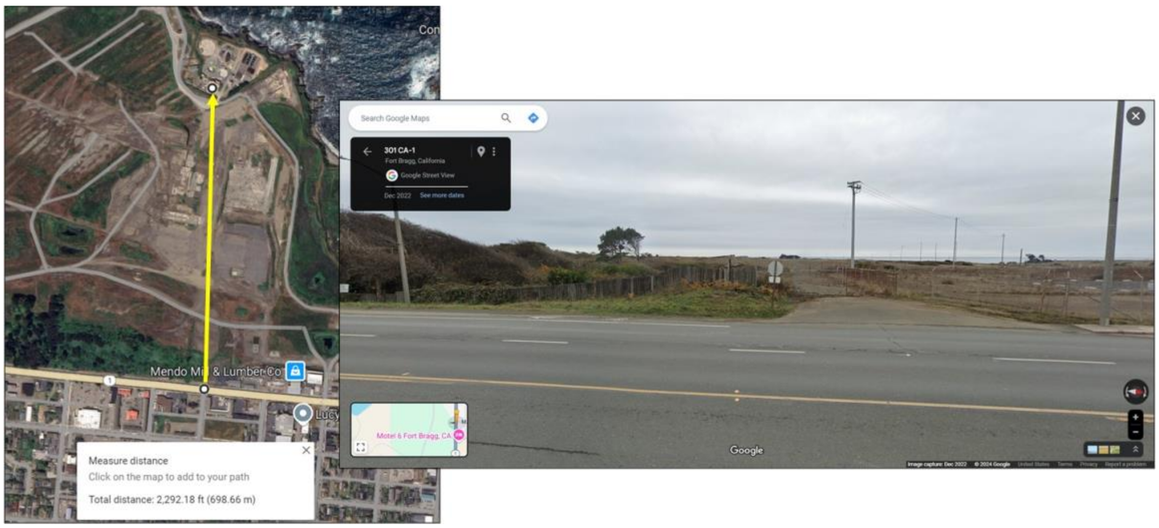

Figure 5. Google Maps Streetview from Route 1 in the City of Fort Bragg. Yellow arrow indicates westward direction of street view from Route 1.

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

Less Than Significant Impact. The proposed pilot project would not substantially degrade the existing visual character or quality of public views of the site and its surroundings and therefore would have a less than significant impact. Although the Iceberg buoy and some of its mooring system components would be visible from shore, they would appear small. Additionally, the proposed pilot project has a 12-month operational duration, so any such potential impacts would be temporary.

Permeate would be conveyed to shore via a three-inch diameter HDPE pipeline. The pipeline would be mounted to the existing concrete bluff at the WWTP. The concrete surface extends from the base of the bluff up to the top of the bluff where a walkway exists (Figure 6). Since this is a fully engineered structure, there is no potential to impact any of the natural rock outcroppings on the shoreline. In addition, the permeate pipe would be very difficult for the public to see and unlikely to degrade the existing visual character of the site which is an operational WWTP.

A vegetation survey by WRA (CFB 2024) confirmed only Ice Plant (*Carpobrotus edulis*) exists along the edges of the existing concrete walkway and between the concrete walkway and the chlorine contact tank (Figure 7). Ice Plant is invasive and has outcompeted other endangered, threatened, and rare plants. In this area, the permeate pipe would either be laid on bare ground where no plants exist or would be supported by simple pipe supports that rest on bare ground.

Either way, vegetation would be avoided out of an abundance of caution. That said, the permeate pipe supports would be very difficult for the public to see and unlikely to degrade the existing visual character of the site which is an operational WWTP. In summary, the proposed pilot project would not substantially damage scenic resources within a state scenic highway.

Figure 6. Concrete pad and walkway at top of rocky outcrop to which permeate pipeline may be attached.

Figure 7. Vegetated area between the concrete walkway at bluff edge and the chlorine contact tank at the WWTP.

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Less Than Significant Impact. The Iceberg buoy would be equipped with all U.S. Coast Guard-required provisions, which may include a flashing navigation light and a passive radar reflector. However, neither of these provisions would create a new source of substantial light or glare which would adversely affect day or nighttime views in the area and therefore would have a less than significant impact. Furthermore, these features are being included as a safety measure so that proposed pilot project equipment in the Pacific Ocean is visible to watercraft.

2.3.2 AGRICULTURE AND FOREST RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and the forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.

Question	CEQA Determination
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	No Impact
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	No Impact
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	No Impact
d) Result in the loss of forest land or conversion of forest land to non-forest use?	No Impact
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	No Impact

Discussion

As described in the Project Description (Appendix 1), all project activities will occur 1. Offshore, or 2. In Noyo Harbor, or 3. On the beach in front of the CFB WWTP, or 4. At the CFB WWTP. No project activities will occur on or near farmland, forested land, or current or future agricultural lands. No impact to these terrestrial resources is anticipated from this project.

2.3.3 AIR QUALITY

Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations.

Question	CEQA Determination
a) Conflict with or obstruct implementation of the applicable air quality plan?	No Impact
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non- attainment under an applicable federal or state ambient air quality standard?	No Impact
c) Expose sensitive receptors to substantial pollutant concentrations?	No Impact
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	No Impact

Discussion

The Buoy exclusively utilizes ocean wave energy with no need for combustion engines or other fossil-fuel-derived power to operate its desalination system. The Buoy is constructed of inert materials that do not produce air emissions during the deployment, operation, construction, or decommissioning. During transport and deployment, vehicles and vessels will be used that are exempt from requiring a permit to operate (NCUAQMD 2015 Reg. I, Rule 102, Item D). No impacts to air quality will occur from the deployment, operation, maintenance, and decommissioning of the Buoy.

2.3.4 BIOLOGICAL RESOURCES

Question	CEQA Determination
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, or NOAA Fisheries?	Less Than Significant Impact
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	Less Than Significant with Mitigation Incorporated
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	No Impact
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	Less Than Significant with Mitigation Incorporated
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	No Impact
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	No Impact

Discussion

Would the project:

a) ***Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, or NOAA Fisheries?***

Less Than Significant Impact - As documented in greater detail in the Project Description (Appendix 1), environmental surveys were conducted in the area by marine biologists using

SCUBA to survey the area where the Buoy and its conveyance line will be installed along the seafloor observed limited marine resources. During these surveys, several brown and red algae (fleshy and coralline*)* were observed along the transects. Coralline red algae was the dominant form covering over 80%, on average, of the habitat overlying the trench that was backfilled after installation of the WWTP outfall. Fleshy red algae was present in the area as well, but at lower coverage than the coralline red algae. Two forms of brown algae were present in the area but covered less than 4% of the area.

Four invertebrate species were observed in the area during the SCUBA surveys. They were recorded as percent coverage of the subtidal habitat surveyed. Purple sea urchin (*Strongylocentrotus purpuratus*) was the most common occurring on 8 – 10% of the habitat, on average, followed by bat stars (*Patiria miniata*) and red sea urchins (*Mesocentrotus franciscanus*). Red abalone (*Haliotis rufescens*) was observed in the area and was the only species counted. On average, nearly two red abalone were observed on each transect line surveyed.

Endangered abalone species occur in the area, but in decreasing abundances likely because of the reduced algae, their primary food source. The proposed conveyance pipeline pathway avoids previously identified abalone sightings. The applicant proposes the following mitigation (APM BIO-1) to ensure abalone are protected as well as minimize impacts to hard-bottom habitat. APM BIO-1 includes a detailed pre-construction survey of the proposed project area (mooring area and pipeline conveyance to shore) to ensure an abalone-free, and minimal algae, path is followed. The APM BIO-1 pre-construction survey will be completed 90 days before the project deployment, weather permitting. The survey will be repeated when all materials (Iceberg, mooring system, conveyance pipeline to shore) are removed to confirm that minimal, if any, permanent changes to the seafloor occurred because of the project.

The Iceberg and all its mooring infrastructure will be within a soft-bottom area identified approximately 0.5 miles offshore the CFB's WWTP in Mill Bay. The approximately 6.3-acre soft-bottom area is sufficient to contain the entire mooring system designed to hold the Iceberg in place. The mooring system includes both a primary and secondary mooring system to provide redundancy in the event the high-energy wave climate compromises the primary system. The mooring system is designed to minimize primary and secondary entanglement to the extent possible. Where possible, the mooring lines will remain taught or encased in a hard pipe to prevent any loops in the line from forming that could ensnare marine mammals or sea turtles. An entanglement mitigation plan was developed as part of the Project Description (Appendix 1) to address any primary entanglement events and both the prevention and response to secondary entanglement. The chief prevention technique for secondary entanglement is to inspect the mooring system during the near-weekly maintenance visits to the buoy.

The pipeline conveyance to shore and associated anchoring plan for the pipeline is described in detail in the Project Description Section 5.5 and is restated here. To facilitate a safe and efficient process under the challenging environmental conditions, the permeate pipe will be installed in sections. The first section installed will run from the top of the bluff at the WWTP, down the vertical cliff face along the existing concrete stairwell, and out to the mean high tide line where it will be connected to the offshore, submerged pipe. The HDPE pipe will be secured to the existing concrete covering the vertical cliff face using traditional concrete anchors and saddles. The lower end of the pipe on the beach and nearshore section will be secured using a combination of concrete collars and mooring chain as ballast. Articulated concrete mats will be used as needed to add supplemental stability to the pipeline in this section. No attachments to the underlying dirt or native materials will be required. An industry-standard HDPE pipe-to-pipe connection will be used for all connections of the spooled section of the permeate pipe.

The offshore portions of the permeate pipe will consist of sections of HDPE pipe. These will be rolled off spools on the deployment vessel and pulled to shore using a winch mounted on the bluff and reeved along the onshore portion of the pipe mounts to the beach flange connection point. The first section will be pulled to shore and connected to the beach flange connection. For protective purposes, the permeate pipe may be run through a slightly larger HDPE pipe through the surf zone segment and other segments as needed. Since the HDPE pipe is slightly positive buoyant, ballast weights will be added at intervals so that the pipe will sink to the seafloor when pulled into place and flooded. Additional sections of the nearshore pipe will be deployed, pulled into place, and connected to the previously installed section via a HDPE flange connection. Once the water depth is sufficient, the pipe will be unspooled and deployed as the deployment vessel fleets further offshore, until all the pipe is on the seafloor. Divers will support the pipe deployment to ensure that the pipe is within the pre-approved, designated alignment so that there will be no damage to local ocean flora and fauna.

Once connected to the beach flange, the offshore section of the pipe will be aligned over the top of the existing outfall, which is encased in a concrete overpour. The pipe will be secured using a combination of concrete collars, mooring chain and articulated concrete mats as ballast. Where mooring chain is used, it will be draped over the pipeline, providing a continuous ballast along its length. Pipeline ballasting and stability will be augmented by concrete collars and articulated mats (Submar or equivalent) as required. The ballast will be placed over the pipe on top of the existing outfall concrete encasement. No mechanical attachments will be made to the concrete encasement or surrounding rock or seabed.

There will be no mechanical attachment to the concrete encasement or surrounding rock. Near shore, ballast will be placed by a hydraulic RT crane working from the bluff inside the WWTP. Offshore, ballast will be placed by the diving support vessel using the deck crane. Divers will support the deployment and placement of the ballast once they are near the seafloor in the final location, while always maintaining a safe working distance from the fall zone of the load. All ballast has locations for rigging attachment, to allow it to be set quickly and safely with minimal support. In the area inaccessible by either the onshore crane or the offshore diving support vessel, divers will deploy ballast using air bags or buoys and float them into place with alignment assisted by a pull winch on the bluff and cable running along the pipe track.

With the Iceberg secured to the primary and secondary moorings, divers will connect the offshore end of the permeate pipe to the bottom of the Iceberg's umbilical connection. Once connected at the bottom, the umbilical is then attached to the Iceberg's permeate outtake. This attachment will include a breakaway link at the buoy connection point to prevent damage to the buoy or umbilical in case of excessive loads due to high seas. This will complete the installation process.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Less Than Significant with Mitigation Incorporated - The Iceberg's operation will have a less than significant impact on all forms of marine life due to its 0.06 mm (60-micrometer) intake screen mesh that will exclude all but the smallest planktonic life forms. The through-screen-velocity of 0.22 feet/second (assuming a 15% screen blockage) is substantially less than the 0.5 feet/second considered protective against impingement (SWRCB 2010). The actual impacts on these planktonic life forms cannot be estimated at this time due to a lack of sufficient life history information and ancillary data.

As detailed in the Project Description Section 8.2.4 (Appendix 1), instead of using the empirical transport model/area of production forgone (ETM/APF), the applicant proposes APM BIO-2. APM BIO-2 will adhere to the current interim mitigation calculation for the use of ocean or estuary waters of the State for power plant cooling (SWRCB Resolution No. 2024-0014). The annual mitigation calculation is derived as a fee per million gallons (MG) of seawater circulated within a calendar year. As of 2024 per SWRCB Resolution No. 2024-0014, the fee is $12.51/MG with a 3% annual escalator for each subsequent year. Therefore, seawater circulated in 2025 will be mitigated at $12.89/MG and seawater circulated in 2026 will be mitigated at $13.27/MG. Regardless of the year during which seawater was circulated, a 20% management and maintenance fee will be applied to the subtotal. A maximum of 0.066 million gallons per day will be circulated for an annual estimated maximum of 24.09 MG. Using the cost/MG listed above, with the management and maintenance fee added, the total mitigation fee will ultimately range from $372.49 to $383.66 assuming all seawater circulation occurs in either calendar year 2025 or 2026, respectively. Seawater circulation spanning January 1, 2026 will be a composite of the two fee schedules based on the amount of seawater circulated in each year.

In consultation with the North Coast Regional Water Quality Control Board, the mitigation fee will be paid to an organization in the CFB area engaged in marine restoration. The CFB and Oneka Technologies have identified The Nature Conservancy and the Noyo Center for Marine Science as the two potential recipients of the mitigation fees. Both projects are working to restore the area's kelp forests that have been impacted by urchin overpopulation and overgrazing.

c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

No Impact – No wetlands are within the project footprint or in the nearby vicinity that will be affected by the project's installation, operation, or removal.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less Than Significant with Mitigation Incorporated – No significant effects on marine fish and invertebrate movements in the area other than the effects detailed under item b above.

The project's installation and removal in Mill Bay will have a less than significant impact with mitigation incorporated to the movement of marine mammals in the area. Project installation and removal will need to avoid marine mammals during project activities. APM BIO-3 will require implementation of the Marine Wildlife Monitoring as detailed in Section 2 of the Environmental Monitoring Plan (Appendix 2).

A less than significant impact with mitigation incorporated due to marine mammal entanglement may occur during the project's deployment in Mill Bay. The presence of multiple vertical, tensioned lines in the area connecting the Iceberg to its mooring system and the surrounding marker buoys create opportunities for both primary and secondary entanglement. APM BIO-4 will require the implementation of the Entanglement Mitigation Plan included as Appendix 4 to the Project Description (Appendix 1).

Pelagic cormorant (*Urile pelagicus*) rookeries are present in the area (Mendicino Audubon Society 2019). Construction on land of the pipeline to the WWTP and any associated supporting infrastructure will result in a less than significant impact with mitigation after the implementation of APM BIO-5. In brief, APM BIO-5 would require the project's onshore construction either be initiated and/or completed between August 31 to January 31 or include nest monitoring by a qualified biologist. No monitoring is needed outside of the general bird nesting season (February 1 to August 30). If land disturbance activities cannot be completed or initiated outside of the nesting season, a pre-construction nesting bird survey should be performed by a qualified biologist no more than 7 days prior to the initiation of construction.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No Impact – The Iceberg and its mooring system will be located approximately 0.75 miles from the MacKerricher State Marine Conservation Area. No other local policies or ordinances protecting biological resources beyond those discussed under item b above are in the area that could be impacted by the project.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impact - The Iceberg and its mooring system will be located approximately 0.75 miles from the MacKerricher State Marine Conservation Area. No other Habitat Conservation Plans, Natural Community Conservation Plans, or other regulatory agency-approved habitat conservation plan is applicable in the area that is subject to potential impact by the project.

2.3.5 CULTURAL RESOURCES

Question	CEQA Determination
a) Cause a substantial adverse change in the significance of a historical resource pursuant to in §15064.5?	Less Than Significant with Mitigation Incorporated
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	Less Than Significant with Mitigation Incorporated

Question	CEQA Determination
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	Less Than Significant with Mitigation Incorporated
d) Disturb any human remains, including those interred outside of dedicated cemeteries?	Less Than Significant with Mitigation Incorporated

Discussion

There are no known cultural resources in the proposed pilot project area (either offshore or onshore). A search was performed of the local Information Center (IC) of the California Historical Resources Information System (CHRIS). The local IC (Northwest IC) is located at Sonoma State University. The Cultural Resources Inventory does not return any cultural resources located at the proposed pilot project site.

The proposed pilot project area (co-located on the WWTP property) is also within an area zoned as Public Facilities and Services (Figure 8); therefore, the risk of encountering any cultural resources is low.

Would the project:

a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?

Less Than Significant Impact with Mitigation Incorporated. The proposed pilot project would have a less than significant impact with mitigation incorporated on the significance of a historical resource. Cultural resources are resources of historical or archaeological value and include human remains (even if interred outside of dedicated cemeteries). CEQA Guidelines at §15064.5(a) define historical resources as:

- A resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources
- A resource included in a local register of historical resources
- Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California

The Office of Historic Preservation's California Register of Historic Resources uses four criteria for designating historical resources:

- Associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States (Criterion 1).
- Associated with the lives of persons important to local, California or national history (Criterion 2).

- Embodies the distinctive characteristics of a type, period, region or method of construction or represents the work of a master or possesses high artistic values (Criterion 3).
- Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California or the nation (Criterion 4).

The proposed pilot project area is comprised of offshore and onshore components. None of the components to be installed offshore or onshore are located in areas that are listed or eligible to be listed on the California Register of Historical Resources. Installation of offshore and onshore components would not require excavation of any submerged or dry land; therefore, the probability of affecting any historical resources is also very low.

Relative to the offshore environment, APM BIO-1 would be conducted to confirm the bathymetry and identify any surficial features within the project boundaries. Based on the bathymetry, the specific locations for the primary and secondary mooring spread anchors and ground legs would be identified and plotted. The anchor locations for the derrick barge mooring spreads would be identified to minimize any impacts to environmentally sensitive areas. The Anchoring Plan will be developed based on the results of APM BIO-1 and will identify the anchor placement sites along with the procedures for setting and recovering anchors and mooring system components. The survey would also afford the opportunity to confirm the absence of any obvious historical resources that may be on the sea floor.

Relative to the onshore environment, proposed pilot project components would be installed on City property that houses the WWTP where it is highly unlikely any existing historical resources would not have already been located and protected.

Regardless of existing knowledge, there is potential for unanticipated discovery of historical resources during installation of the proposed pilot project equipment. This risk would be mitigated by implementing a stop-work order (APM CULT-1) if any resource is unintentionally identified so that its significance can be determined. With this mitigation approach, the impact would be less than significant with mitigation incorporated.

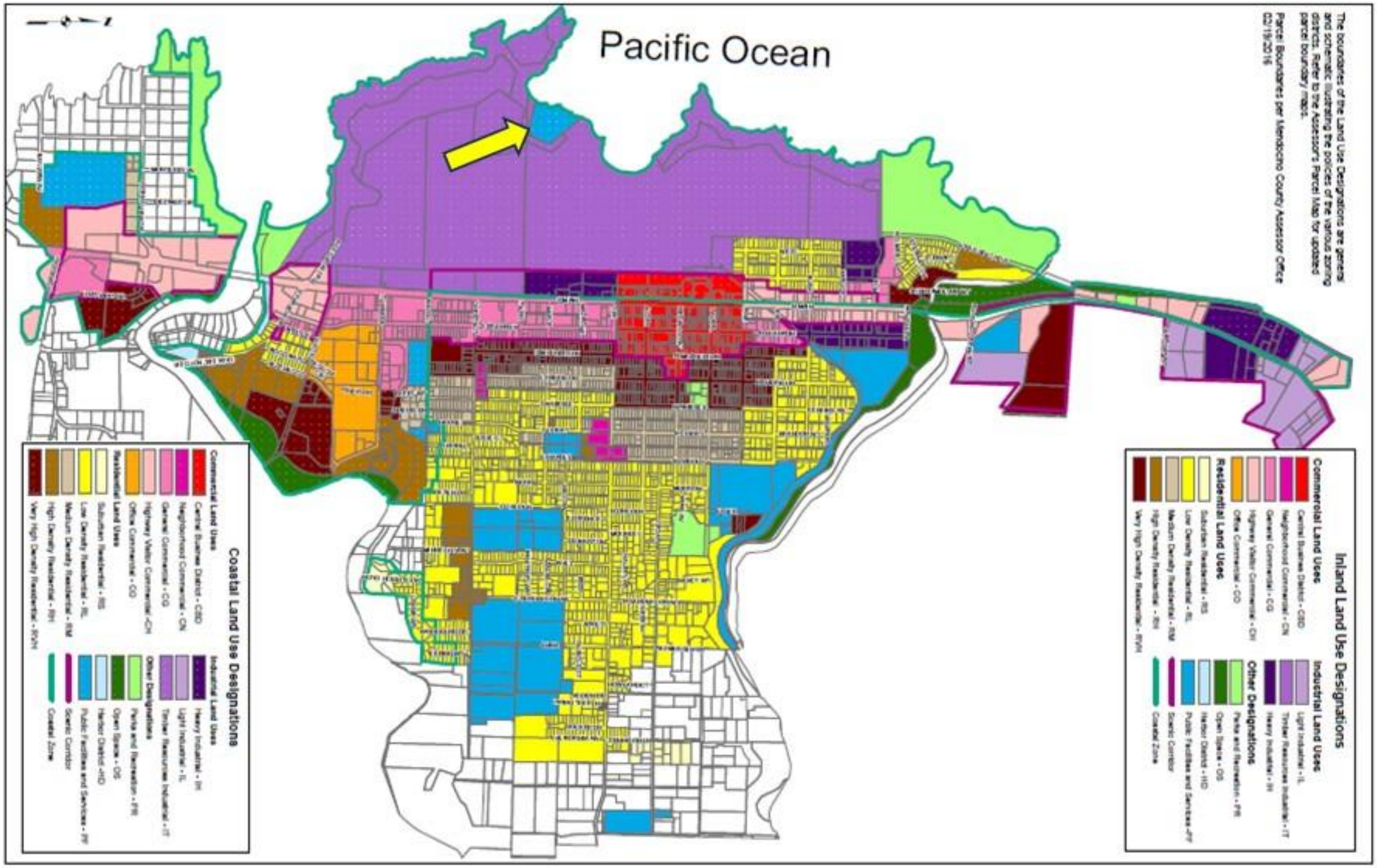

Figure 8. Zoning map for the City of Fort Bragg. Proposed pilot project location indicated with yellow arrow.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Less than Significant Impact with Mitigation Incorporated. CEQA Guidelines at §15064.5(a) note that effects to archaeological sites must be considered as follows:

- When a project will impact an archaeological site, a lead agency shall first determine whether the site meets the definition of an historical resource
- If not determined to be an historical resource, it may meet the definition of an archaeological resource
- If the resource meets neither of the definitions (historical or archaeological resource), there can be no determination of significant effect.

There are no known archaeological resources on the proposed pilot project site. Installation of offshore and onshore components would not require excavation of any submerged or dry land; therefore, the probability of affecting any archaeological resources is very low. On July 10, 2024, City of Fort Bragg staff discussed the project with Sherwood Valley Band of Pomo Indians (SVBP) Tribal Preservation Officer (THPO), Valerie Stanley and shared the following documents: 1) Project Description; 2) Environmental Monitoring Plan; and 3) Essential Fish Habitat Survey. Staff requested tribal input and also offered to provide a presentation to community members and SVBP Tribal Council at a public meeting. No comments were received, nor consultation requested.

Regardless of existing knowledge, there is potential for unanticipated discovery of archaeological resources during installation of proposed pilot project equipment. This risk would be mitigated by implementing a stop-work order (APM CULT-1) if any resource is unintentionally identified so that its significance can be determined. With this mitigation approach, the impact would be less than significant with mitigation incorporated.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less than Significant Impact with Mitigation Incorporated. The CFB's Coastal Land Use and Development Code Chapter 17.50.030 lists six specific areas that may potentially contain archaeological and/or paleontological resources. There are no known paleontological resources or unique geologic features on the proposed pilot project site. Installation of offshore and onshore components would not require excavation of any submerged or dry land; therefore, the probability of affecting any paleontological resources is also very low.

Regardless of existing knowledge, there is potential for unanticipated discovery of paleontological resources during installation of the proposed pilot project equipment. This risk would be mitigated by implementing a stop-work order (APM CULT-1) if any resource is unintentionally identified so that its significance can be determined. With this mitigation approach, the impact would be less than significant with mitigation incorporated.

d) Disturb any human remains, including those interred outside of dedicated cemeteries?

Less than Significant Impact with Mitigation Incorporated. As noted above, there are no known human remains in the proposed pilot project area; however, there is potential for unanticipated discovery of human remains during installation of the proposed pilot project equipment. This risk would be mitigated by implementing a stop-work order (APM CULT-1) if any remains are unintentionally discovered. With this mitigation approach, the impact would be less than significant with mitigation incorporated.

2.3.6 ENERGY

Question	CEQA Determination
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	No Impact
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	No Impact

Discussion

The Iceberg converts ocean wave energy into mechanical energy to operate the seawater reverse osmosis desalination system and pump permeate to shore. Ancillary systems, if used, will be powered by solar panels mounted on the Iceberg. No marine renewable energy installations are currently proposed within 10 miles of the proposed Iceberg installation.

2.3.7 GEOLOGY AND SOILS

Question	CEQA Determination
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	No Impact
ii) Strong seismic ground shaking?	No Impact
iii) Seismic-related ground failure, including liquefaction?	No Impact
iv) Landslides?	No Impact
b) Result in substantial soil erosion or the loss of topsoil?	Less Than Significant Impact

Question	CEQA Determination
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	Less Than Significant Impact
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	No Impact
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	No Impact
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	No Impact

Discussion

a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

> ***i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.***
>
> ***ii) Strong seismic ground shaking?***
>
> ***iii) Seismic-related ground failure, including liquefaction?***
>
> ***iv) Landslides?***

No Impact - As described in the Project Description (Appendix 1), the commissioned Iceberg will be offshore of the CFB WWTP in the Pacific Ocean. Its five-point mooring system is designed with redundancy to minimize to the extent possible any chance of the Iceberg breaking free as a result of seismic activity or other geologic event.

b) Result in substantial soil erosion or the loss of topsoil?

Less than Significant Impact - The Iceberg will not impact terrestrial soils and geology. Due to its size and conveyance of small permeate volumes (maximum of 13,200 gallons/day), the pipeline's placement and normal operation will have no impact on terrestrial soils and geology. Any seismic event may shift the pipeline and even cause a break in the pipeline. Such a break, caused by a seismic event or other unplanned event, may cause an uncontrolled release of freshwater. The low volume conveyed by the pipeline could cause less than significant and highly localized erosion if it occurs on top of the cliff at the WWTP fence line. If the pipeline break occurs closer to the shoreline its effect will be less than significant with minimal erosion on the rocky beach beyond that which naturally occurs because of wave and tidal action.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Less than Significant Impact – Only in the event of an uncontrolled release of permeate caused by a broken conveyance pipeline would the project potentially induce or contribute to soil stability concerns.

e) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

No Impact – The project is not located on expansive soil and will not create substantial direct or indirect risks to life or property.

f) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

No Impact – The project does not require septic tanks or alternative waste water disposal systems.

g) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

No Impact – No unique paleontological resource or geologic feature is known to occur within the project's area (see section 2.3.5. for more information). No land disturbance activities are scheduled to occur as part of the project.

2.3.8 GREENHOUSE GAS EMISSIONS

Question	CEQA Determination
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	Less Than Significant Impact
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	No Impact

Discussion

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Less than Significant Impact – The Iceberg's desalination system is completely powered by mechanically converting the ambient ocean wave energy with no GHG produced. Minimal GHG will be produced by the service vessels used to deploy the Iceberg, its mooring system, and conveyance system to the shore. Additional minimal GHG production will occur because of the small vessel used to transport operational crew to visit and maintain the Iceberg while it is deployed.

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

No Impact – The Iceberg's operation will not conflict with any plans adopted to reduce GHG emissions.

2.3.9 HAZARDS AND HAZARDOUS MATERIALS

Question	CEQA Determination
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	Less Than Significant Impact
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	Less Than Significant Impact
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	No Impact
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	No Impact
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	No Impact
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	Less Than Significant Impact
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	No Impact

Discussion

Would the project:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Less Than Significant Impact. The proposed pilot project would not routinely transport, use, or dispose of hazardous materials. The desalination buoy operates solely on wave power; there is no fuel on board. A biodegradable oil is used in the capstan motor that maintains main line tension for the buoy. Though the biodegradable oil poses a spill risk, it is biodegradable.

Vessels would be used to install and remove the offshore equipment for the proposed pilot project and would also be used for periodic maintenance tasks during the 12-month operational period. Use of vessels presents a risk of potential spills of fuel or working hydraulic fluids. All vessels would be required to adhere to the Best Management Practices (BMP) as outlined in Attachment B-1 of the Notice of Intent for the Low Threat Discharge Permit from the Water Board. The BMP includes a Spill Prevention and Response Plan that outlines the methods to minimize spill risk. For these reasons, it represents a less than significant impact.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Less Than Significant Impact. See discussion above for item a above.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

No Impact. None of the proposed pilot project components is located within one-quarter mile of an existing or proposed school. The closest school is approximately one mile from the project site. Furthermore, the proposed pilot project would not have hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

No Impact. The proposed pilot project has offshore and onshore components. The offshore components are located in the Pacific Ocean which is not captured on the Department of Toxic Substances and Control (DTSC) Hazardous Waste and Substances List (Cortese List). The onshore components are located on the WWTP property and do not appear on the DTSC Cortese List. There are two listed sites in the CFB: City of Fort Bragg Coastal Trail (EnviroStor ID # 60002118) and the Georgia-Pacific Corporation (EnviroStor # 23240008). None of the proposed pilot project components would be located on either of these two sites; therefore, it would not create a significant hazard to the public or the environment. There would be no impact.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

No Impact. The proposed pilot project would not be located within an airport land use plan nor within two miles of a public airport. However, a small private airstrip, Fort Bragg Airport (Destination Airport ID 82CL), is within 2.5 miles of the project location. This airport hosts about eight local pilots and their planes and is available only to these pilots and their guests. Due to the small size and low number of flights (about 25 monthly), this airport is not considered a source of excessive noise. A such, the addition of the proposed project would not contribute to a safety hazard or excessive noise for people residing or working in the project area.

f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less Than Significant Impact. The CFB has an Emergency Response Plan (aka Emergency Plan) that was published in January 2016. The Emergency Plan covers mitigation, response, and recovery efforts. Since the majority of the project components would be located offshore, there would be no opportunity for this proposed pilot project to impair the implementation of or physically interfere with the adopted Emergency Plan.

The CFB also has a Tsunami Contingency Plan which provides guidelines to address evacuations of the public from tsunami risk zones within the city limits. Given that the offshore pilot project components would be located in the Pacific Ocean, there would be no opportunity for this proposed pilot project to impair the implementation of or physically interfere with the adopted Tsunami Contingency Plan. The onshore pilot project components would be located on the WWTP. The WWTP is identified in the Tsunami Contingency Plan as a facility located in a low-lying area (i.e., below 60-ft elevation). If the coastal site were to be affected by a tsunami, some of the onshore components (e.g., HDPE piping, permeate tank) could impair the implementation of or physically interfere with the Tsunami Contingency Plan. That said, the risk would be low, since the proposed pilot project components would represent only a very small proportion of the infrastructure that would be affected (i.e., WWTP components).

g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

No Impact. The vast majority of the proposed pilot project components are located offshore in the Pacific Ocean and, therefore, do not occur in an area of wildfire risk. None of the proposed pilot project components would expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.

2.3.10 HYDROLOGY AND WATER QUALITY

Question	CEQA Determination
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	Less Than Significant Impact
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such the project may impede sustainable groundwater management of the basin?	No Impact
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: (i) result in substantial erosion or siltation on- or off-site;	Less Than Significant Impact

Question	CEQA Determination
(ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	No Impact
(iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	No Impact
(iv) impede or redirect flood flows?	No Impact
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	Less Than Significant Impact
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	Less Than Significant Impact

Discussion

Would the project:

a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Less Than Significant Impact. The Oneka buoy creates desalinated water through a reverse osmosis (RO) process driven solely by wave energy (i.e., no grid power). The RO process is accomplished by pressurizing seawater to drive it through a membrane creating two liquid streams: 1) freshwater (permeate) and 2) concentrated seawater (brine). The Oneka RO process does not require the use of any chemicals (e.g., antiscalants, coagulants, preservatives, chlorine, RO membrane cleaning solutions). In addition to the two liquid streams, solid waste (of natural origin) would be created during routine maintenance of the buoy's submerged surfaces when biofouling is manually removed. Details about the discharge streams are provided in Table 3.

Table 3. Characterization of the discharge streams.

Discharge Stream	Discharge Location	Constituent	Discharge Rate
Permeate	Existing WWTP outfall	Freshwater	0.013 MGD
Brine	Approximately 0.5 miles offshore adjacent to buoy along the 90-ft isobath	Salinity (ppt)	0.0528 MGD
Biofouling	Offshore adjacent to buoy	Natural organic debris	Approx 4 ft^3 per quarter

Attachment B-1 to the Notice of Intent for the Low Threat Discharge Permit from the Water Board includes Best Management Practices and Pollution Prevention Plan (BMP/PP Plan; Appendix 3). The purpose of the BMP/PP Plan is to identify and implement site-specific BMPs and pollution prevention measures to reduce or prevent the discharge of wastes and pollutants to the Pacific Ocean of the North Coast Region. It describes the various BMPs that would ensure the environmentally friendly operation of the proposed pilot project.

As a permitted Low Threat discharge, the proposed pilot project would be subject to waste discharge requirements (WDRs) set forth in the General Order (R1-2020-0006) upon authorization by a Notice of Applicability (NOA) from the California Regional Water Quality Control

Board, North Coast Region (Regional Water Board). As described in the General Order: a low threat discharge is generally defined as a planned, short-term and/or minimized volume discharge from a definable project that results in a point source discharge to surface waters and that is managed in a manner that does not threaten the quality or beneficial uses of water without additional dilution. Due to the size and duration of the proposed pilot project, the risk is low for the project to substantially degrade surface or ground water quality.

Installation of the offshore components, especially the anchors for the Iceberg buoy and the secondary back-up anchoring system, would temporarily increase local turbidity. Given that this would be a local phenomenon, it would have a less than significant impact on overall water quality.

b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such the project may impede sustainable groundwater management of the basin?

No impact. The proposed pilot project has no nexus with groundwater; it is a proposed seawater desalination pilot project. All brine and permeate would be discharged back to the Pacific Ocean.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

There are no pilot project features that would alter the course of a stream or river or construct impervious surfaces. The majority of the proposed pilot project components are in the Pacific Ocean. The permeate pipeline transitions from the Ocean, up the bluff, and on to the WWTP property; however, the installation would not include any impervious surfaces (e.g., new concrete) or other alteration to the drainage pattern at the WWTP. The permeate would be directly routed to the WWTP outfall as part of the City's normal discharge.

i. result in substantial erosion or siltation on- or off-site

Less Than Significant Impact. The submerged permeate pipeline and primary and secondary anchoring systems may temporarily impact offshore sedimentation and scour patterns. This affected sedimentation and scour patterns would be short-lived, only occurring during the course of the 12-month operational period. Once the permeate pipeline and primary and secondary anchoring systems are removed, sedimentation and scour patterns should revert to normal over time.

ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite

No Impact. None of the proposed pilot project components would affect surface runoff at the project site. The majority of the components would be submerged underwater.

iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff

No Impact. None of the proposed pilot project components would contribute to runoff water at the project site.

iv. impede or redirect flood flows?

No Impact. None of the proposed pilot project components would impede or redirect flood flows. The majority of the proposed pilot project components are in the Pacific Ocean and would not be affected by flood flows. The permeate pipeline transitions from the Ocean, up the bluff, and on to the WWTP property; however, the installation has no nexus with flood flows.

d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

Less Than Significant Impact. The proposed pilot project components would be in a designated low-lying area (i.e., below 60-ft elevation) which could put them at tsunami risk. However, the only pollutant at risk of potential release during a tsunami is the biodegradable oil used in the capstan motor that maintains main line tension for the buoy. Though the biodegradable oil poses a release risk, it is biodegradable and therefore considered a less than significant impact.

e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Less Than Significant Impact. The proposed pilot project has applied for a Low Threat discharge permit from the North Coast Regional Water Quality Control Board. As such, it would be subject to the WDRs set forth in the General Order (R1-2020-0006). The proposed pilot project has no nexus with a groundwater management plan.

2.3.11 LAND USE AND PLANNING

Question	CEQA Determination
a) Physically divide an established community?	No Impact
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	No Impact

Discussion

The project will occur away from any established communities and will be installed, commissioned, operated, and decommissioned in compliance with all applicable environmental regulations.

2.3.12 MINERAL RESOURCES

Question	CEQA Determination
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	No Impact
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	No Impact

Discussion

The area surrounding the Iceberg's proposed installation, pipeline to shore, and WWTP do not support any known mineral resource or mineral resource recovery operations.

2.3.13 NOISE

Question	CEQA Determination
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	Less Than Significant Impact
b) Generation of excessive groundborne vibration or groundborne noise levels?	No Impact
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	No Impact

The CFB has an Inland General Plan and a Coastal General Plan; the latter is germane to the proposed pilot project. Element 8 of the Coastal General Plan is the Noise Element which is enacted to protect the health and welfare of the community by promoting development which is compatible with established noise standards. The proposed pilot project site is adjacent to an operating WWTP and outside of Sensitive Noise Receptors identified in the Coastal General Plan (Figure 9).

Discussion

Would the project result in:

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less Than Significant Impact. During installation and removal of the proposed pilot project equipment, noise would be generated by offshore vessels (i.e., derrick barge, tugboats, push boat, dive support vessel). The principal noise would therefore be from boat motors. The noise would be temporary (approximately two weeks for installation and approximately two weeks for removal). During the operation of the proposed pilot project, the principal offshore component that could contribute to noise levels is the buoy which generates desalinated water without the use of an electric pump or motor. The buoy would generate no noise during its operation. Regardless, the Iceberg's distance from any onshore receptors limits potential impacts onshore. There are no onshore components that could contribute to noise levels. Onshore noise at the project site would be dominated by the operational WWTP.

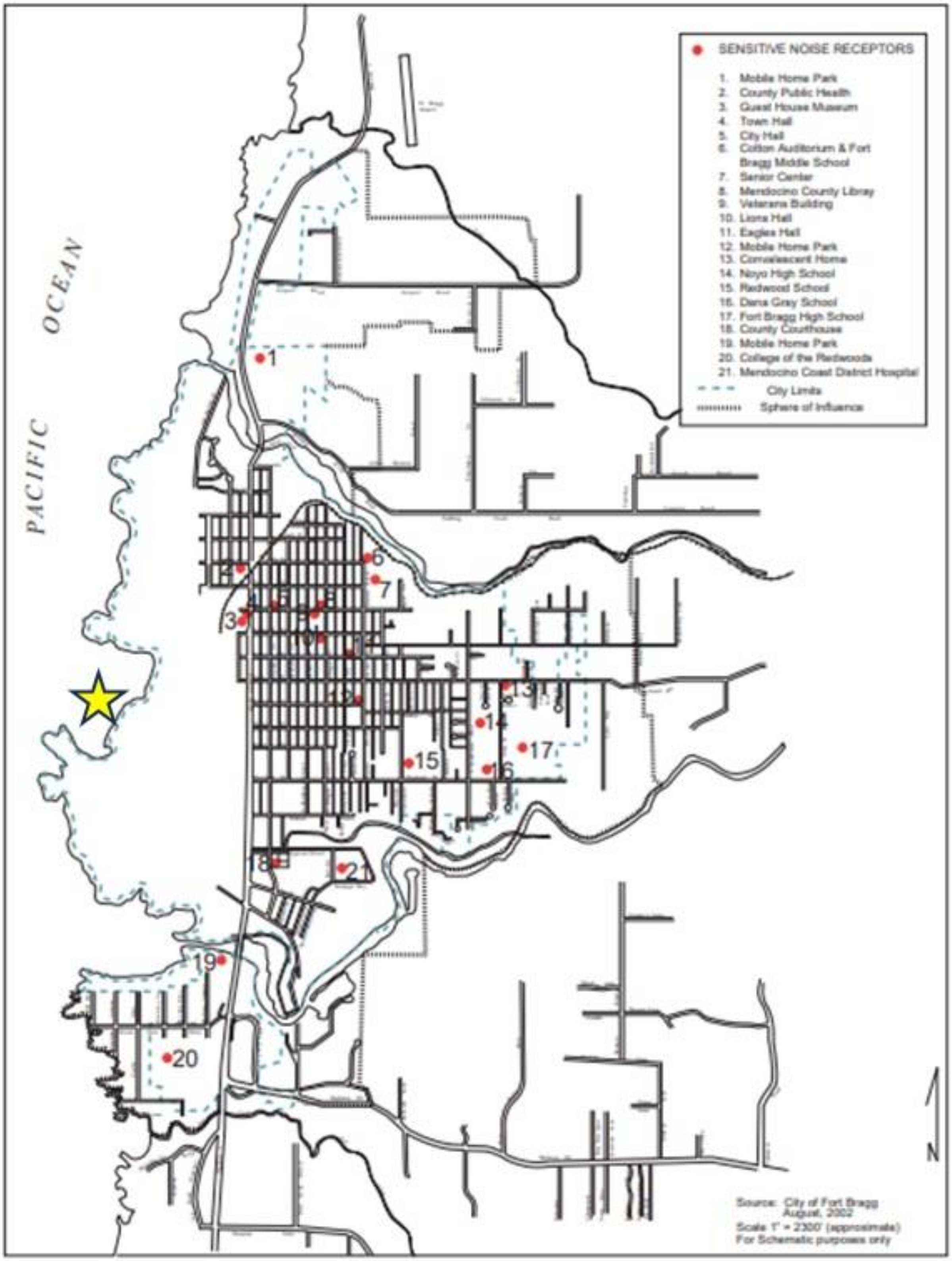

Figure 9. Map N-1 Sensitive Noise Receptors from the City of Fort Bragg's Coastal General Plan (https://www.city.fortbragg.com/home/showpublisheddocument/698/637710004813930000). Proposed pilot project location shown as yellow star.

b) Generation of excessive groundborne vibration or groundborne noise levels?

No Impact. The majority of the proposed pilot project components would be installed offshore; therefore, there is no potential for generating groundborne vibration. The only onshore component is the permeate pipeline which would not generate noise.

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. The proposed pilot project would not be located within an airport land use plan nor within two miles of a public airport. However, a small private airstrip, Fort Bragg Airport (Destination Airport ID 82CL), is within 2.5 miles of the project location. This airport hosts about eight local pilots and their planes and is available only to these pilots and their guests. Due to the small size and low number of flights (about 25 monthly), this airport is not considered a source of excessive noise. A such, the addition of the proposed project would not contribute to a safety hazard or excessive noise for people residing or working in the project area.

2.3.14 POPULATION AND HOUSING

Question	CEQA Determination
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	No Impact
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	No Impact

Discussion

The project is a temporary pilot project with a scheduled field deployment of 12 consecutive months. It will not add any potable water to the CFB's overall supply and thus not alleviate any drought effects. No roads or infrastructure, other than the temporary infrastructure associated with the Iceberg's installation and operation, will be constructed to support population growth. No persons or communities will be displaced by the installation, commissioning, operation, and decommissioning of the Iceberg and its ancillary infrastructure.

2.3.15 PUBLIC SERVICES

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:

Question	CEQA Determination
a) Fire protection?	No Impact
b) Police protection?	No Impact
c) Schools?	No Impact
d) Parks?	No Impact
e) Other public facilities?	No Impact

Discussion

The project is a temporary pilot project that would have no interaction, and thus no impact, with fire or police services, schools, or parks. The conveyance pipeline will deliver permeate to the shoreline fence of the WWTP but not interact with the WWTP operations or wastewater treatment infrastructure. The project will not interact with any other public facilities. Therefore, no impact to public facilities is expected due to the project.

2.3.16 RECREATION

Question	CEQA Determination
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	No Impact
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	No Impact

Discussion

The installation, commissioning, operation, and decommissioning of the Iceberg and its ancillary infrastructure will not include or require any regional parks or other recreational facilities. All project activities will occur either offshore of the CFB WWTP, at the WWTP, or for brief periods in Noyo Harbor.

2.3.17 TRANSPORTATION

Question	CEQA Determination
a) Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	No Impact
b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	No Impact
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	No Impact
d) Result in inadequate emergency access?	No Impact

Discussion

The installation, commissioning, operation, and decommissioning of the Iceberg and its ancillary infrastructure will not impact traffic beyond the normal transportation of goods to Noyo Harbor using standard overland shipping methods. No interruptions to normal vehicle traffic will be needed to transport the Iceberg, and ancillary infrastructure, to or from Noyo Harbor. All other transportation will occur on the water where the Iceberg will remain for most of the pilot project's duration. The Iceberg will only be brought back into Noyo Harbor (by being towed behind a standard sized vessel, such as a size used by a commercial sea urchin diver) for maintenance, in advance of extreme weather, or when being decommissioned at the end of the pilot project.

2.3.18 TRIBAL CULTURAL RESOURCES

Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

Question	CEQA Determination
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	Less Than Significant with Mitigation Incorporated
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	Less Than Significant with Mitigation Incorporated

Discussion

There are no known archaeological resources on the proposed pilot project site. Installation of offshore and onshore components would not require excavation of any submerged or dry land; therefore, the probability of affecting any archaeological resources is very low. On July 10, 2024, City of Fort Bragg staff discussed the project with Sherwood Valley Band of Pomo Indians (SVBP) Tribal Preservation Officer (THPO), Valerie Stanley and shared the following documents: 1) Project Description; 2) Environmental Monitoring Plan; and 3) Essential Fish Habitat Survey. Staff requested tribal input and also offered to provide a presentation to community members and SVBP Tribal Council at a public meeting. No comments were received, nor consultation requested.

Regardless of existing knowledge, there is potential for unanticipated discovery of archaeological resources during installation of proposed pilot project equipment. This risk would be mitigated by implementing a stop-work order (APM CULT-1) if any resource is unintentionally identified so that its significance can be determined. With this mitigation approach, the impact would be less than significant with mitigation incorporated.

Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

a) ***Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)***

Less Than Significant Impact with Mitigation Incorporated. The project would not cause a substantial adverse change in the significance of a TCR that is listed or eligible for listing as defined in Public Resources Code section 5020.1(k).

In the CA Code of Regulations (CCR), section 15064.5, a "substantial adverse change in significance" is defined as *the physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired*. None of the potentially discoverable TCRs would experience a substantial adverse change in significance as a result of the proposed pilot project given the mitigation measure described herein (APM Cult-1).

The proposed pilot project area is comprised of offshore and onshore components. None of the components to be installed offshore or onshore are located in areas that are listed or eligible to be listed on the California Register of Historical Resources or in a local register of historical resources as defined in PRC Section 5020.1(k). The City does not have the proposed site listed, designated, or recognized on a local register of historical resource.

Installation of offshore and onshore components would not require excavation of any submerged or dry land; therefore, the probability of affecting any historical resources is also very low. Regardless of existing knowledge, there is potential for unanticipated discovery of TRCs during installation of the proposed pilot project equipment. This risk would be mitigated by implementing a stop-work order (APM CULT-1) if any TRC is unintentionally identified so that its significance can be determined. With this mitigation approach, the impact would be less than significant with mitigation incorporated.

b) ***A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.***

Less than Significant Impact with Mitigation Incorporated. The proposed pilot project would not cause a substantial adverse change in the significance of a TCR that is determined by the lead agency to be significant per subdivision (c) of PRC Section 5024.1. Subdivision (c) states:

A resource may be listed as an historical resource in the California Register if it meets any of the following National Register of Historic Places criteria:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.

(2) Is associated with the lives of persons important in our past.

(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.

(4) Has yielded, or may be likely to yield, information important in prehistory or history.

None of the above criteria in subdivision (c) are met for the proposed pilot project site. That said, there is potential for unanticipated discovery of TCRs during installation of the proposed pilot project equipment. This risk would be mitigated by implementing a stop-work order (APM Cult-1) if any TCR is unintentionally identified so that its significance can be determined.

2.3.19 UTILITIES AND SERVICE SYSTEMS

Question	CEQA Determination
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	No Impact
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	No Impact
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	No Impact
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	No Impact
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	No Impact

Discussion

Would the project:

a) ***Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?***

No Impact. The proposed pilot project would not result in the relocation or construction of new or expanded utilities. The WWTP has indicated that it has sufficient capacity in their outfall to accommodate discharge of the 0.013 MGD of permeate flow that would be generated during this temporary project.

b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

No Impact. The proposed pilot project does not require any potable water supply.

c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

No Impact. The WWTP has indicated that it has sufficient capacity in their outfall to accommodate discharge of the 0.013 MGD of permeate flow that would be generated during this temporary project.

d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

No Impact. The Iceberg's operation would not generate any solid waste of sewage origin or landfill material. A small amount (~ 4 ft^3 per quarter) of biological material of natural origin would be created during routine maintenance of the Iceberg's submerged surfaces when biofouling organisms are manually removed by divers. The biofouling organisms would be allowed to fall to the seafloor and be reabsorbed by the environment. No chemicals or antifouling treatments will be applied to the Iceberg that would leach into the biofouling organisms.

After the decommissioning of the proposed pilot project, all recoverable system components (e.g., buoy, anchors) will be reused to the extent possible or otherwise recycled. Project components that can neither be reused or recycled will be diverted to landfill. The project proponents intend to reuse or recycle as much of the material as possible.

e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

No Impact. See the response above.

2.3.20 WILDFIRE

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:

Question	CEQA Determination
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	No Impact

Question	**CEQA Determination**
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	No Impact
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	No Impact
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	No Impact

Discussion

All project activities will occur away from state responsibility areas or lands classified as very high fire hazard severity zones. The project will occur offshore in Mill Bay with a small terrestrial footprint on the beach, seaward cliff, and promontory point up to the seaward fence of the WWTP.

2.3.21 MANDATORY FINDINGS OF SIGNIFICANCE

Question	CEQA Determination
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	Less Than Significant Impact
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	Less Than Significant Impact
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	Less Than Significant Impact

Discussion

a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a

fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

Less Than Significant Impact – The project will not significantly impact the marine environment, all forms of marine life, or any examples of California's history or prehistory. The project is a pilot project with a 12-month operational deployment planned. The brief duration of the deployment and gentle touch practices proposed will minimize impacts while collecting data to inform analyses of the potential impacts of a future, permanent, utility-scale installation.

The Iceberg's seawater intake and brine discharge are designed to minimize environmental impacts to the maximum extent possible. The seawater intake will result in a small, but non-zero loss of marine life which will be mitigated by APM BIO-2.

The mooring system will be temporarily placed, for the duration of the deployment, in a soft-bottom area of the seafloor. Soft-bottom areas are highly dynamic and constantly reshaped by the ambient wave action. After the project is over, the soft bottom is expected to be again reshaped by the wave action when the mooring system is removed.

The conveyance pipeline to shore and its anchoring system will be placed by divers to avoid sensitive habitats with submerged aquatic vegetation. Presently, much of the California coast, including the Fort Bragg coastline, is suffering from an overabundance of herbivorous purple sea urchins that have denuded the rocky reef habitat of nearly all algae. Multiple government and non-governmental organization-supported efforts to remove purple sea urchins are underway in hopes of restoring coastal algae. Therefore, any temporary contact between the conveyance pipeline and submerged hard substrate will preferentially occur where overabundant purple sea urchins are present and algae absent.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

Less Than Significant Impact – No other projects are currently planned in Mill Bay that, when combined with the presently proposed Iceberg pilot study, would result in cumulative impacts. At the WWTP, the recently prepared IS/MND and Coastal Development Permit (CDP 9-24) for the Wastewater Treatment Facility Bio-Solid Storage and Dryer Buildings & PV Project (CFB 2024) represents the only other CEQA project in the general area overlapping the Iceberg pilot study. While both projects will occur at the same general site, the WWTP, their cumulative impacts will be less than significant with no additive elements. Only desalinated permeate will arrive on site at the WWTP through the small hose installed at the seawater edge of the WWTP.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Less Than Significant Impact – A less than significant impact may happen to human beings. This will result from minor inconveniences that may be generated in NOYO Harbor while the

Iceberg is being readied for deployment and returned. The Essential Fish Habitat assessment (included in Appendix 1 of the Project Description (Appendix 1 to this IS/MND)) found minimal fishing effort reported in the Mill Bay area.

3 APPLICANT PROPOSED MITIGATION

APM BIO-1 The nearshore environment of Mill Bay is dynamic. To minimize any impacts to sensitive habitat that may develop between when the surveys discussed in the Project Description (Appendix 1) were completed and when the Iceberg installation occurs, a new pre-construction survey of the pipeline pathway will be completed. This survey will be completed to verify conditions observed previously reported in the Project Description (Appendix 1) and identify the best current alignment for the permeate pipeline to shore. The best alignment will be one that avoids vegetated hard substrate and prefers either soft-bottom habitat or denuded hard substrate. The survey will also inspect for any abalone that may have moved to the area. The new survey will be completed between 30 and 90 days, weather permitting, before the installation begins. A post-construction survey will be completed to confirm that the placement and removal of the Iceberg, its mooring system, and conveyance pipeline to shore with its associated anchorage occurred within planned specifications and resulted in minimal, if any, permanent changes to the seafloor habitat. The comparison between the new pre-construction and post-construction surveys will also identify if any habitat impacts have occurred that would require additional mitigation.

APM BIO-2 As detailed in Appendix 1. After consulting with staff from the State Water Resources Control Board and the North Coast Regional Water Quality Control Board, we propose the following mitigation for impacts to all forms of marine life. Mitigation for all forms of marine life entrained will follow the procedure for interim mitigation of once-through-cooled power plant entrainment by calculating a fee per volume of water circulated, with an additional monitoring and maintenance fee. The Iceberg deployment schedule is dependent on the date all permits are received. Therefore, the minimum and maximum fees were calculated for different years as presented in Table 4. The minimum fee assumes the field deployment occurs only in 2025 resulting in a mitigation fee of $372.49. If the full field deployment occurs in 2026, the maximum mitigation fee would be $383.66. The final mitigation fee, dependent upon when the Iceberg is deployed, will be donated to a group conducting marine mitigation within the CFB area, identified by the City and Oneka, and agreed upon by the North Coast Regional Water Quality Control Board.

Table 4. Proposed Mitigation for Impacts to All Forms of Marine Life Resulting from Entrainment through the Iceberg's Fine Mesh Intake Screen.

Year	2024 Fee/MG	3% Annual Escalation	Max MGD	Total Annual Project Flow (MG)	Subtotal	Final with 20% M&M
2025	$12.51	$12.89	0.066	24.09	$310.41	$372.49
2026	$12.51	$13.27	0.066	24.09	$319.72	$383.66

APM BIO-3 As detailed in Section 2 of the Environmental Monitoring Plan (Appendix 2), a Marine Mammal Monitoring Plan will be implemented during the installation and removal of all marine components: the Iceberg, the Iceberg's mooring system, the permeate pipeline, and the pipeline's anchoring system.

APM BIO-4 To prevent marine mammal entanglement to the extent possible and respond if an entanglement occurs, the applicant has prepared an Entanglement Mitigation Plan included as Appendix 3 to the Project Description (Appendix 1 to this IS/MND). APM BIO-3 commits the applicant to implement this Entanglement Mitigation Plan.

AMP BIO-5 The project's onshore construction should either be initiated and/or completed from August 31 to January 31, outside of the general bird nesting season, or include monitoring by a qualified biologist. If land disturbance activities cannot be completed or initiated outside of the general bird nesting season, a pre-construction nesting bird survey should be performed by a qualified biologist no more than 7 days prior to the initiation of construction. The survey should cover the Project Area and surrounding areas within 500 feet. If active bird nests are found during the survey, a qualified biologist should monitor nesting birds during construction to ensure they are not disturbed by the project activities. If the monitor notices behavioral changes in the birds, an appropriate no-disturbance buffer should be established by the qualified biologist. The no-disturbance buffer will remain in place until it is determined that the young have fledged (left the nest) or the nest otherwise becomes inactive (e.g., due to predation). If more than 14 days of no work occurs during the nesting season, birds may begin nesting; therefore, if more than 14 days of no work occurs during the nesting season and will need to resume to complete the proposed Project, an additional nesting survey is recommended.

AMP CULT-1 Tribal Monitoring is required during earth moving activities, which shall be paid for by the applicant. The Sherwood Valley Band of Pomo Tribal Historic Preservation Office will be contacted at least ten days prior to construction. If cultural resources are encountered during construction, work on-site shall be temporarily halted within 50 feet and the area marked off. Project personnel shall avoid altering the cultural resources encountered and their context until a qualified professional archaeologist and tribal monitor has evaluated the situation and provided appropriate recommendations. Project personnel shall not collect or move cultural resources. No social media posting. If human remains or burial materials are discovered during project construction, work within 50 feet of the discovery location, and within any nearby area reasonably suspected to overlie human remains, will cease (Public Resources Code, Section 7050.5). The Mendocino County Coroner will be contacted. If the coroner determines that the remains are of Native American origin, it is necessary to comply with state laws regarding the disposition of Native American remains (Public Resources Code, Section 5097).

4 REFERENCES

City of Fort Bragg (CFB). 2024. Initial Study/Mitigated Negative Declaration: Wastewater Treatment Facility Bio-Solid Storage and Dryer Buildings & PV Project.

Mendocino Audubon Society. 2019. Citizen science pelagic cormorant monitoring in Mendocino and Northern Sonoma County, California – 2009-2018 seasons. Available at: https://www.mendocinocoastaudubon.org/news/cormorant-monitoring.

APPENDIX 1: CITY OF FORT BRAGG ONEKA DESALINATION BUOY PILOT PROJECT DESCRIPTION

CITY OF FORT BRAGG

ONEKA DESALINATION BUOY PILOT PROJECT DESCRIPTION

Prepared For	CITY OF FORT BRAGG
Prepared By	MILLER MARINE SCIENCE & CONSULTING, INC TWB ENVIRONMENTAL RESEARCH & CONSULTING
Date	MARCH 2025

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TABLES

FIGURES

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1 PROJECT DESCRIPTION

This document presents a description of the City of Fort Bragg's (City's) Oneka Desalination Buoy Pilot Project (Pilot Project). It provides the project background, the environmental setting for the deployment area offshore of the City, the design of the Pilot Project components, the construction/installation methods, the operation, and maintenance (O&M) plan, the decommissioning approach, and the requisite permits and approvals.

2 PROJECT BACKGROUND

The City has suffered water reliability concerns in recent years during the severe droughts California has endured. In response, the City installed portable, containerized desalination units to treat the brackish or saline waters at a diversion point approximately 4.5 miles upriver from the Noyo River mouth. To avert future challenges, the City has sought out new, reliable water supply alternatives. One promising technology is the Oneka Technologies (Oneka) wave-powered desalination system. The Oneka units convert seawater into freshwater through reverse osmosis (RO), using only the power of ocean waves. The Oneka design will be the first of its kind in California and would therefore benefit from a pilot study to demonstrate its effectiveness and refine its operational parameters to inform a future utility-scale deployment.

In consultation with the City, Oneka identified their Iceberg class unit as the most appropriate to pilot test off the coast of the City. The Iceberg unit is the 9th generation of this technology developed over seven years in the ocean environment. The pilot study will deploy a single Iceberg class unit that will produce on average 13,200 gal/day or 0.013 million gallon/day (MGD) for a period of 12 months. Over the course of the pilot study, the operational parameters and environmental impact of the Iceberg's operation will be monitored to support permitting of a future array of Iceberg units to provide a utility-scale water supply.

3 ENVIRONMENTAL SETTING

The City is located in western Mendocino County on a stretch of the rugged Northern California coastline between the Noyo River and Pudding Creek. It is one of the comparatively more urban areas within the mostly rural Mendocino County. Historically, the local economy has been dominated by natural resource-based business enterprises such as timber, fishing, and tourism. The 2002 closure of the Georgia-Pacific Mill reduced the timber industry's stake in the local economy. Fishing and tourism remain significant parts of the coastal economy.

The coastal waters where the buoy for this pilot project will be moored is a mix of sandy plains interspersed among high-rugosity rocky reefs underlying a high-wave-energy environment (Figure 1). In support of the pilot study, a detailed map of the seafloor was created using side-scan sonar imaging followed by remotely-operated vehicle surveys to verify the structures identified during the sonar imaging. This resulted in identifying the mapped soft-bottom habitat displayed in tan in Figure 1. Kelp canopy mapped during three years (1989, 1999, and 2016) is also shown in Figure 1. Two of the years represent near-maximum canopy area (1989 and 1999) and the most recent year for which a GIS shapefile is available (2016) from the California

Department of Fish and Wildlife's Marine GIS unit (https://filelib.wildlife.ca.gov/Public/R7_MR/). Kelp canopy areas can be used as a proxy for the presence of hard substrate. Canopy forming kelps require hard substrate to attach to in high-energy wave areas to maintain position. Not all hard substrate, however, supports canopy-forming kelp. This can be due to turbidity, high-concentration of suspended solids that scour the substrate and eliminate canopy-forming kelp holdfasts, an abundance of herbivorous predators, and others (Schiel and Foster 2015). Marine protected areas (MPAs) in the area were also added to the map (Figure 1) to assess the spatial proximity of the proposed project to protected areas.

Recent environmental surveys in compliance with the City's wastewater treatment plant (AMS 2023) documented a variety of marine resources such as various algal species, sea urchins (including *Strongylocentrotus purpuratus* and *S. franciscanus*), and red abalone (*Haliotis rufescens*). Foliose algal species such as *Desmarestia* and *Nereocystis* were either absent or present in very low densities consistent with the overall trend of declining algal communities along the Northern California coastline (Rodgers-Bennet and Catton 2019). The algal community decline has coincided with an increase in the sea urchin populations, which may be correlated to the algal decline, and an increase in exposed rocky habitat. During the four surveys in the area since 2007, AMS (2023) reported a gradual habitat conversion from sand to rocky substrate throughout the area. This coincides with two significant drought episodes in California.

A circular area measuring approximately 6.3 acres of predominantly sandy substrate (the offshore bowl) was identified offshore of the City wastewater treatment plant and deemed suitable for the placement of the buoy mooring system with minimal risk to sensitive habitat. A sand channel extending from the offshore bowl inshore to near the terminus of the City's wastewater treatment plant ocean outfall was identified and deemed suitable for the placement of the permeate pipeline. The permeate pipeline will have to cross hard substrate that supported canopy-forming kelp in both the 1989 and 1999 mapping surveys. No kelp canopy was reported in this area during 2016 mapping effort or during the side-scan sonar and ROV surveys performed for this project. The proposed channel from the offshore bowl to the existing wastewater treatment plant ocean outfall is the least impactful identified. The channel's minimum width is 71 ft; wide enough for the permeate pipeline and its anchoring system to reach the shoreline.

Two sites were initially evaluated for the deployment, the preferred site in Mill Bay offshore of the Wastewater Treatment Plant, and the alternative site offshore Noyo Harbor (Figure 2). The mooring system is approximately 427 ft in diameter. This size was used on the map in Figure 2 to represent the area likely closed to vessel traffic in each alternative site. The preferred site is positioned approximately 0.5 mile offshore of the wastewater treatment plant. Mill Bay does not support any marinas, ports, harbors, or other high-traffic areas for commercial and recreational vessels. It does, however, already contain habitat disturbed for the installation and operation of the wastewater treatment plant's ocean outfall. Noyo Harbor contains a working marina and port supporting the local blue economy with consistent vessel traffic. The Noyo Harbor entrance channel is approximately 1,400 wide with kelp canopy mapped along both sides of the channel further constricting the safe, navigable passage. No infrastructure exists on the bluffs on either side of the Noyo Harbor channel that could temporarily support the Iceberg pilot study, thus requiring the permeate pipeline to make landfall in Noyo Harbor at the docks. Additional infrastructure would be needed to accept the permeate in a way that would allow for the proper discharge of unused permeate while providing access to the permeate for testing and non-potable uses at the City's discretion.

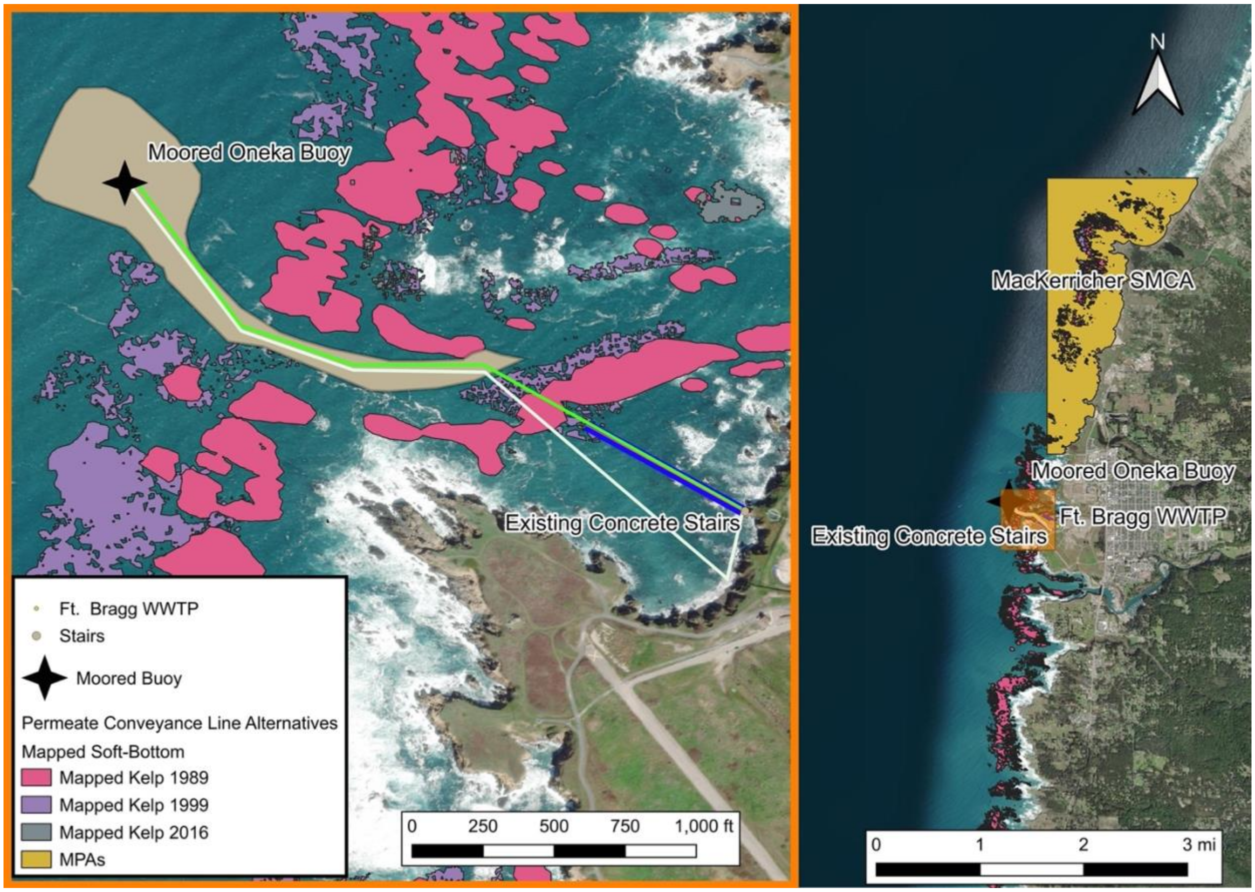


Figure 1: Map of the proposed pilot project and surrounding habitat, existing infrastructure, and location of the nearest Marine Protected Area (MPA). Mapped kelp areas drawn from the California Department of Fish and Wildlife's Marine GIS. Mapped soft-bottom from side-scan sonar survey summarized in Appendix 1. Green (preferred) and white (alternative) permeate conveyance lines depicted on the map.

Using these maps (Figures 1 and 2), the preferred Iceberg mooring site is approximately 570 ft from the nearest canopy-forming kelp based on the 1989 mapping survey, 317 ft from the nearest canopy-forming kelp based on the 1999 mapping survey, and 0.75 miles from the nearest MPA, MacKerricher State Marine Conservation Area (SMCA).

3.1 Water Quality

AMS (2023) measured four water quality parameters at five stations (Figure 3) in the area on August 31, 2022. The parameters were stable throughout the water column and across the monitoring area. A summary of these data is provided in Table 1. All parameters were within the ranges specified in the California Ocean Plan. For the purposes of this analysis, no stations were considered as the reference site. The pH was less than 0.2 units different among any of the stations. All dissolved oxygen concentrations were within 90%, or more, of each other indicating the concentration at any one station was depressed no more than 10% from ambient. Salinity and water temperature were nearly identical across the area.

The salinity in the area on August 31, 2022 was between 33.0 and 33.1 PSS (Table 1). This was consistent with the long term average salinity (33.0 PSS, standard error = 0.007) recorded in Humboldt Bay between March 22, 2021 and March 22, 2024 (https://data.caloos.org/#metadata/20363/station/data).

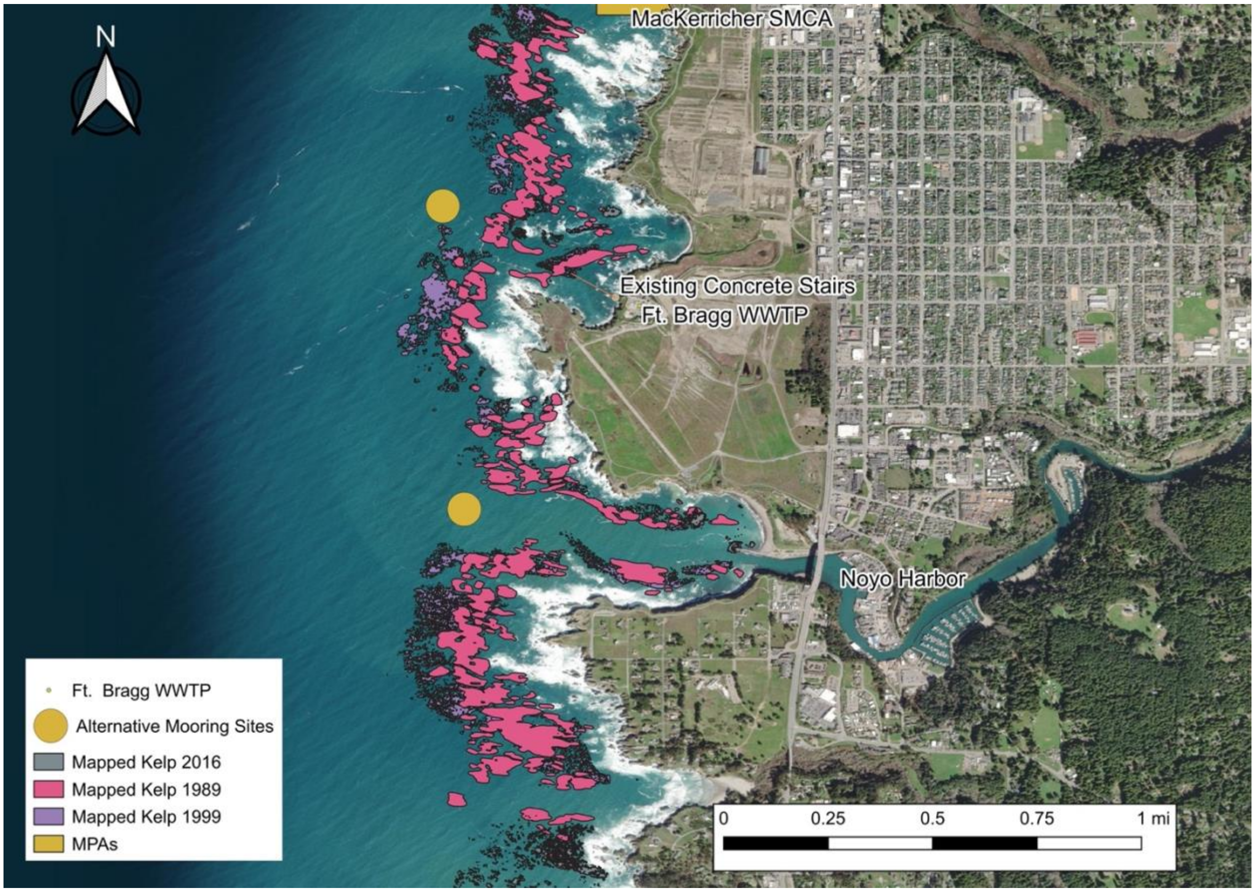


Figure 2. Iceberg buoy mooring sites considered in this analysis with habitat layers included for reference.

On August 9, 2023, seawater was collected from the surface where the Iceberg will be deployed. The seawater sample was delivered to Alpha Analytical Laboratories, Inc. (ELAP# 1551) for analytical testing. Testing was for the Ocean Plan Table 1 list of analytes with the full results in Appendix 2. Only five analytes were detected in the water sample (Table 2).

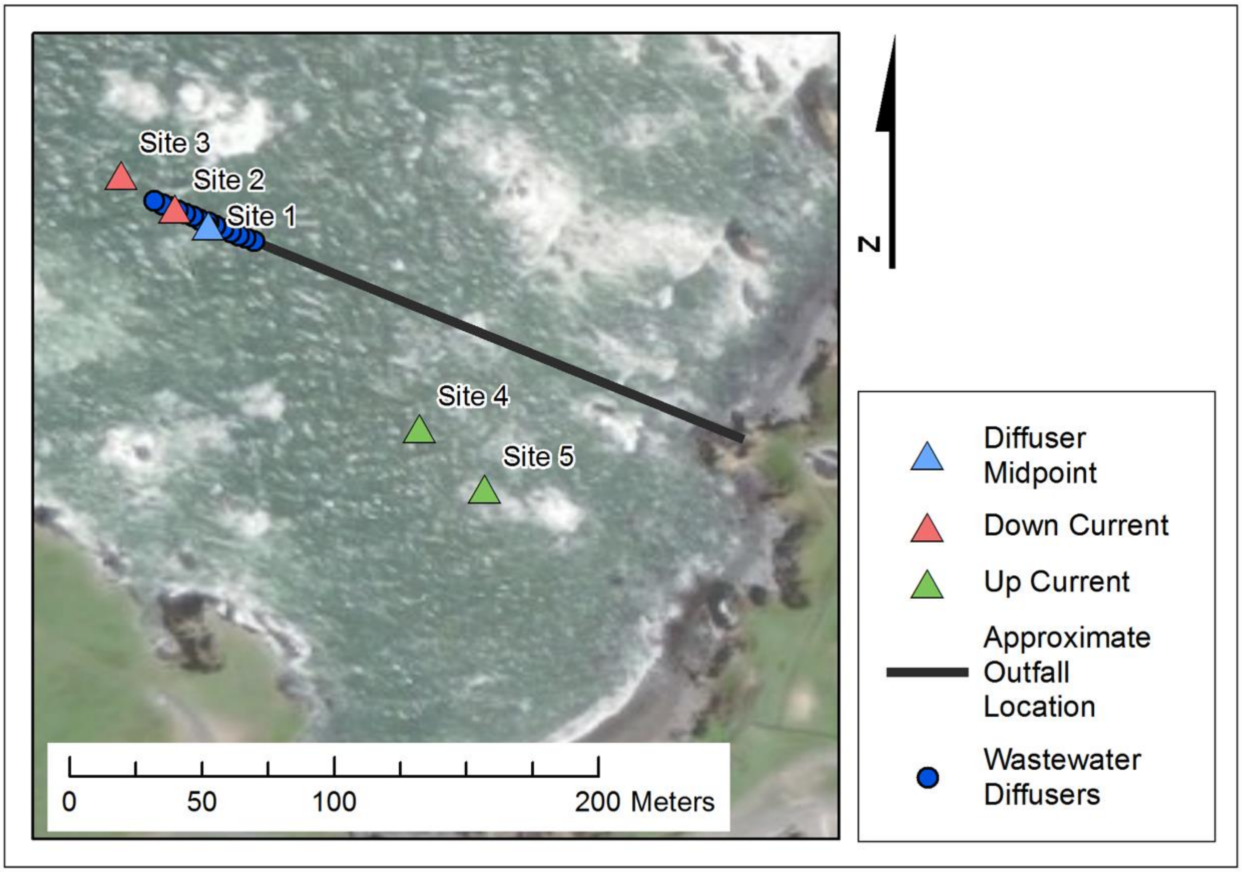


Figure 3. Water quality monitoring stations. From AMS (2023).

Table 1. Average water quality parameter values recorded throughout the water column at each Site surveyed on August 31, 2022. Data provided by Applied Marine Sciences.

Parameter	Site 1	Site 2	Site 3	Site 4	Site 5
Water Temperature (°C)	11.4	11.4	11.5	11.6	11.5
Salinity (PSS)	33.1	33.0	33.1	33.0	33.1
pH	8.0	8.0	8.1	8.1	8.1
Dissolved Oxygen (mg/l)	8.2	8.4	8.7	9.0	8.7

Table 2. Analytical chemistry results for a water sample collected on August 9, 2023 at the proposed location of the moored Iceberg.

Parameter	Value	Units
Copper	5.4	µg/L
Nickel	8.1	µg/L
Ammonia	0.17	mg/L
Acetone	5.5	µg/L
Di-n-butyl phthalate	6.2	µg/L

4 DESIGN OF COMPONENTS

The Iceberg can produce a maximum of 22,000 gal/day (0.022 MGD) of permeate, but for the Pilot Study, the daily production target is 13,200 gal/day (0.013 MGD) to allow for flexibility in testing multiple recovery percentages while withdrawing less than 100,000 gal/day (0.10 MGD) of seawater. A maximum of 66,000 gal/day (0.066 MGD) of seawater is needed to produce 13,200 gal/day. The system is comprised of the following components. A site layout (Figure 4) depicts all the principal project components. The design of each component is described in greater detail in the following subsections

- Iceberg buoy – the buoy is the floating structure that houses the wave power-generating device, the seawater intake system, the seawater RO membranes, and the brine discharge system.
- Mooring/anchoring system – the mooring/anchoring system keeps the Iceberg unit anchored to the seafloor with built-in redundancy providing a safety back-up if the principal mooring system fails for any reason.
- Permeate pipeline – the permeate pipeline is used to convey desalinated permeate from the Iceberg buoy to shore. It will also be anchored to the seafloor.

4.1 Iceberg Buoy

The Oneka Iceberg-class wave-powered desalination buoy weighs 22 tons and measures 19.7 ft wide by 28.7 ft long. The Iceberg is 21.7 ft tall with 15.6 ft above the water line and 6.1 ft below the water line (Figure 5). The Iceberg is designed to be towed to and from the dock and deployment site using a towboat[1]. It can be installed or removed within a few hours.

[1] The towboat will be, at a minimum, more than 35 ft in length with a total propulsion power of at least 1000 hp preferably distributed across multiple engines. All diesel engines will be compliant with the applicable California Air Resources Board regulations based on length and passenger load. The actual towboat will be selected and contracted once all permits have been secured.

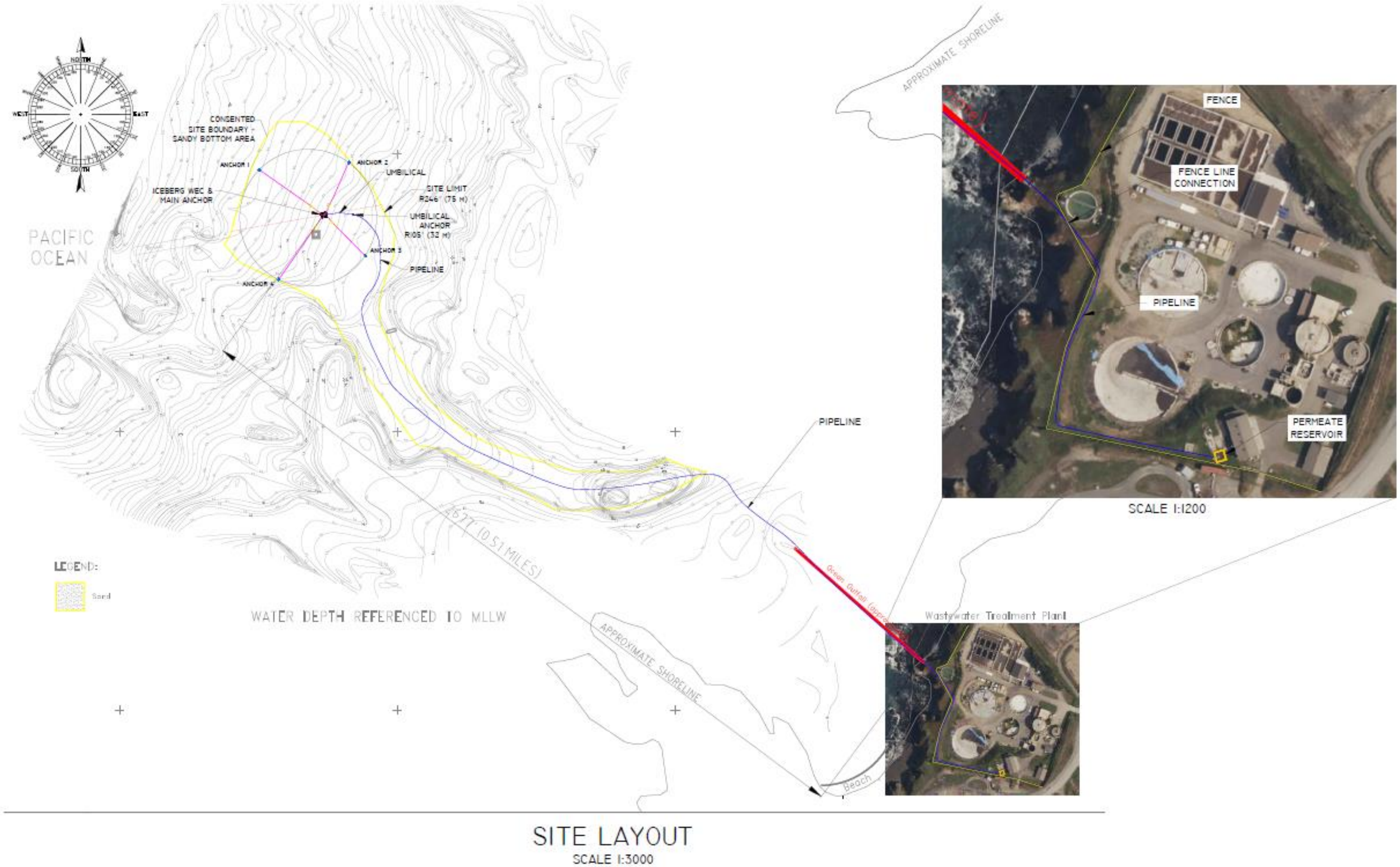


Figure 4. Site Layout for the pilot project depicting the Iceberg's location, mooring system layout, permeate pipeline to shore, existing City of Fort Bragg wastewater treatment plant existing ocean outfall, and wastewater treatment plant with the proposed terminus of the permeate pipeline within the treatment plant.

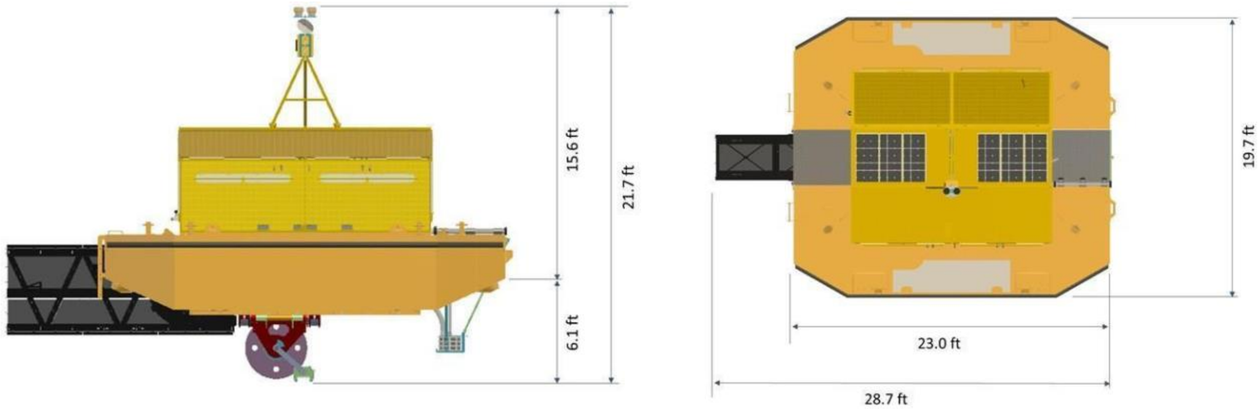


Figure 5. Dimensions of the Iceberg unit.

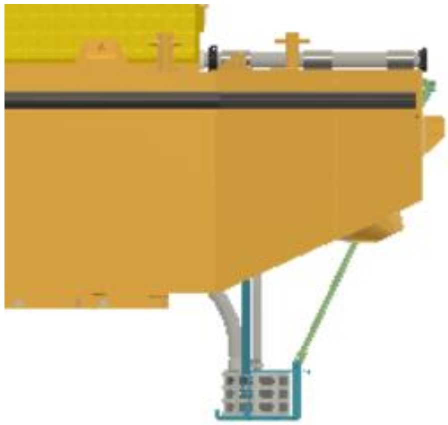
The buoy is a fully self-contained desalination system powered exclusively by mechanical wave energy and uses no chemicals in the treatment process. Using the point absorber principle[2], the buoy gathers energy with every wave. The patented Power Take Off (PTO) mechanism drives a water pump which has a self-cleaning, 60-micron (0.06-mm) mesh, cylindrical intake screen at a nominal depth of four ft below the ocean surface. All material, including nearly all forms of marine life, are passively excluded by the 60-micron mesh intake screen at the point of withdrawal. Once into the system, the pressurized water is filtered through 5-micron mesh cartridge filters before entering the RO membranes.

4.1.1 Intake System

The intake screen is 16.5 in in diameter and 10.3 in long (Figure 6) and is designed to withdraw a nominal 66,000 gal/day (0.066 MGD). The calculated through-screen intake velocity is approximately 0.22 ft/sec at the design flow rate and 0.27 ft/sec with an assumed 15% open area blocked. Under all operating scenarios, the intake for the Pilot Project will not exceed 0.5 ft/sec.

The screening mesh is 316 stainless steel. The intake screen is automatically cleaned via a rotary cleaning device inside the screen which is driven mechanically by intake and discharge flow. This internal cleaning is continuous if the buoy is operating. The intake system is also retrievable to the surface, so manual cleaning can be done (if required) without divers.

[2] A point absorber is a floating device that absorbs energy from waves by exploiting the motion of the device relative to a fixed anchoring point on the seabed to create mechanical energy.



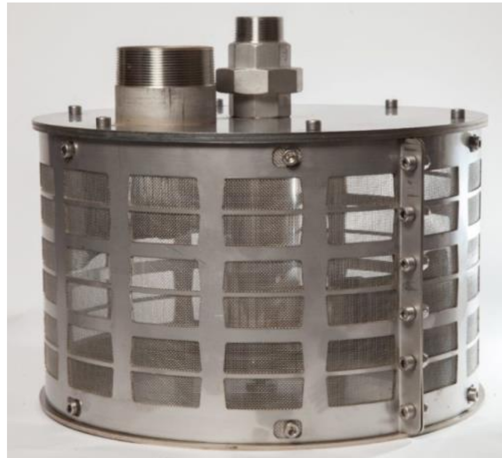


Figure 6. Seawater intake and brine discharge system with 60-micron mesh screening. https://www.rotorflush.com/products/rf400a/#models

4.1.2 Seawater Reverse Osmosis System (SWRO)

The Iceberg buoy will contain four RO membranes distributed across two pressure vessels (two RO membranes per pressure vessel).

While capable of a maximum production of 22,000 gal/day (0.022 MGD), during the Pilot Project the buoy will nominally produce 13,200 gal/day (0.013 MGD) of permeate, on average. The 13,200 gal/day (0.013 MGD) production rate is analyzed here as it represents average operating conditions and produces the highest salinity brine depending on the recovery percentage (Table 3). A range of potential recovery percentages are also presented to describe the average operational envelope.

Assuming ambient salinity is 33.1 ppt in the deployment area, the maximum seawater intake volume will occur with 20% recovery but will result in the least saline brine (41.38 ppt). As the recovery percentage increases the brine volume decreases, but its salinity increases to an estimated maximum of 50.92 ppt salinity at a 35% recovery rate.

Table 3. Iceberg buoy seawater desalination processing parameters with a nominal permeate production of 13,200 gallons/day (0.0132 MGD).

Recovery %	Seawater Intake		Brine Discharge		Produced water	
	Volume (x1000 G)	Salinity (ppt)	Volume (x1000 G)	Salinity (ppt)	Volume (x1000 G)	Salinity (ppt)
20	66	33.1	52.8	41.38	13.2	0.167
25	52.8	33.1	39.6	44.13	13.2	0.175
30	44	33.1	30.8	47.29	13.2	0.185
35	37.7	33.1	24.5	50.92	13.2	0.196

4.1.3 Brine Discharge System

Brine rejected from the RO system first passes through the energy recovery device before being discharged through the same component used for the intake (Figure 6). The point of discharge is therefore the face of the 60-micron screen. The maximum brine velocity at the point of discharge is 0.23 ft/sec.

Hydrodynamic modeling was completed assuming a quiescent ocean and Iceberg operation at the 35% recovery rate. The 35% recovery rate was modeled because this results in the most saline brine (50.92 ppt) discharged. Modeling indicates dilution to no more than 2.0 ppt over ambient salinity occurs within less than 1.0 feet away (horizontally) and less than 9 ft away (vertically) from the discharge point (Appendix 3).

4.1.4 Mooring/Anchoring System

The mooring/anchoring system is comprised of two parts: the components required to anchor the Iceberg buoy and the components required for the secondary back-up anchoring system which would keep project components in place if the principal system failed for any reason. The buoy's position is constantly monitored via electronic telemetry. Solar-powered systems onboard the buoy transmit the buoy's coordinates to Oneka servers in real time to monitor its position and operation. These data will confirm that the units are securely attached and performing well.

The mooring/anchoring design is streamlined to reduce the amount of seafloor anchors, vertical and horizontal mooring lines to mitigate entanglement of marine animals. Vertical and horizontal mooring lines are designed to be kept under a minimum of tension, avoiding looping of lines, and furthering entanglement mitigation. Periodic inspections of the mooring/anchoring system will allow the Iceberg maintenance staff the opportunity to monitor entanglement risks and act proactively. The pilot project's complete entanglement mitigation plan is included in Appendix 4.

4.1.5 Principal Mooring/Anchoring

The primary mooring system for the Iceberg will consist of a main tether running between the underside of the Iceberg and a gravity anchor placed on the seafloor. The tether will be part of the heave compensation system built into the Iceberg that will accommodate the vertical movement of the Iceberg with the swells. The gravity anchor will consist of a structural steel frame that will hold removable concrete blocks, which will be set in place after landing the frame on the seafloor (Figure 7). This modular design may reduce the overall anchor weight for deployment and recovery purposes.

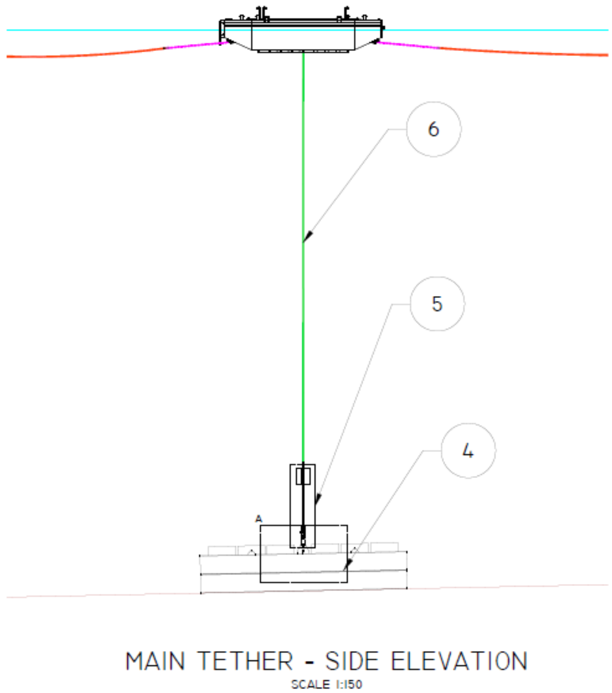


Figure 7. Main tether and gravity anchor.

4.1.6 Back-up Mooring/Anchoring

The secondary mooring system for the Iceberg will consist of four traditional anchors, ground leg and mooring line spreads. Each spread will consist of a gravity anchor (comprised of either concrete or chain) connected to a marker buoy via a synthetic riser line running to the surface; a ground leg laying on the seafloor consisting of studlink chain; a synthetic riser line connected to the ground leg and running up to a surface buoy; and a surface mooring line running between the buoy and the Iceberg (Figures 8 and 9). The four secondary mooring spreads will be placed to best accommodate the prevailing swells and will stay within the seafloor footprint limitations. The design of these spreads, with a single riser between the ground leg on the seafloor and the buoy, will minimize the potential for interference with marine animals.

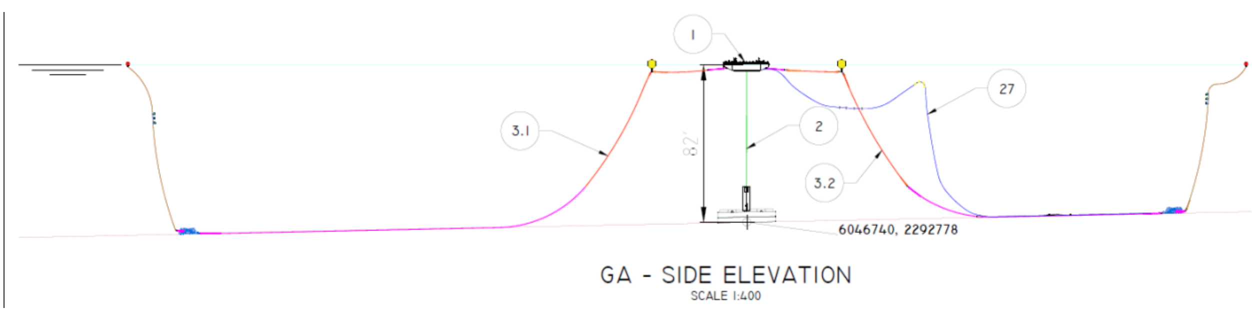


Figure 8. Mooring system and location.

4.2 Permeate Pipeline

A High-Density Polyethylene (HDPE) pipe will be used to transfer permeate from the Iceberg buoy to shore. HDPE is commonly used for marine pipeline installations due to its flexibility, corrosion resistance, and compatibility with fresh water. The pipe will be three-inch diameter DR 11 (200 psi) and based on the proposed site layout (Figure 4) will have an approximate total length of 3,600 feet, of which 2,900 feet will be below sea and the remaining 700 feet floating at the surface.

The umbilical connection of the pipeline to the buoy will feature a standard lazy wave configuration used in most pipeline-to-floating-structure connections to reduce strain on the pipeline and avoid damage. The umbilical will use buoy supports and mid-water weights to lift and bend the pipeline before connecting to the buoy's permeate outtake (Figure 9). The connection of the pipeline to the outtake will feature a breakaway link which would disconnect the pipeline from the buoy for entanglement prevention and to prevent damage.

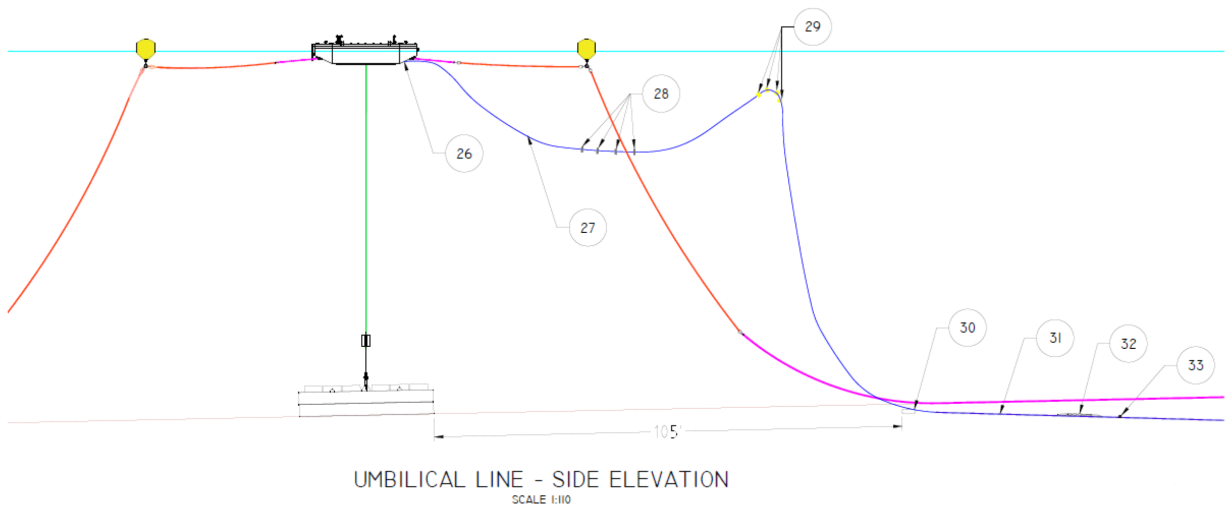


Figure 9. Umbilical connection of the pipeline to the Iceberg featuring a lazy wave configuration.

The onshore end of the permeate pipe will terminate within the Fort Bragg Sanitation facility. The pipe will connect to a City-supplied water pipe through a valve and meter connection near the top of the bluff. From that point heading towards the ocean, the permeate pipe will be attached to the existing concrete slab and deck using u-clamps and fasteners. At the edge of the bluff the permeate pipe will turn vertical and run down the face of the bluff, again being connected to the existing concrete bluff face using u-clamps and fasteners. At the bottom of the cliff the permeate pipe will turn horizontal and run out across the shoreline to connect with the offshore portion of the permeate pipe. Additional information on the onshore portion and the installation are provided in Section 5.6 Anchoring Permeate Pipe.

5 CONSTRUCTION/INSTALLATION METHOD

5.1 Pre-Construction Surveys

Prior to the installation of the Iceberg mooring system, pre-construction multibeam hydrographic surveys[3] will be performed to confirm the bathymetry and identify any surficial features within the project boundaries. Based on the bathymetry, the specific locations for the primary mooring spread anchor and the secondary mooring spread anchors and ground legs will be identified and plotted. The anchor locations for the derrick barge mooring spreads will be identified to minimize any impacts to environmentally-sensitive areas. The Anchoring Plan will identify the anchor placement sites along with the procedures for setting and recovering anchors and mooring system components.

5.2 Primary and Secondary Mooring Spreads Installation

Using the plots detailed in the Anchoring Plan and employing real-time survey and positioning services on the barge, the derrick barge spread will set up in a 4-point or 6-point anchor spread at the primary mooring location defined in the Anchoring Plan. The barge will first deploy the primary mooring anchor frame followed by the concrete ballast weights into the frame.

After deployment of the primary mooring anchor frame, the derrick barge anchors will be raised allowing the barge to move. The derrick barge will then move to each of the secondary anchor locations and deploy the gravity anchor, ground leg chain, synthetic line riser and buoy. The derrick barge will work in “live boat” mode, so no barge anchors or ground tackle will be deployed on the seafloor. Tugboats fore and aft, along with a lateral push boat, will position the barge over the location specified in the Anchoring Plan and the barge will use its crane to drop the clump weight in position. The tugs and push boat will then move the barge along the approved path as the ground leg chain and riser are deployed from the barge. The onboard survey spread will confirm and document that all anchors and mooring components are within their pre-approved areas and alignments. Once all the anchors and mooring components are installed and confirmed in place, the surface synthetic lines from the buoys will be temporarily secured together to keep the buoys from drifting during deployment of the Iceberg.

5.3 Towing Iceberg

The Iceberg will be launched from a local dock in Noyo Harbor and towed out to the installation site using a towboat, with an assist vessel supporting the tow as needed. If sufficient space or capacity on a local dock is not available at the time of deployment, the Iceberg can be transported to the installation site aboard the materials barge that will be bringing in the mooring system components. During installation and final removal, the derrick barge that will accompany the materials barge will have sufficient capacity to deploy the Iceberg as well as the mooring system components.

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[3] All hydrographic surveys will be conducted by a licensed contractor. The contractor will be required to have an active California State Lands Commission Geophysical Survey Permit and will abide by all conditions of said permit.

5.4 Anchoring Iceberg

During installation, upon arrival of the Iceberg at the offshore installation site, installation-support vessels will hold the Iceberg in place while two of the surface synthetic lines from the mooring buoys are secured to the Iceberg. Divers will then connect the main tether from the Iceberg to the primary mooring anchor on the seafloor. This connection will actuate the system to secure the Iceberg in place. The final two surface synthetic lines from the remaining mooring buoys will be secured to the Iceberg and the towboat will release the Iceberg. This will complete the installation of the primary and secondary moorings, and the Iceberg will be captured within the primary and secondary moorings.

5.5 Laying Permeate Pipe

To facilitate a safe and efficient process under the challenging environmental conditions, the permeate pipe will be installed in sections. The first section installed will run from the top of the bluff at the wastewater treatment plant, down the vertical cliff face along the existing concrete stairwell, and out to the mean high tide line where it will be connected to the offshore, submerged pipe. The HDPE pipe will be secured to the existing concrete covering the vertical cliff face using traditional concrete anchors and saddles. The lower end of the pipe on the beach and nearshore section will be secured using a combination of concrete collars and mooring chain as ballast. Articulated concrete mats will be used as needed to add supplemental stability to the pipeline in this section. No attachments to the underlying dirt or native materials will be required. An industry-standard HDPE pipe-to-pipe connection will be used for all connections of the spooled section of the permeate pipe.

The offshore portions of the permeate pipe will consist of sections of HDPE pipe. These will be rolled off spools on the deployment vessel and pulled to shore using a winch mounted on the bluff and reeved along the onshore portion of the pipe mounts to the beach flange connection point. The first section will be pulled to shore and connected to the beach flange connection. For protective purposes, the permeate pipe may be run through a slightly larger HDPE pipe through the surf zone segment and other segments as needed. Since the HDPE pipe is slightly positive buoyant, ballast weights will be added at intervals so that the pipe will sink to the seafloor when pulled into place and flooded. Additional sections of the nearshore pipe will be deployed, pulled into place, and connected to the previously installed section via a HDPE flange connection. Once the water depth is sufficient, the pipe will be unspooled and deployed as the deployment vessel fleets further offshore, until all the pipe is on the seafloor. Divers will support the pipe deployment to ensure that the pipe is within the pre-approved, designated alignment so that there will be no damage to local ocean flora and fauna.

5.6 Anchoring Permeate Pipe

Once connected to the beach flange, the offshore section of the pipe will be aligned over the top of the existing outfall, which is encased in a concrete overpour. The pipe will be secured using a combination of concrete collars, mooring chain and articulated concrete mats as ballast. Where mooring chain is used, it will be draped over the pipeline, providing a continuous ballast along its length. Pipeline ballasting and stability will be augmented by concrete collars and articulated mats

(Submar or equivalent) as required. The ballast will be placed over the pipe on top of the existing outfall concrete encasement (Figure 10). No mechanical attachments will be made to the concrete encasement or surrounding rock or seabed.

There will be no mechanical attachment to the concrete encasement or surrounding rock. Near shore, ballast will be placed by a hydraulic RT crane working from the bluff inside the wastewater treatment plant. Offshore, ballast will be placed by the diving support vessel using the deck crane (Figure 11). Divers will support the deployment and placement of the ballast once they are near the seafloor in the final location, while always maintaining a safe working distance from the fall zone of the load. All ballast has locations for rigging attachment, to allow it to be set quickly and safely with minimal support (Figure 12). In the area inaccessible by either the onshore crane or the offshore diving support vessel, divers will deploy ballast using air bags or buoys, and float them into place with alignment assisted by a pull winch on the bluff and cable running along the pipe track.

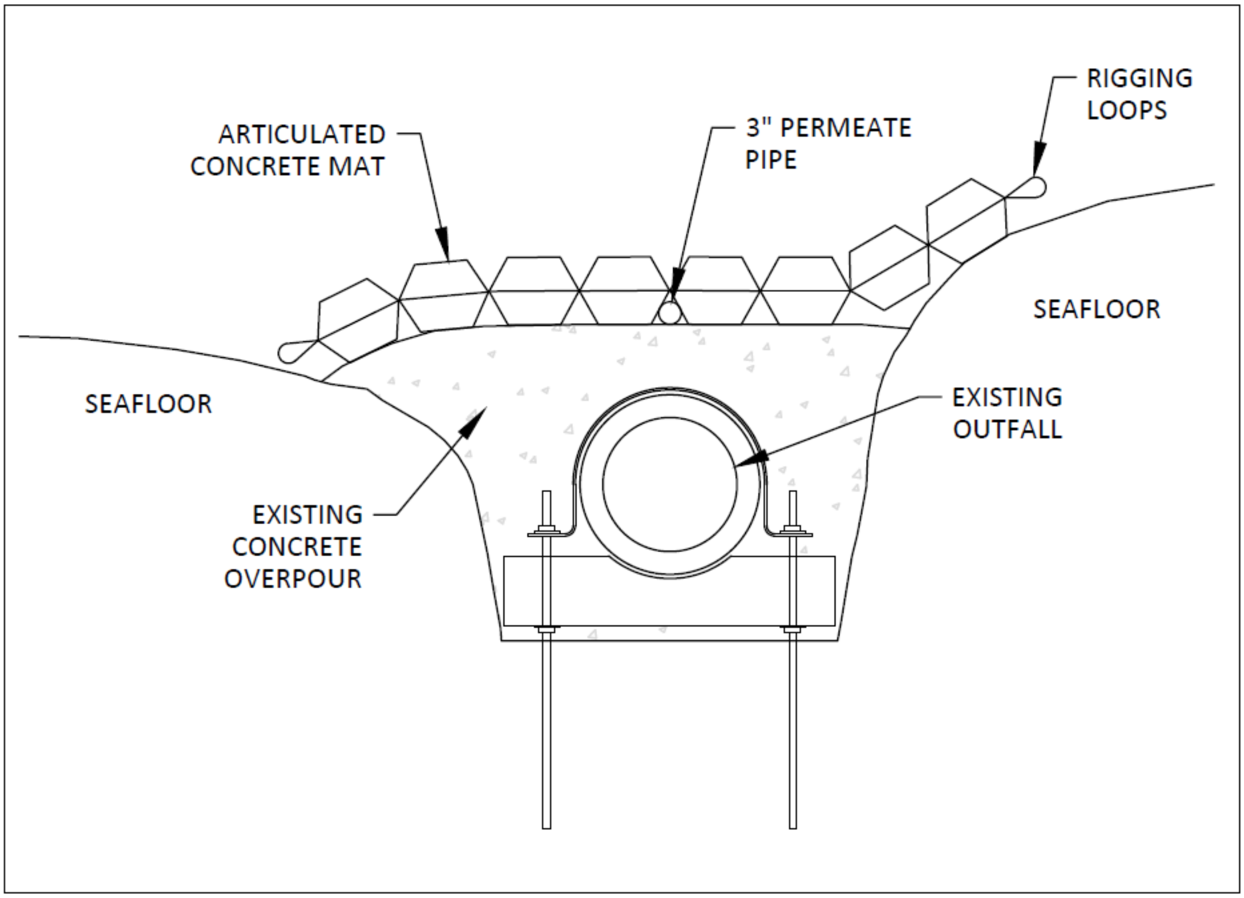

Figure 10. Articulated concrete mat over permeate pipe and existing outfall.

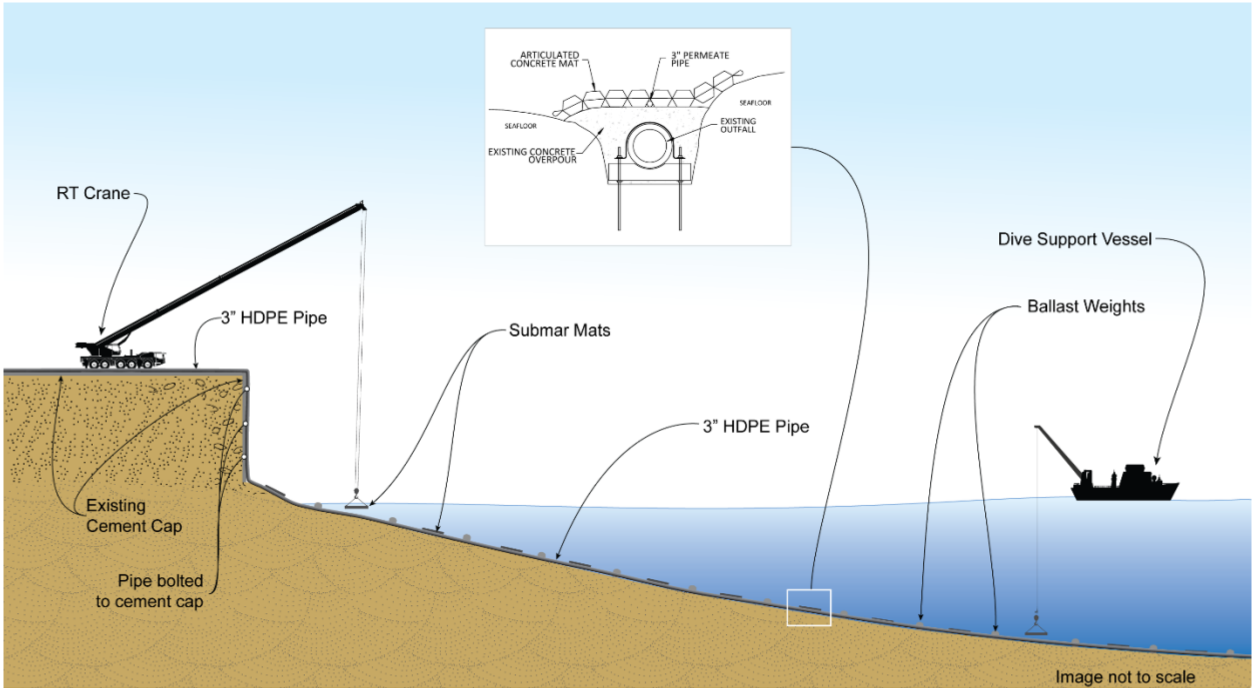

Figure 11. Placement of ballast on permeate pipe.

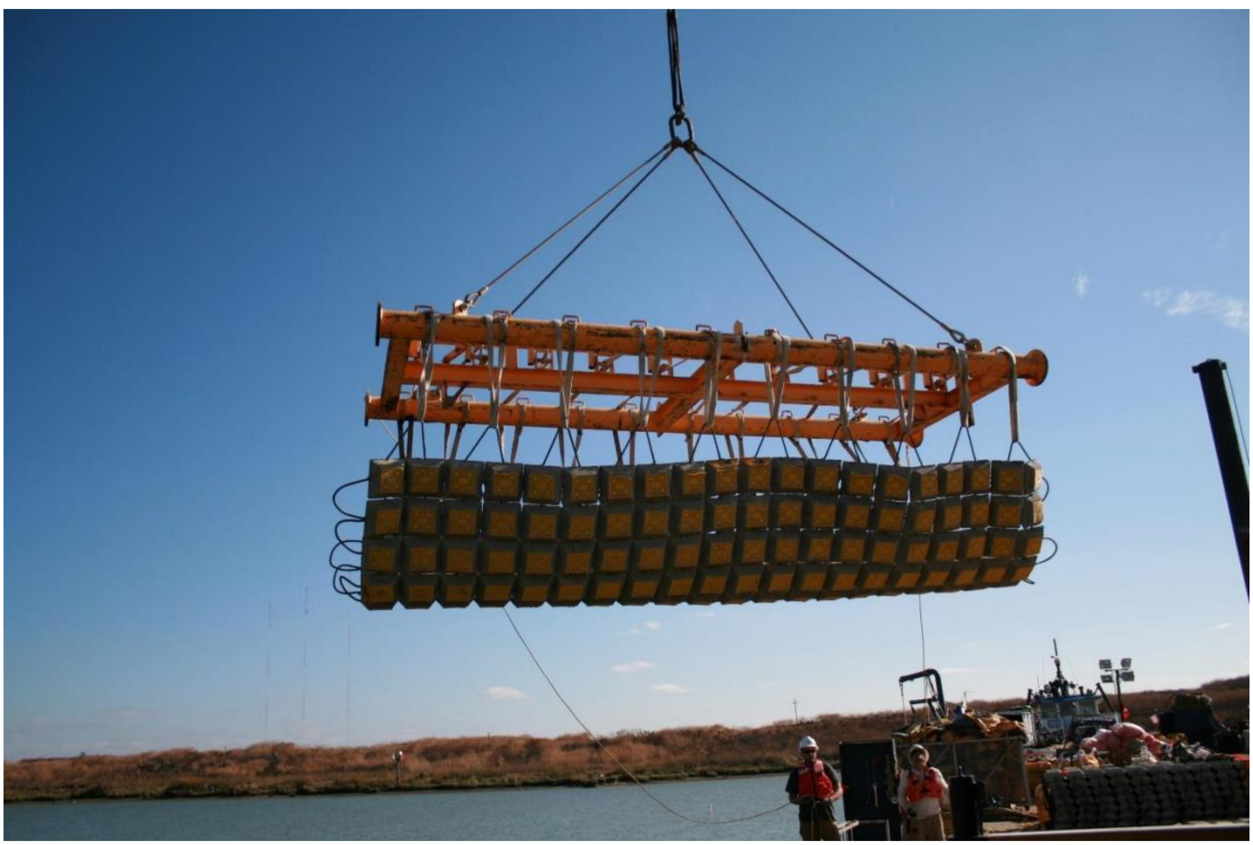

Figure 12. Articulated concrete mat with deployment frame.

5.7 Connecting Permeate Pipe to Iceberg

With the Iceberg secured to the primary and secondary moorings, divers will connect the offshore end of the permeate pipe to the bottom of the Iceberg's umbilical connection. Once connected at the bottom, the umbilical is then attached to the Iceberg's permeate outtake. This attachment will include a breakaway link at the buoy connection point to prevent damage to the buoy or umbilical in case of excessive loads due to high seas. This will complete the installation process.

6 OPERATION AND MAINTENANCE PLAN

For operations and maintenance activities throughout the project period, the City will contract[4] Oneka for technical support in the operation and maintenance of the Iceberg. The Iceberg is a new technology that does not incorporate standard water plant operator criteria as certified under the Drinking Water Operator Certification Program. To support the City, Oneka intends to maintain a project staff of three operations personnel on site in Fort Bragg. This team will include the following:

- Operator/Technician
- Field Service Engineer
- Operations Coordinator

The operations team will be based in the the Noyo Harbor area to facilitate rapid response to the Iceberg if needed.

6.1 Operation

The Iceberg desalination buoy is designed to operate continuously throughout the 12-month pilot test period, producing permeate constantly unless planned maintenance activities and/or extreme sea conditions (hurricane-force winds and waves, tsunamis, etc) trigger a temporary removal of the device. Once maintenance is completed or extreme sea conditions have subsided, the Iceberg buoy will be moved back into position to resume permeate production. The permeate pumped to shore will have multiple potential uses, but none of them potable at this time. Before any use by the City, the permeate will be tested in accordance with California Division of Drinking Water standards. During this time, the permeate will be directly routed to the wastewater treatment plant outfall as part of the City's normal discharge. After testing, the City will evaluate the results and determine if the water is suitable for non-potable uses.

6.2 Operational Monitoring

The primary purpose of the project is to collect data while demonstrating the functionality of the Oneka desalination buoy technology. Throughout the course of the project, data will be collected across a range of operating conditions, including wave height and frequency, across all seasons.

[4] Appendix 5 consists of a letter from the City of Fort Bragg to Oneka Technologies demonstrating the City's intent to purchase the Iceberg and contract Oneka Technologies to operate and maintain the Iceberg on the City's behalf.

The operational monitoring program is designed to gather information on the following items through the testing and monitoring listed in Table 4:

- Pressure loss in prefilters
- Pressure loss in RO membranes
- Recovery % of energy recovery device
- Efficacity of energy recovery device
- Water flows of feed, brine and permeate
- Water pressure of suction line, pump, accumulators, process plant, brine and permeate
- Water quality of feed, brine and permeate

Table 4. Testing Activities to be completed during the Pilot Study to assess the Iceberg's operational performance.

Daily Testing/Monitoring Tasks
Data collection, analysis, and reporting on water flows, water pressures (Intake, prefilters, pump, process plant, RO membranes, brine, permeate), water quality – feed, brine, and permeate, and pump performance
Energy recovery
Sample and analyze permeate samples at shore pipeline connection for comparison with California Division of Drinking Water standards and to identify additional treatment that would be required to meet standards
Observe and monitor the Sofar meteorologic buoy data
Monitor weather forecasts (local and internet) for wind and wave conditions and predicted storm activity
Monitor harmful algal blooms via CalHabMap
Weekly Testing/Monitoring Tasks
Travel to and visually inspect the buoy (all mechanical and electrical items) and mooring lines
Ongoing Testing/Monitoring Tasks as Required Throughout the Project Life
Health, Safety, Security, and Environment (HSSE) – ensuring compliance with all local, state, regional and federal rules and regulations
Internal and external reporting for internal R&D requirements, Internal QA/QC requirements, and Regulatory compliance submissions
Procurement of the Iceberg's consumables, lab equipment and test kits/reagents, spare parts, equipment replacement, etc.

The testing program will commence in conjunction with installation of the Iceberg buoy. All monitoring sensors and related equipment will be tested and commissioned prior to installation of the buoy and commencement of operation. The testing program described above will be carried out for the duration of the pilot project.

6.3 Maintenance

Maintenance of the Iceberg is accomplished through a combination of on-water maintenance and on-shore maintenance. The Iceberg is designed to be easily removable from its moorings for on-shore planned inspections and maintenance, as well as any unscheduled maintenance.

The Iceberg buoy's hull and structure will be inspected and cleaned monthly. The buoy hull will be painted with a non-toxic epoxy which will require periodic scraping while at sea. The Iceberg will be brought into Noyo Harbor as needed for maintenance. Diver surveys will be carried out monthly to ensure the integrity and condition of the moorings and anchors. Oneka will work with the City and local community groups to recruit skilled local tradespeople and engineers to undergo training to form the service team and carry out the planned maintenance of the Iceberg, process plant, and electronics systems (Table 5). A stock of appropriate spare parts and consumables will be maintained close to the site and will be available to the service teams.

System service requirements are as shown in the following table:

Table 5. Maintenance schedule of the Iceberg during 12-month pilot study deployment.

Maintenance Activity	Frequency*
Buoy Onboard Systems	
General inspection of buoy and mooring from vessel	weekly
Inspect inlet strainer and clean as required	weekly
Check accumulator pressure	weekly
Sample and verify water quality	weekly
Inspect ultra-filtration and clean as required	monthly
Pump house maintenance	monthly
Pre-Filter cartridges change	monthly
Reverse Osmosis membrane cleaning	every 3-6 months
Process plant check valve inspections	every 3 months
Calibration of permeate water quality sensor	every 3 months
Calibrate check and relief valves	every 3 months
Calibration of pressure transmitters	every 6 months
Inspect battery health	weekly
Clean solar panel	weekly
Sensor validation and calibration	every 6 months
Inspect buoy frame for integrity	every 6 months (when buoy is on land)
Replace pump seals	every 6 months (when buoy is on land)
Repair and replace pulley bushings	every 6 months (when buoy is on land)
Inspect/Replace check valve seals	every 6 months
Replace back pressure regulator seal	every 6 months
Inspect/Replace cathodic protection	every 6 months
Winch maintenance	every 6 months
Accumulator bladder inspection	every 6 months
Buoy Hull (when buoy is on land)	
Hull cleaning	every 3 months or as needed
Paint hull and frame	every 3 months or as needed
Mooring System (diving operations)	
Inspection of BOB rope - main mooring line	monhtly
Inspect/Replace mooring main line nylon absorber	every 3 months or as needed
Inspect anchoring links	monthly
Pipeline to Shore	
Inspection pipeline (diving operation)	quarterly

*All surveys will be scheduled on a weather-permitting basis.

7 DECOMMISSIONING

The decommissioning and removal of the Iceberg and associated equipment is the reverse of the installation process, as detailed in the following sections.

7.1 Disconnecting Permeate Pipe from Iceberg

The first step in the decommissioning process will be to disconnect the permeate pipe from the Iceberg. Once the disconnect is complete, the permeate pipe will be weighted down using ballast weights and placed on the seafloor away from the primary mooring system so it will not be affected or become entangled with the mooring system during the complete recovery.

7.2 Removing Iceberg

While the Iceberg is fully secured in the primary and secondary moorings, divers will disconnect the main tether of the primary mooring from the Iceberg. The towboat will move into position, securely rig the Iceberg, and then disconnect the four synthetic surface lines. Once the Iceberg is free from the primary and secondary mooring lines, the tug will tow the Iceberg either to the derrick barge for recovery on deck or directly to the dock in Noyo Harbor.

7.3 Primary and Secondary Mooring Spreads Removal

Using the plots detailed in the Anchoring Plan and employing real-time survey and positioning services on the barge, the derrick barge spread will set up in a 4-point or 6-point anchor spread at the primary mooring location defined in the Anchoring Plan. The barge will recover the concrete ballast weights and the primary mooring anchor frame on deck. The derrick barge will then set up in live boat mode at each of the secondary mooring locations and recover all synthetic line risers, buoys, ground chains and gravity anchors on deck.

7.4 Recovering Permeate Pipe

The onshore portion of the permeate pipe, running from the top of the bluff, down the vertical cliff face and out to the mean high tide line, will be disconnected at the flange connection at the mean high tide line. The vertical pipe section will be supported with rigging while the attachment points to the concrete cap on the cliff face are disconnected and removed. The onshore pipe section will then be recovered to the wastewater treatment plant, sectioned, and dispositioned for recycling or disposal.

For the tide line portion of the permeate pipe, beach crews or divers will rig the pipe ballast for removal by the RT crane on the bluff.

For the offshore portion of the permeate pipe, divers will rig the pipe ballast for removal by the crane on the diving support vessel, which will recover the ballast on deck.

In the area that cannot be accessed by either the onshore crane nor the offshore diving support vessel, divers will rig air bags to the individual pieces of ballast and float them to the surface, where they will be pulled to the diving support vessel using a deck winch and then recovered on deck using the crane.

Once all ballast has been removed, compressed air will be pumped into the pipe at the offshore terminus to push out the entrained water into the holding tank within the wastewater treatment plant. This will allow the pipe to float to the surface, allowing an easier retrieval. The pipe will then be pulled to the derrick barge or the diving support vessel, where it will be recovered on deck and cut into sections for recycling or disposal.

7.5 Post-Construction Surveys

Once the Iceberg, mooring spreads and permeate pipe have all been recovered, a post-construction multibeam hydrographic survey[38] will be performed and compared to the pre-construction survey to: 1. Confirm that no project-related materials or debris remain in the project site, 2. Examine for any detectable changes in the marine habitat attributable to the installation and removal of the Iceberg and associated systems, 3. Estimate any changes to the habitat that may have occurred and could be attributed to the installation, operation, and removal of the Iceberg and associated systems.

8 WATER BOARDS' REQUESTED APPLICATION MATERIALS

The Regional Water Quality Control Board, in consultation with the State Water Resources Control Board, provided a file titled City of Fort Bragg Seawater Desalination Pilot Buoy Application Materials via email on March 12, 2024. The file identifies information necessary for the North Coast Regional Water Quality Control Board (North Coast Water Board) to (1) determine if the City of Fort Bragg's proposed pilot wave-powered seawater desalination buoy (Project) is exempt from Water Quality Control Plan for Ocean Waters of California (Ocean Plan) Chapter III.M.2, M.3, and M.4 as a small, portable desalination facility, (2) make findings pursuant to Water Code section 13142.5(b), and (3) determine whether notice of applicability under the North Coast Water Board's Low Threat General Order (Order No. R1-2020-0006) can be issued. The following sections provide responses to the information requested in that file.

8.1 Proposed Exemption from Chapters III.M.2, M.3, and M.4 of the Ocean Plan

- Project name, physical address, contact information: City of Fort Bragg Pilot Test of Oneka Wave-Powered Desalination Buoy, 416 North Franklin Street, City of Fort Bragg, CA 95437; John Smith (jsmith@fortbragg.com; 707-961-2823 ex. 136)
- Project owner, project operator, landowner, address for correspondence, Billing address: City of Fort Bragg, 416 North Franklin Street, City of Fort Bragg, CA 95437; John Smith (jsmith@fortbragg.com; 707-961-2823 ex. 136)
- Project location: The project will be located offshore of the City of Fort Bragg in Mill Bay at Lat: 39.44° Lon: -123.82°. The existing wastewater treatment plant ocean outfall discharge point 001 is located at Lat: 39.44 and Lon: -123.82. The permeate from the desalination buoy will make landfall at the City of Fort Bragg wastewater treatment plant where it will be piped directly to the ocean outfall to discharge unused permeate. Some permeate will be drawn from the pipeline inside the wastewater treatment plant for testing and non-potable uses.
- Information showing that the Project withdraws less than 0.10 million gallons per day of seawater: See Section 4.1.1.

- Operational agreement to demonstrate that City of Fort Bragg staff will be responsible for operating the Project: See Appendix 5.
- Duration of the proposed Project: 12 months; see Sections 2 and 4
- Plan for Project decommissioning to demonstrate that the Project is portable: See Section 7
- Other information demonstrating that the Project is portable (e.g., size or scalability, short-term duration, ability to relocate the Project, logistical or operational constraints unique to portable facilities, frequency of use, or other information that is unique to small, portable desalination facilities relative to permanent facilities): Please refer to Sections 4.0 and 5.0 above.

8.2 Water Code Section 13142.5(b) Determination

8.2.1 Site

8.2.1.1 INFRASTRUCTURE TO BE USED OR CONSTRUCTED

Section 4.0 above details the Iceberg design, mooring system, and permeate pipeline to be used and constructed.

The Iceberg is described in detail in Section 4.1 above. In brief, the Iceberg is a self-contained seawater desalination system that uses ambient wave energy to pressurize seawater and pass it through RO membranes to remove all salts, pathogens, and contaminants of emerging concern in the source seawater. The resulting permeate remains pressurized as it is conveyed to shore through a three-inch diameter HDPE pipe. Sufficient wave energy is required to pressurize the seawater through the RO membranes and pump permeate to the seaward fenceline of the City's wastewater treatment plant. The City will extend the permeate pipeline inside the wastewater treatment plant to an in-plant discharge point where the permeate will be routed back to the ocean via the existing ocean outfall. The City's permeate pipeline within the wastewater treatment plant will include valving to allow permeate to be drawn from the line for testing and potentially for alternative, non-potable uses at the City's determination. After the 12-month pilot testing deployment, the Iceberg will be removed from service, disconnected from the permeate pipeline and mooring system, and towed into Noyo Harbor for final decommissioning. The final decommissioning of the Iceberg will culminate with its removal from the water.

The mooring system is described in detail in Section 4.1.4 above. The mooring system will include a single primary anchor located directly beneath the Iceberg and a secondary mooring system to protect the environment, residents, and Iceberg should the primary anchor line fail at any point during deployment. All lines will be sufficiently tensioned to eliminate any chance of loops that could act as primary entanglement snares for marine life. The primary anchor will consist of a 44T wet weight gravity anchor. The secondary mooring system will consist of 8 to 11 T wet weight gravity anchors with surface marker buoys and mooring lines connected to the Iceberg. All mooring system elements will be placed within the soft-bottom area identified during the hydrographic survey and habitat visual inspection (Figure 1 and Appendix 1). After the Iceberg has been removed from service and towed into Noyo Harbor, the mooring system will be removed from the water as described in Section 7.3.

8.2.1.2 PREFERRED SITE

The site depicted in Figure 4 was selected after examining the general area for suitable submerged and terrestrial site to place the mooring system, conveyance system and the terrestrial site to receive the permeate. The permeate would not be usable as a potable supply until tested and certified by the California Division of Drinking Water. Testing supporting such a certification was planned to occur during the pilot study. Therefore, a permeate delivery location was required that could both accept the permeate flow and properly use or dispose of the water. The City's wastewater treatment plant is located on the coast. It has space to accept the permeate with plumbing infrastructure in place to either store small amounts of permeate or directly dispose of the permeate into its operating wastewater outfall.

The ideal distance from shore for the Iceberg is less than one mile. Positioning the Iceberg requires careful consideration of pumping efficiency, ambient wave energy, water depth for brine dispersion, and visual impacts. The preferred site is located 0.5 miles offshore. At this distance, the system's pumping capacity to deliver the permeate to shore would not require supplemental pumping. The distance offshore and low profile of the Iceberg minimizes its visual impact in comparison to maintaining a position closer to shore. Lastly, the water depth is optimal to tap into the natural wave energy without being in the dominant surf zone where the breaking waves could damage the Iceberg.

The preferred site minimizes the impact to all forms of marine life in comparison to alternatives sites by:

1. Placing the mooring system within an area dominated by soft-bottom habitat.
2. Minimizing the permeate pipeline distance to shore to maximize the efficiency of the wave-powered system to pump the water to shore without supplemental energy requirements.
3. The pipeline alignment can follow the existing, previously disturbed habitat created by the installation of the wastewater treatment plant's ocean outfall.

The preferred site is presented in Figure 1 along with the locations of previously mapped kelp canopy and MPAs. The mapped kelp canopy was also used as a general proxy for the location of hard substrate due to kelp's reliance on hard substrate in high-wave-energy environments as the anchorage for the kelp's holdfast. Using the available data, both from public sources such as the California Department of Fish and Wildlife, and data acquired for the project using side scan sonar and ROV surveys, the preferred site is located approximately 0.75 miles from the nearest MPA and at least 300 ft from the nearest, historic kelp canopy. No kelp canopy was observed during the 2023 side scan and ROV surveys conducted explicitly for the project.

Alternative sites were initially screened. Noyo Harbor was considered as it is near the water treatment plant and close to the City's harbor-based marine infrastructure. The location was considered infeasible due to the potential impact on the rest of the Noyo Harbor activities, especially vessel traffic. To operate there, the Iceberg would need to be placed in the mouth of the harbor, or outside the harbor, but close enough to route the permeate pipeline to shore (Figure

2). In either location, the Iceberg and its mooring system would create a significant hazard to navigation.

Additional sites within Mill Bay were screened using available desktop resources. The presence of previously mapped kelp beds indicates likely areas of hard bottom that would be impacted by the mooring system and conveyance pipeline. Historic nautical maps further indicate hard substrate in most of Mill Bay. The preferred location is directly offshore of the lone sandy beach in the area, indicating a potential area of soft substrate offshore. This was confirmed with the 2023 hydrographic survey completed explicitly for this project (Appendix 1).

8.2.1.3 AMBIENT SALINITY

The area does not have any ongoing water quality monitoring programs. In Section 3.0 above, two sources of data were aggregated to determine ambient salinity. The AMS (2023) once-a-permit monitoring in support of the City's wastewater treatment plant measured salinity on August 31, 2022 at five stations surrounding the City's ocean outfall in the vicinity of the preferred site for the Iceberg. Salinity averaged 33.0 PSS during this monitoring. The nearest source of long-term salinity monitoring, Humboldt Bay, recorded the same average salinity (33.0 PSS) for the three-year period of March 22, 2021 – March 22, 2024.

8.2.2 Design

Section 4.0 above contains a detailed description of the system's design and engineering. The following discussion highlights some of the salient features that minimize impacts to water quality, the surrounding environment, and all forms of marine life.

The intake structure (Figure 6) also serves as the discharge. Seawater will be withdrawn at a depth of six feet below the water's surface through the 60-micron (0.06 mm) mesh screening on the intake, with a maximum through-screen velocity of 0.22 ft/sec (includes a 15% blockage of open screen area). The through-screen velocity would be lower when the screen is cleaner. The Iceberg screen's mesh is significantly finer than the 1-mm mesh required under the California Ocean Plan Section M. This should increase the protection of all forms of marine life over what would be expected from either an unscreened or 1.0-mm screened intake. The pilot study will include sampling to verify this increased protection to all forms of marine life.

The intake through-screen velocity (0.22 ft/sec) is less than the 0.5 ft/sec required in the California Ocean Plan Section M. This velocity has been determined by the United States Environmental Protection Agency and California State Water Resources Control Board prior rulemaking regarding once-through-cooping and the California Ocean Plan which states "*In order to minimize impingement, through-screen velocity at the surface water intake shall not exceed 0.15 meters per second (0.5 feet per second)*". Furthermore, the 60-micron (0.06-mm) mesh intake screen is finer than the body dimensions of all juvenile and adult fish and invertebrates, in addition to a substantial portion of the plankton community. The combination of ultra-fine mesh and low through screen velocity should minimize to the extent possible, if not eliminate, impingement in compliance with California Ocean Plan Section M.2.d.(1).(c).iv.

The brine discharge through the intake screen backflushes the screen, helping to maintain a clean screen face. The screen is also mechanically brushed with rotating brushes to maintain a cleaner screen face and minimize the through-screen velocity for both the intake and discharge operational modes. The maximum brine velocity at the point of discharge is 0.23 ft/sec and brine will be diluted to within 2 ppt (PSS) of ambient salinity within less than one foot (horizontally) and less than nine feet (vertically) of the discharge (Appendix 3) even when discharging the most saline brine listed in Table 2 above. Discharging the brine through the intake structure at a nominal depth of six feet eliminates the potential for suspension of seafloor sediments. The brine mixes naturally without requiring added energy, like a diffuser, as it falls through the water column until achieving dilution. No brine is expected to reach the seafloor. The near-passive discharge does not induce shearing forces as expected from a standard multiport diffuser. This process minimizes impacts to all forms of marine life to the greatest extent possible.

No chemicals are used in the desalination process aboard the Iceberg. Because the wave-energy capturing system is entirely mechanical, some lubricants and other chemicals are used internally in the energy-capture system to maintain smooth operation. The safety data sheets (SDS) for each compound are included in Appendix 6. Each compound and its reported environmental hazard, as per the SDS, are listed below (Table 6). An oil spill prevention plan to be used during the pilot study is also included in Appendix 6.

Table 6. List of chemicals used to maintain the reliable and smooth operation of the Iceberg's wave energy capture system.

Compound	Purpose	Environmental Hazard
BioBlend	Grease moving parts	Not classified as a hazard
Jet-Lube	Anti-seize for moving parts	Not considered harmful to aquatic organisms or to cause long-term adverse environmental effects
Clarity Synthetic EA Hydraulic Oil	Hydraulic fluid within actuators	Not expected to be harmful to aquatic organisms

The mooring system will consist of as few midwater lines as possible to minimize the entanglement risk. All lines will be tensioned to prevent loops large enough to ensnare marine life, e.g., marine mammal tail or flippers. During weekly inspections, the operations and maintenance staff will inspect all mooring lines for the presence of nets and associated marine debris that could pose a risk of secondary entanglement. If detected, the debris will be removed as soon as safely possible. The entanglement mitigation plan is included in Appendix 4 and provides additional detail.

8.2.3 Technology

The Iceberg minimizes impacts to all forms of marine life, water quality, and the marine environment using its 60-micron mesh intake screen, shallow intake point, low through-screen velocity, and low intake volume. Passive discharge of the brine through the intake structure also minimizes impacts to all forms of marine life, water quality, and the marine environment. The passive diffusion of brine does not generate shearing forces as would occur with a multiport diffuser. Discharging low volumes of brine near the ocean's surface allows the brine to mix as it falls through the water column until it has diluted to near-ambient salinity within less than one foot (horizontally) and nine feet (vertically) of the discharge. The Iceberg will be moored along the 80-

ft, or deeper, isobath allowing for sufficient water depth for the brine to fall and mix well before contacting the seafloor. The near-surface passive discharge also eliminates the chance of suspending any seafloor sediments.

Energy use is a common concern with seawater desalination. The Iceberg operates carbon-free with no added energy from the local power grid. Ambient waves generate the energy needed to operate the Iceberg's desalination system and deliver permeate to shore through patented wave actuators. Additional electrical power, if needed, for ancillary systems will be generated by on-board solar panels. However, these ancillary systems are not required to produce permeate.

8.2.4 Mitigation

The Empirical Transport Model and Area of Production Forgone (ETM/APF) as required under Section M of the California Ocean Plan requires life history information, specifically age at length (larval fish) or age at stage (invertebrates) information to calculate parameter *d*. Parameter *d* is used directly in the ETM and is used to calculate the alongshore current displacement required to derive the ETM parameter P_s. The calculated alongshore displacement is also used to calculate the taxon-specific total source water area that is used in the APF. We hypothesize[5] that the organisms entrained through the 60-micron (0.06-mm) mesh intake screen will not have such life history information available. We do expect phytoplankton, nanoplankton, and microplankton may pass through the 60-micron (0.06-mm) mesh intake screen. Data to estimate the total entrainment of all forms of marine life will be collected through the Environmental Monitoring Plan execution. These data will be extrapolated by multiplying the per cubic meter entrainment estimate derived from the sampling by the total seawater volume circulated by the Iceberg during the time period represented by the sample.

After consulting with staff from the State Water Resources Control Board and the North Coast Regional Water Quality Control Board, we propose the following mitigation for impacts to all forms of marine life. Mitigation for all forms of marine life entrained will follow the procedure for once-through-cooled interim mitigation of a fee per volume of water circulated, with an additional monitoring and maintenance fee. The Iceberg deployment schedule is dependent the date all permits are received. Therefore, the minimum and maximum fees were calculated and presented in Table 7. The minimum fee assumes the field deployment occurs only in 2025 resulting in a mitigation fee of $372.49. If the full field deployment occurs in 2026, the maximum mitigation fee would be $383.66. The final mitigation fee, dependent upon when the Iceberg is actually deployed, will be donated to a group conducting marine mitigation in the area within the City of Fort Bragg area identified by the City and Oneka and agreed upon by the North Coast Regional Water Quality Control Board.

Table 7. Proposed Mitigation for Impacts to All Forms of Marine Life Resulting from Entrainment through the Iceberg's Fine Mesh Intake Screen.

Year	2024 Fee/MG	3% Annual Escalation	Max MGD	Total Project Flow (MG)	Subtotal	Final with 20% M&M
2025	$12.51	$12.89	0.066	24.09	$310.41	$372.49
2026	$12.51	$13.27	0.066	24.09	$319.72	$383.66

[5] The Environmental Monitoring Plan has been designed to include sampling to test this hypothesis.

No impacts to sensitive marine habitats are expected. A pre- and post-construction survey of the final deployment areas will indicate if the Iceberg, mooring system, and permeate pipeline installation, operation, and removal resulted in any impacts to the area's marine habitat. These surveys will include new bathymetry surveys to reaffirm the mooring placement and pipeline-to-shore path. A remotely operated vehicle or diver survey will visually inspect the proposed mooring placement and pipeline path. During this visual survey, the habitat and marine life will be catalogued for comparison with the post-construction survey. The post-construction survey will only involve the visual survey of the mooring placement and pipeline path to inventory any and all impacts, if any, to the seafloor ecology.

The pre-construction survey will be conducted no more than 90 days before construction begins. A 90-day window is used in response to the volatile weather and wave climate that limits the number of working days for a survey crew and the need to coordinate the survey crew with those unpredictable working days. We anticipate some false starts where the survey crew is mobilized but conditions deteriorate beyond what was forecasted. The post-construction survey will likewise be conducted no more than 90 days after construction is complete for the same reasons outlined for the pre-construction survey.

9 REFERENCES

Applied Marine Sciences (AMS). 2023. Receiving water monitoring report: Fort Bragg Municipal Improvement District No. 1. Prepared for the City of Fort Bragg.

Rogers-Bennett, L. and C.A. Catton. 2019. Marine heat wave and multiple stressors tip kelp forest to sea urchin barrens. Nature Scientific Reports. https://doi.org/10.1038/s41598-019-51114-y

Schiel, D.R. and M.S. Foster. 2015. The biology and ecology of giant kelp forests. Univ of California Press.

APPENDIX 1: SIDE SCAN SONAR SURVEY REPORTS

CITY OF FORT BRAGG – ONEKA DESALINATION BUOY PILOT PROJECT

ESSENTIAL FISH HABITAT ASSESSMENT

Prepared For ONEKA TECHNOLOGIES

Prepared By MILLER MARINE SCIENCE & CONSULTING, INC

Date JANUARY 22, 2024

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Appendix 3: Essential Fish Habitat Mapper Output

Photo Credits: J. Williams, VRG

REGULATORY REVIEW

Essential Fish Habitat is managed under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson Act). This act protects waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (Magnuson-Stevens Act, 16 U.S.C. 1801 et seq.). Substrates include sediment, hard bottom, structures underlying waters, and associated biological communities (NMFS 2002). This essential fish habitat assessment is prepared for the installation and operation of an Oneka Technologies "Iceberg" seawater desalination buoy in conformance with the Magnuson Act. NMFS (2002) defines specific EFH terms as follows (50 Code of Federal Regulations [C.F.R.] §§ 600.05–600.930):

• "Waters" include all aquatic areas and their associated biological, chemical, and physical properties that are used by fish and may include aquatic areas historically used by fish where appropriate.

• "Substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities.

• "Necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "Spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle.

PROJECT DESCRIPTION

The pilot study will deploy a single Iceberg class (buoy) unit that will produce up to 22,000 gal/day or 0.02 MGD for a period of 12 months. The buoy will be deployed approximately 1 km offshore of the City of Fort Bragg's wastewater treatment plant (Figures 1 & 2). Over the course of the pilot study, the operational parameters and environmental impact of the Iceberg's operation will be monitored to support permitting of a future array of Iceberg units to provide a utility-scale water supply.

In support of this EFH, the subtidal benthic habitat was surveyed using side-scan-sonar and remotely operated vehicles (Appendix 1) to characterize the habitats and biota in the area. These new surveys were supplemented by a review of existing information from the outfall construction and prior outfall inspections performed by contractors to the City of Fort Bragg (Appendix 2). From these analyses, an approximately 6.3 ac area of predominantly soft-bottom/sand was identified in Mill Bay offshore of the City of Fort Bragg wastewater treatment plant. A soft-bottom channel was identified between the offshore area and the City's existing wastewater outfall and its existing California State Lands Lease easement through which the conveyance line can be placed to minimize impact to the area's undisturbed rocky-reef habitat. Lastly, kelp canopy resources in the area, as mapped by the California Department of Fish and Wildlife, were included in the Appendix 2 analysis to visualize the proximity of known kelp resources to the potential locations for the pilot deployment.

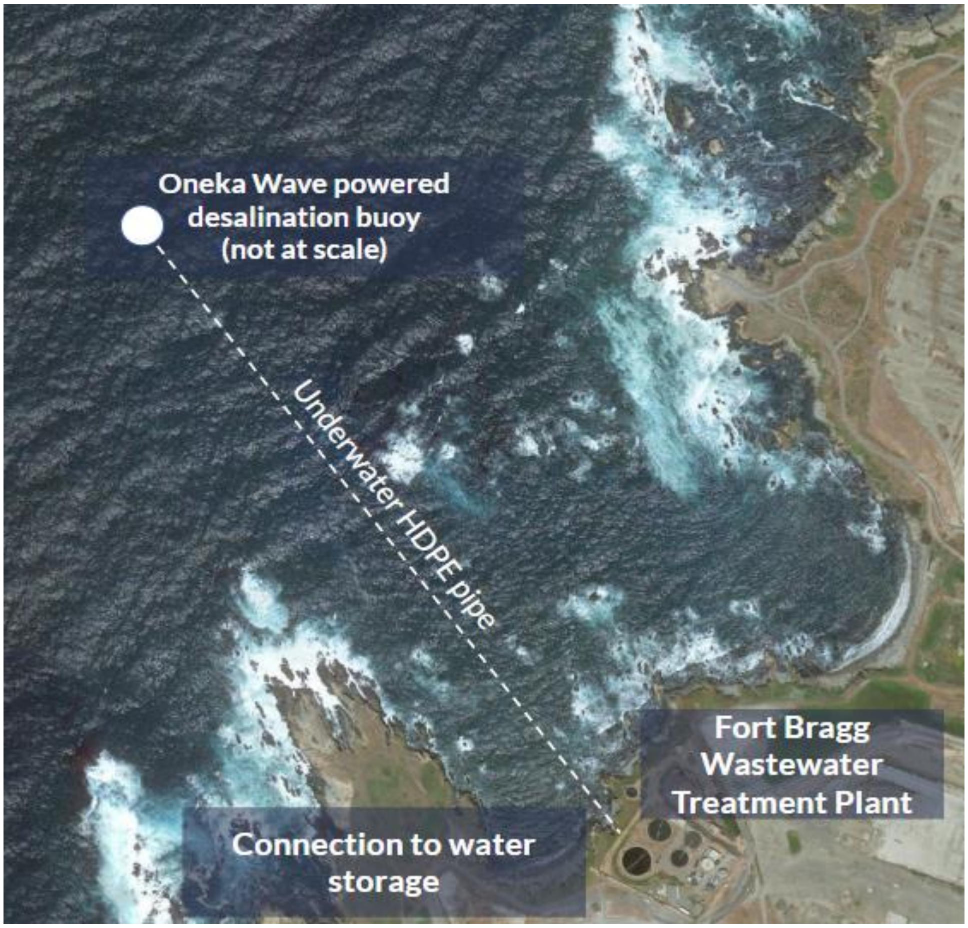

Figure 1. Generally proposed location of the desalination buoy and generalized pathway for the underwater HDPE pipe (conveyance line).

DATA SOURCES AND ANALYSIS

Species occurrence records were limited to commercial fishery landings data (2017 – 2022) from Catch Blocks 248, 249, 255, 256, 262, and 263 (Figure 3) provided by the California Department of Fish and Wildlife (CDFW; CDFW 2023). Data released to the public by the Department is subject to confidentiality restrictions which results in the information for some Catch Blocks being publicly unavailable. The buoy will be deployed within Catch Block 262. Catch records for each FMP species recorded among the Catch Blocks. The catch of each FMP species was recorded and placed into the context of the overall catch by data type. The catch from Catch Block 262 was placed into an area context against the landings reported from all six Catch Blocks. These percentages were categorized as Low (less than 10% occurrence in the dataset), Moderate (between 10% and 50% occurrence in the dataset), and High (greater than 50% occurrence in the dataset).

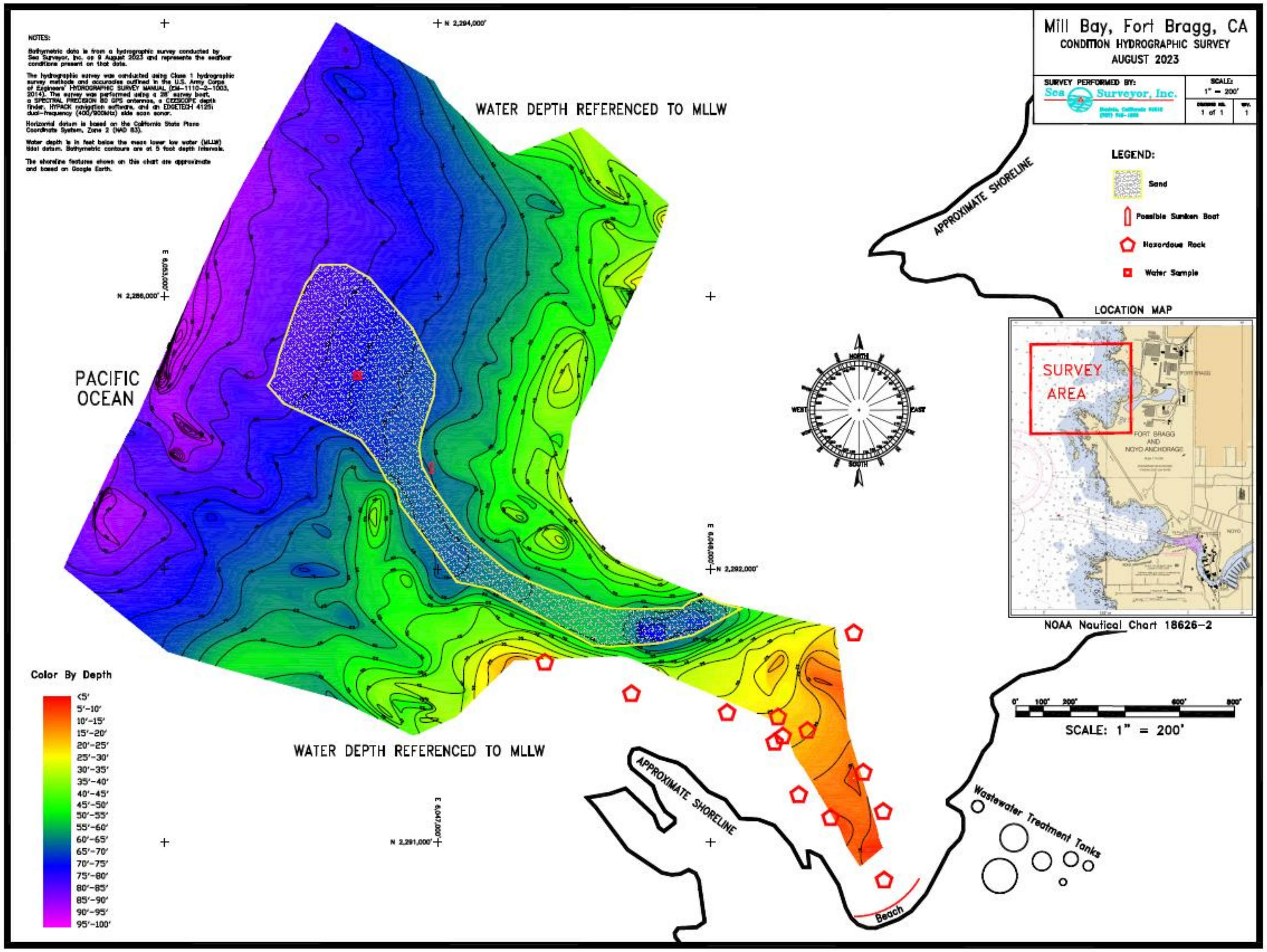

Figure 2. Bathymetric map of the project area prepared using side-scan sonar survey readings. Sand is denoted in the cross-hatched area.

FISHERIES MANAGEMENT PLANS

The Magnuson Act encourages the identification, conservation, and enhancement of Essential Fish Habitat (EFH) for species that are regulated under a Federal fisheries management plan. Under the Magnuson Act, regional fishery management councils for marine fisheries that extend up to 200 nautical miles offshore in the United States Exclusive Economic Zone (EEZ) are required to develop fishery management plans that foster the long-term and economic sustainability of marine populations that are specific to regions, fisheries, and fish stocks. Fishery management plans (FMPs) are cohesive documents created by the Pacific Fishery Management Council that are specific to groups of species that occur within the same marine habitats, communities, or special fisheries. These documents are updated regularly, with the objectives to increase conservation efforts, maximize the economic value of fish resources, and achieve the maximum biological yield of the species in the management plan.

The National Marine Fisheries Service EFH Mapper was used to initially screen the area for anticipated FMPs relevant to the project site (Appendix 3). Four FMPs are relevant to the proposed project site: The Pacific Coast Groundfish FMP, The Coastal Pelagic Species FMP, and The Highly Migratory Species FMP. The Pacific Coast Salmon FMP was included because landings were recorded from one of the Catch Blocks despite the EFH Mapper indicated no Pacific Coast Salmon EFH was present at the project location. The Pacific Coast Salmon FMP EFH designation includes marine waters from the high-tide line out 200 miles offshore encompassing the United States Exclusive Economic Zone. Each FMP designates a suite of shared and FMP-specific ecosystem component species (EC; Table 1) that are not targeted by fisheries but serve as fishery-independent sentinels indicative of environmental conditions that influence the health and vitality of the fished species.

Pacific Coast Groundfish

The Pacific Coast Groundfish FMP was established in 1983, was first amended in 1984, and has been amended 32 times since its implementation (PFMC 2023a). The most current FMP (PFMC 2023a) includes four elasmobranch species, six roundfish species, 65 rockfish species, and 12 flatfish species in five core areas based on the International North Pacific Fisheries Commission statistical areas (Conception, Monterey, Eureka, Columbia, and Vancouver).

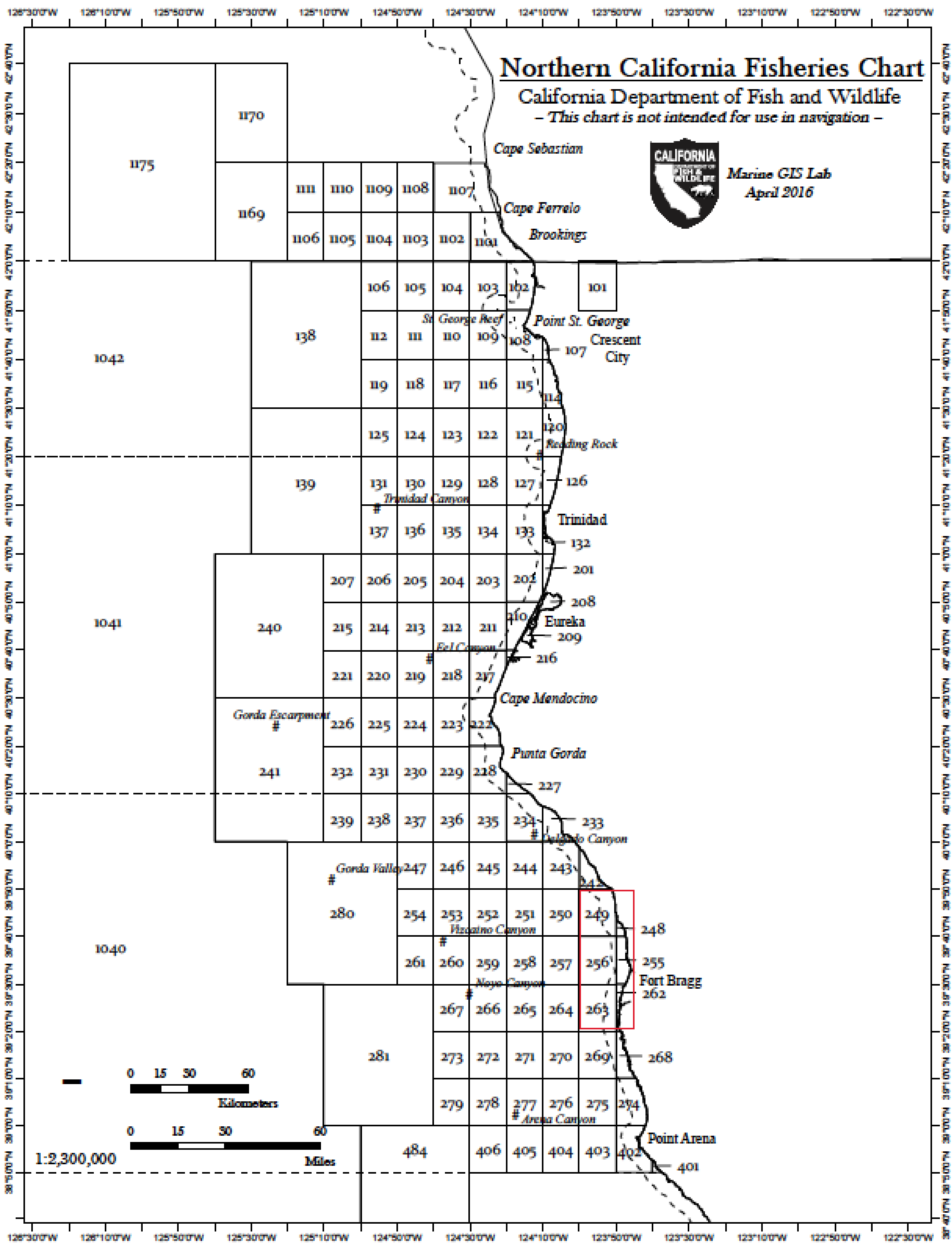

Figure 3. The Northern California Fisheries Chart developed by the California Department of Fish and Wildlife (DFW). Highlighted in red are the fishing blocks that are relevant to the project site.

Pacific Coast Salmon

The Pacific Coast Salmon (PCS) FMP was established in 1977 and amended 23 times through the most recent version (PFMC 2022). Like other FMPs, the PCS documents the cumulative information and regulation of for all salmon fisheries within the United States EEZ along the states of California, Oregon, and Washington. Natural and hatchery salmon are treated synonymously under the FMP when encountered by fishers. The FMP manages all salmon species that may be caught in the area, the historically dominant species include Chinook Salmon (*Oncorhynchus tshawytscha*), Coho Salmon (*O. kisutch*), and Pink Salmon (*O. gorbuscha*). The PCS EFH includes waters and substrate needed to for salmon production to promote the long-term sustainability of the fishery and contributions to a healthy ecosystem. The PCS marine and estuarine EFH begins at the maximum high tide line in the nearshore and tidally influenced environments inside state waters out to the EEZ boundary offshore the states of Washington, Oregon, and California. This designation extends to the waters offshore of Alaska for those salmon stocks managed by the PFMC that may extend north to Alaska. The PCS EFH also includes inland waters outside the scope of this assessment.

Highly Migratory Species

The Highly Migratory Species (HMS) FMP was established in 1981 for billfish and sharks before later amendments to the MSA allowed for the inclusion of other highly migratory, oceanic species with Amendment 1 (PFMC 2023b). Today, the HMS FMP includes 11 species representing tunas, sharks, billfish, and Dolphinfish (*Coryphaena hippurus*). The HMS routinely cross international borders and the EEZ making their management complex and subject to additional international conventions. The HMS includes eight EC species in addition to the six species shared among all FMPs discussed in this assessment. The catch records used in this assessment will identify which, if any, HMS is relevant to the project and its (their) EFH will be reviewed.

Coastal Pelagic Species

The Coastal Pelagic Species (CPS) FMP was established in 1978 for Northern Anchovy fisheries and was amended in 1998 to include other coastal pelagic species (Table 2). Today, five fished taxa and two EC are managed under this FMP (PFMC 2023c). Furthermore, all species of krill (Euphasiidae) are protected from harvest in the West Coast EEZ to protect higher-trophic species that depend on krill as a primary forage target. There are three categories of management under this FMP, including active management (stocks requiring intense harvest management procedures), monitored management (stocks not requiring intensive management), and prohibited harvest management (stocks that are prohibited to fishing, landing, or harvesting) to encourage efficient use of agency resources.

Ecosystem Component Species

Several species are shared between FMPs and are identified as Ecosystem Component (EC) Species, including a suite of shared EC (Table 1). All four FMPs discussed above include the EC as critical elements of a healthy ecosystem. These species are not actively managed, as they are neither actively fished nor are subject to overfishing. However, such species are protected by all FMPs to help reduce bycatch in pre-existing fisheries and to prohibit the introduction of these species into a fishery until appropriate research has been completed to assess their vulnerability within a fishery and the impacts resulting from their introduction into a fishery. As these species are not subject to commercial harvest, data on their occurrence in the area is scarce.

Table 1. Ecosystem Component Species listed in each of the fishery management plans relevant to California's coastal waters.

Ecosystem Component Species (Taxa)	Applicable Fishery Management Plan	Biogeographic Range Includes Fort Bragg Area
Round Herring (*Etrumeus teres*)	Shared	No
Thread Herring (*Opisthonema libertate* and *O. medirastre*)	Shared	No
Pacific Sand Lance (*Ammodytes hexapterus*)	Shared	Yes
Mesopelagic Fishes	Shared	Yes
Pacific Saury (*Cololabis saira*)	Shared	Yes
Silversides (Family Atherinopsidae)	Shared	Yes
Smelts (Family Osmeridae)	Shared	Yes
Select pelagic squids	Shared	Yes
Shortbelly Rockfish (*Sebastes jordani*)	Groundfish	Yes
Aleutian Skate (*Bathyraja aleutica*)	Groundfish	Yes
Bering/Sandpaper Skate (*Bathyraja interrupta/B. kincaidii*)	Groundfish	Yes
California Skate (*Beringraja inornata*)	Groundfish	Yes
Roughtail Skate (*Bathyraja trachura*)	Groundfish	Yes
Skates (Family Arhynchobatidae)	Groundfish	Yes
Pacific Flatnose (*Antimora microlepis*)	Groundfish	Yes
Spotted Ratfish (*Hydrolagus colliei*)	Groundfish	Yes
Tope (aka Soupfin Shark) (*Galeorhinus galeus*)	Groundfish	Yes
Grenadiers (Family Macrouridae)	Groundfish	Yes
Bigeye Thresher Shark (*Alopias superciliosus*)	HMS	Yes
Common Mola (*Mola mola*)	HMS	Yes
Escolar (*Lepidocybium flavobrunneum*)	HMS	Yes
Lancetfishes (Family Alepisauridae)	HMS	Yes
Louvar (*Luvarus imperialis*)	HMS	Yes
Pelagic Stingray (*Pteroplatytrygon violacea*)	HMS	Yes
Pelagic Thresher Shark (*Alopias pelagicus*)	HMS	No
Wahoo (*Acanthocybium solandri*)	HMS	No
Pacific Herring (*Clupea pallasii pallasii*)	CPS	Yes
Jacksmelt (*Atherinopsis californiensis*)	CPS	Yes

Biogeographic ranges per Love (2011). Nomenclature updated per Page et al. (2023).

Habitat Areas of Particular Concern

Habitat Areas of Particular Concern (HAPCs) include both habitat types and areas, such as estuaries, canopy kelp, seagrass, rocky reefs, and specific areas of interest. HAPCs are primarily identified based on the ecological importance of the habitat, the sensitivity of the habitat to anthropogenic stressors, the extent of development activities proposed in the habitat, and the rarity of the habitat type.

ASSESSMENT

Each of the four FMPs were represented by regulated species caught in one, or more, of the six Catch Blocks across the five-year period reviewed (Table 2). Groundfish were the most landed group with over 320,000 lbs recorded. Of these, over 90,000 lbs were reportedly caught in Catch Block 262 where the buoy will be deployed. This was second only to the 106,000 lbs reportedly caught in Catch Block 263, the much larger Catch Block located directly offshore of Catch Block 262. Pacific Coast Salmon was the second most common FMP represented with almost 143,000 lbs landed. Most of the landings were reportedly caught in Catch Block 263 while the least were reportedly caught in Catch Block 262. The HMS FMP was represented by 4,266 lbs of Albacore (*Thunnus albacares*) landed in Catch Block 263. Landings of HMS in Catch Block 262 were not publicly available and labeled as confidential indicating landings occurred but less than three vessels reported the landings. CPS were reportedly caught in Catch Blocks 262 and 263 but the landings were from fewer than three vessels so the total landings remained confidential.

Table 2. Total landings (lbs) by Catch Block for each of the FMP groups. PCS = Pacific Coast Salmon, HMS = Highly Migratory Species, and CPS = Coastal Pelagic Species. Data from January 1, 2017 – December 31, 2022.

Catch Block	Groundfish	PCS	HMS	CPS
248	2,708	Confidential	0	0
249	21,939	25,127	0	0
255	29,477	22,547	Confidential	0
256	71,611	23,063	0	0
262	90,229	12,989	Confidential	Confidential
263	105,816	59,035	4,266	Confidential
Total	321,781	142,762	4,266	0

Relevant Species

PACIFIC COAST GROUNDFISH

Fifty-nine of the 87 core taxa included in the Groundfish FMP occurred in at least one of the six Catch Blocks examined in this assessment. Species covered under the Pacific Coast Groundfish FMP show primarily low or no occurrence (Table 3). Forty-seven of the 59 taxa were not reported from Catch Block 262 during the five-year period surveyed. Rockfish were the dominant group with 10 taxa represented. Two taxa from the roundfish group were also present. No sharks or flatfish taxa were reported from the six-Catch Block area. Eight taxa were considered to have a high likelihood of occurrence in Catch Block 262 where the Iceberg would be deployed. These included rockfish commonly found at shallower depths on rocky reefs such as: Blue Rockfish (*Sebastes mystinus*), Canary Rockfish (*S. pinniger*), China Rockfish (*S. nebulosus*), Copper Rockfish (*S. caurinus*), Gopher Rockfish (*S. carnatus*), Quillback Rockfish (*S. maliger*), Vermillion Rockfish (*S. miniatus*), and Yellowtail Rockfish (*S. flavidus*). Black Rockfish (*S. melanops*) was considered to have a moderate likelihood of occurrence while Chilipepper Rockfish (*S. goodei*) was considered to have a low likelihood of occurrence in Catch Block 262. The two roundfish taxa included Lingcod (*Ophidion elongatus*), considered a high likelihood of occurrence, and Sablefish (*Anoplopoma fimbria*), considered a moderate likelihood of occurrence. None of the taxa known to prefer soft-bottom substrate habitats, such as the flatfish or some shark and ray species, were likely to occur in the area.

PACIFIC COAST SALMON

Chinook Salmon was the only FMP-managed species of PCS reported from the six-Catch Block area examined between 2017 and 2022 (Table 2). The reported landings from Catch Block 262 represented 11% of the area's catch suggesting there is a moderate likelihood of occurrence in the project's area (Table 3). Landings were highest, reportedly, in the Catch Blocks located offshore rather than in those intersecting the shoreline, such as Catch Block 262.

HIGHLY MIGRATORY SPECIES

Albacore were the only HMS reported within the area surveyed. Most of the reported catch came from Catch Block 263 (Table 2). A confidential amount of Albacore were reportedly caught in Catch Block 262. This represents the catch of less than three vessels reporting a catch from the Catch Block. Because of this reported occurrence, Albacore are considered to represent a low likelihood of occurrence in the project area (Table 3).

COASTAL PELAGIC SPECIES

The CPS were rarely taken in the six-Catch Block area with those reported catches occurring by less than 3 boats in Catch Blocks 262 and 263 (Table 2). Only market squid (*Dorytuethis opalescens*) was reportedly caught in Catch Block 262. It was therefore categorized as a low likelihood to occur in the area (Table 3). Market squid does lay its eggs on soft bottom habitat such as where the Iceberg mooring system would be placed. This represents a potential interaction, but with low likelihood as catches from the area were limited during the five-year period examined.

ECOSYSTEM COMPONENT SPECIES

Twenty-four EC can occur in the project's area based on their reported biogeographic range. No current abundance data was available to assess the likelihood of occurrence for each EC. The assessment for the EC reflects the potential impacts of the buoy on the fished taxa for each FMP.

HABITAT AREAS OF PARTICULAR CONCERN

Rocky reefs and kelp occur in the area. The most recent kelp canopy mapping indicates existing kelp occurs northwest of the proposed buoy location (Appendix 3). Presently, the Northern California coastline is suffering reduced kelp abundance and increased purple sea urchin (*Strongylocentrotus purpuratus*) abundance because of sea star wasting disease and increased seawater temperatures (McPherson et al. 2021).

DISCUSSION

Most species that are covered under an FMP have a low, at best, likelihood of occurrence within the project site. Groundfish will be the most likely to occur in the overall project area with nine species characterized as having a high likelihood of occurrence. All the groundfish species expected in the area prefer hard substrate as juveniles and adults. The project area is dominated by hard substrate punctuated by soft-bottom areas interspersed. The Iceberg mooring system will be placed within a large soft-bottom area identified offshore during the benthic habitat survey (Appendix 1). The preferred pathway for the water conveyance line to shore will follow the existing wastewater treatment plant ocean outfall (Appendix 2). This pathway utilizes the previously disturbed benthic habitat to avoid impacting natural hard-bottom habitat in the area that the likely groundfish species would occur.

The presence of groundfish adult habitat suggests larvae produced by resident adults would be exposed to the operation of the Iceberg. The 60-µm mesh intake screen and low intake velocity will minimize the potential impact on groundfish larvae. A plankton monitoring program will be initiated during the deployment as part of the overall operational data collection. No significant effect of the Iceberg's water intake on groundfish larvae is expected during the commissioning, operation, and decommissioning of the pilot project.

Chinook Salmon adults occur in the overall project area based on commercial catch data. Adult salmon are highly mobile, midwater species that would likely to avoid the Iceberg installation elements. The primary fishery occurs in Catch Block 263, located offshore of the proposed Iceberg installation site which is in Catch Block 262. Chinook Salmon is anadromous with all spawning and larval development occurring in rivers with no larvae occurring in the marine environment where they could interact with the Iceberg during operations. No significant effect on Chinook Salmon is expected during the commissioning, operation, and decommissioning of the pilot project.

Albacore occur in the area, but predominantly offshore of the overall project area in Catch Block 263. A catch was reported by less than three commercial vessels in Catch Block 262 where the Iceberg would be located. Juvenile and adults are highly migratory species swimming in the midwater with no benthic habitat requirements or preferences. Albacore predominantly spawn in the Central and Western Pacific Ocean suggesting minimal likelihood of larvae occurring in the area during the Iceberg's operation. No significant effect on Albacore is expected during the commissioning, operation, and decommissioning of the pilot project.

Market squid have been reported in the overall project area with confidential catches reported from Catch Block 262. These catches, however, were reported by fewer than three commercial fishing vessels. This indicates the area is not heavily utilized by market squid adults. Market squid use soft-bottom habitats to lay their egg cases. The minimal occurrence of market squid in the area suggests it is not heavily used as spawning habitat. No significant effect on market squid is expected during the commissioning, operation, and decommissioning of the pilot project.

The available data suggests the pilot project activities from commissioning through operation and ultimately decommissioning can be completed without impacting essential fish habitat for managed or EC species. Careful mapping has identified areas devoid of hard substrate where the mooring can be placed and the conveyance line laid to reach the previously disturbed ocean outfall area. The conveyance line will follow the ocean outfall within the easement granted the City of Fort Bragg surrounding the ocean outfall. The preferred design can be completed without any significant impact on the area's essential fish habitat.

Table 3. Species that are covered under the four FMPs relevant to the area are listed below. Commercial fishing data (CDFW 2023) was used to evaluate the likelihood of occurrence. Occurrence categories are assigned as: Low (less than 10% occurrence in the dataset), Moderate (between 10% and 50% occurrence in the dataset), and High (greater than 50% occurrence in the dataset). NO indicates No Occurrence.

Fishery Management Plan and Species	Likelihood of Occurrence
Coastal Pelagic Species (CPS)	
Mackerel, jack	No
Mackerel, Pacific	No
Squid, market	Low
Groundfish	
Flounder, arrowtooth	No
Lingcod	High
Ratfish, spotted	No
Rockfish, bank	No
Rockfish, black	Moderate
Rockfish, black-and-yellow	No
Rockfish, blackgill	No
Rockfish, blue	High
Rockfish, bocaccio	No
Rockfish, brown	No
Rockfish, canary	High
Rockfish, chilipepper	Low
Rockfish, China	High
Rockfish, copper	High
Rockfish, cowcod	No
Rockfish, darkblotched	No
Rockfish, gopher	High
Rockfish, grass	No
Rockfish, greenspotted	No
Rockfish, greenstriped	No
Rockfish, group black/blue	No
Rockfish, group canary/vermili	No
Rockfish, group red	No
Rockfish, group shelf	No
Rockfish, group slope	No
Rockfish, group small	No
Rockfish, honeycomb	No
Rockfish, olive	No
Rockfish, quillback	High
Rockfish, redbanded	No
Rockfish, rosethorn	No
Rockfish, rosy	No
Rockfish, shortbelly	No
Rockfish, splitnose	No
Rockfish, starry	No
Rockfish, treefish	No
Rockfish, unspecified	No
Rockfish, vermilion	High
Rockfish, widow	No
Rockfish, yelloweye	No
Rockfish, yellowtail	High

Sablefish	Moderate
Sanddab	No
Sanddab, Pacific	No
Shark, leopard	No
Shark, soupfin	No
Shark, spiny dogfish	No
Skate, big	No
Skate, California	No
Skate, longnose	No
Sole, Dover	No
Sole, English	No
Sole, petrale	No
Sole, rex	No
Sole, rock	No
Sole, sand	No
Thornyhead, longspine	No
Thornyhead, shortspine	No
Thornyheads	No
Highly Migratory Species (HMS)	
Tuna, albacore	Low
Salmon	
Salmon, Chinook	Moderate

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APPENDIX 1: CITY OF FORT BRAGG BUOY INSTALLATION SITE SIDE SCAN SONAR SURVEY AND REMOTELY OPERATED VEHICLE INSPECTION TECHNICAL MEMORANDUM

Technical Memorandum

Date: October 23, 2023
Prepared for: Oneka Technologies
Prepared by: Eric Miller, Miller Marine Science & Consulting, Inc.
Subject: City of Fort Bragg Buoy Installation Site Side Scan Sonar Survey and Remotely Operated Vehicle Inspection

PURPOSE

Miller Marine Science & Consulting, Inc. (MMSC) subcontracted Sea Surveyor Inc. to survey the Mill Bay area offshore of the City of Fort Bragg Wastewater Treatment Plant where the City and Oneka Technologies (Oneka) prefer to deploy an Oneka wave-powered seawater desalination buoy and associated water conveyance pipeline to shore. In accordance with the project permitting plan previously discussed with the applicable California regulatory agencies' staffs, this survey was required to identify the preferred areas for infrastructure placement to avoid or minimize impacts to sensitive subtidal habitat. Sand/soft-bottom is the preferred habitat for the placement of all of the project's subtidal infrastructure.

METHODS

On August 9, 2023 the side scan sonar (SSS) survey was completed using an Edgetech 4125i Side Scan Sonar at frequencies of 400 and 900 KHz. The resulting data was processed to create a habitat map of the seafloor indicating the locations of obstructions, hard bottom, and sand/soft bottom (Figure 1). A circular area measuring approximately 6.3 acres of predominantly sand/soft bottom was identified in Mill Bay. This offshore area was connected to the intertidal zone via a sand/soft-bottom channel passing between hard-bottom substrate boundaries on either side of the channel.

Weather and wave conditions allowed the follow-up, remotely operated vehicle (ROV) survey to occur on October 7, 2023. The ROV survey was intended to visually inspect the areas identified as likely sand/soft bottom during the SSS survey as well as assess the biological community in the area. The Sea Surveyor Inc. ROV report detailing coordinates for each transect line is included as Attachment 1 to this technical memorandum. Three transect lines were surveyed by the ROV during the brief weather window (Figure 2). Overall, visibility was challenging due to the high energy environment surveyed. The cyclical surge stirred up some sediment but also created trapped air bubbles in the submerged field of view at the shallower stations (Transect Line 5+00 and Transect Line 1+00). The limited visibility impaired taxonomic identifications, but macrofauna was identifiable to at least the family level, if not to the species level.

RESULTS

<u>Transect Line 30+00 in the Offshore Circular Sand Area</u>

Transect Line 30+00 was the deepest transect and surveyed the offshore sand/soft bottom circular area where the buoy mooring system is expected to be placed. Minimal hard substrate was observed with the area >90% sand/soft bottom. The small amount of exposed hard substrate was devoid of vegetation with purple sea urchins (*Strongylocentrotus purpuratus*) visible. Three additional sea urchins (likely purple) were observed on the sand. On the sand adjacent to one rock was a spiny sand star (*Astropecten armatus/verilli*). No fish or other microbenthic invertebrates were observed. The SSS survey habitat designation was confirmed.

<u>Transect Line 5+00 Across the sand channel between the offshore circular area and the Intertidal zone</u>.

Transect Line 5+00 surveyed the sand channel(s) where the conveyance line from the buoy to shore is expected to be laid and anchored to the substrate. The transect starts shallow on a hard-substrate urchin barren (Figure 3) populated by mostly purple sea urchins with some red sea urchins (*S. franscianus*) present as well. No vegetation was present on the hard substrate, presumably due to the urchin overgrazing. A seaperch (Embiotocidae) and rockfish (*Sebastes* sp.) were observed near the hard substrate. A predominantly sand channel lies past the urchin barren-impacted hard substrate with some small outcroppings of hard substrate. Past the sand channel another urchin barren overlying hard substrate is encountered. No vegetation was found on this second urchin barren either, but a single rockfish was observed. A second, narrower sand channel was observed past the second urchin barren. No fish, vegetation, or macroinvertebrates were observed in the second sand channel. The second sand channel is bounded by another urchin barren devoid of vegetation. The SSS survey habitat designation was confirmed.

<u>Transect Line 1+00 End of SSS-mapped sand channel and the shallow intertidal area not mapped by SSS</u>.

Transect Line 1+00 was divided into two parts, a south and north transect with each paralleling the line indicated in Figure 2 as ROV 1+00. Transect Line 1+00 is in the deep intertidal zone and traversed into the shoreline starting at approximately 8 ft water depth. The south Transect Line 1+00 transect begins in an area with multiple forms of foliose and crustose algae. Most of the transect occurs over this habitat type. As the transect approaches the shallows, the substrate transitions to unvegetated gravel and cobble stone. One fish was observed, appears to be a Kyphosidae (sea chub), but could not be confirmed.

The north Transect Line 1+00 transect followed a shallow sand channel through the intertidal zone. It was bounded by hard substrate supporting foliose and encrusting algae. The sand channel contains some small, fragmented hard substrate outcrops interspersed in the channel (Figure 4). These outcrops were generally populated with foliose algae. No fish or macroinvertebrates were observed.

CONCLUSION

The SSS and ROV surveys confirmed sufficient sand/soft bottom habitat occurs in the area to support deployment of the buoy without significantly impacting sensitive habitats. The conveyance line from the buoy to shore may require gentle placement over degraded hard substrate presently devoid of algae due to the presence of an urchin barren. The north corridor identified during the ROV survey will provide for passage of the conveyance line with minimal interaction with sensitive habitat.

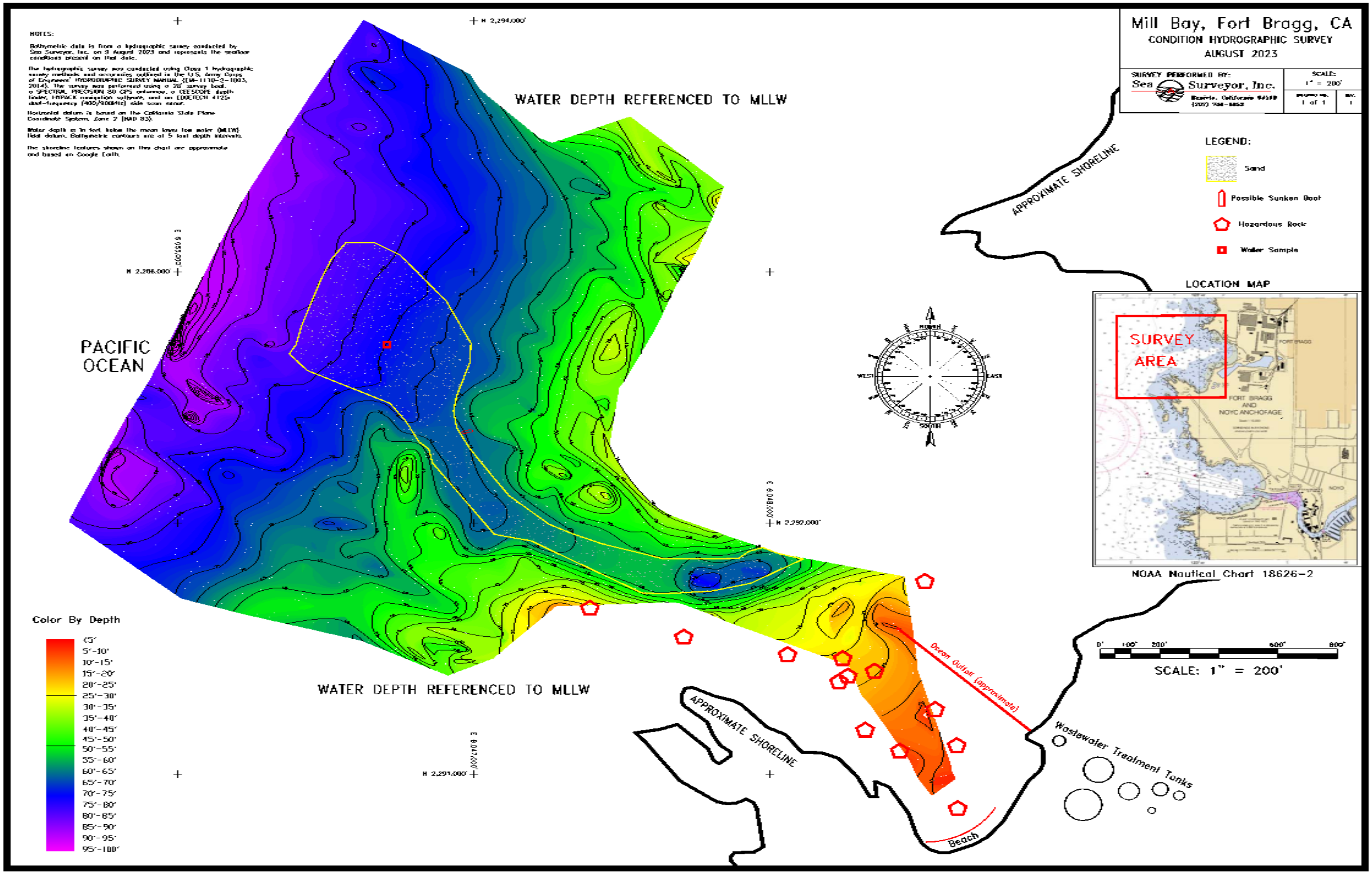

Figure 1. Side scan survey habitat map of Mill Bay, City of Fort Bragg, CA.

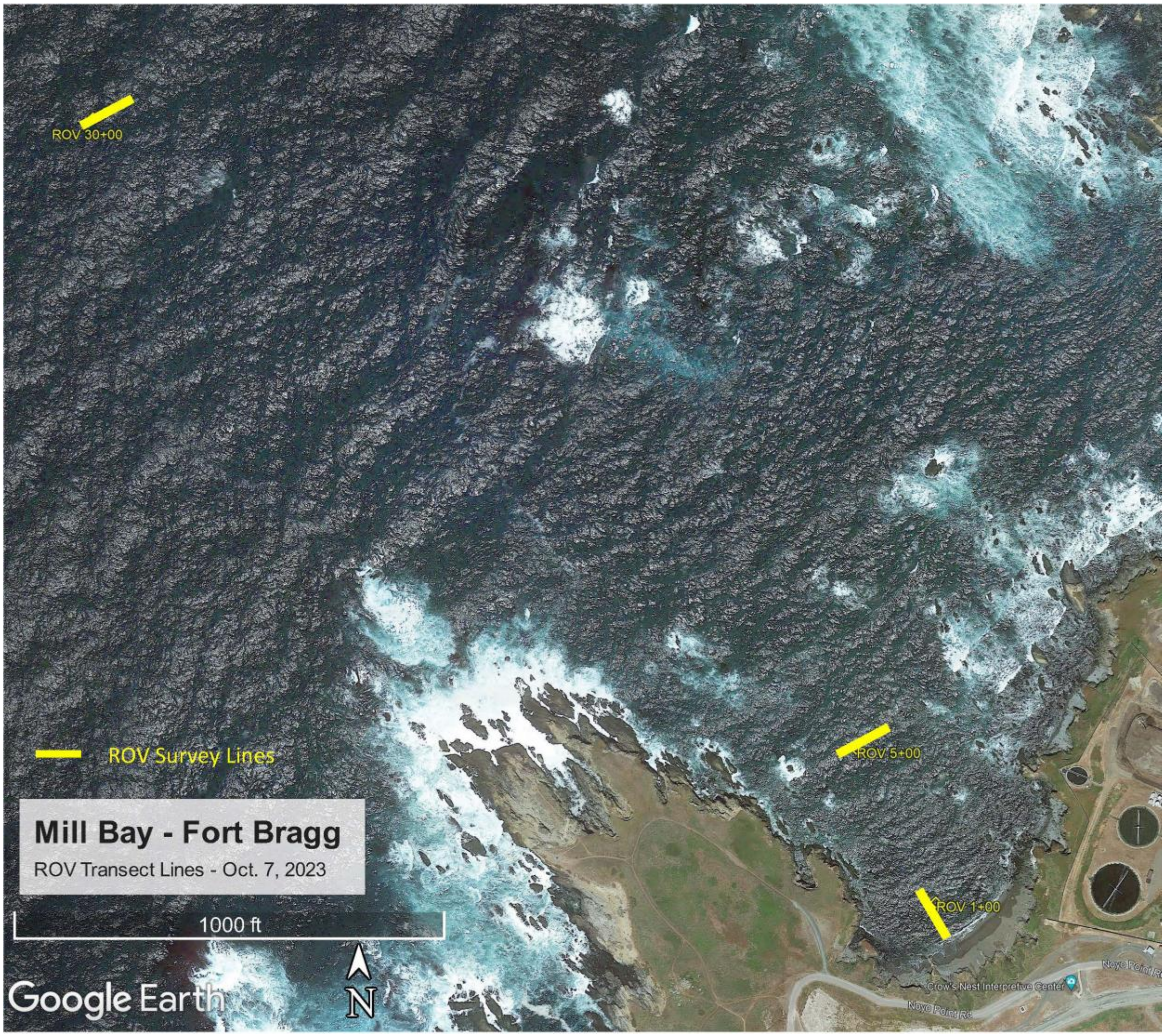

Figure 2. Location of the remotely operated vehicle survey transect lines.

Figure 3. Frame captured from ROV video along Transect Line 5+00 showing hard substrate covered in purple sea urchins creating an urchin barren devoid of submerged aquatic vegetation.

Figure 4. Frame captured from ROV video along North Transect Line 1+00 showing sand/soft-bottom habitat with small hard substrate outcrops interspersed.

Attachment 1: Sea Surveyor Remotely Operated Vehicle Survey Report

Sea Surveyor, Inc.

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ROV Seafloor Inspection in Mill Bay, Fort Bragg, California on 7 October 2023

Introduction

Sea Surveyor, Inc. was contracted by Miller Marine Science & Consulting, Inc. to conduct an remotely operated vehicle (ROV) survey on 7 October 2023 of specific underwater areas within Mill Bay near Fort Bragg, California depicted on the side scan sonar map: *Fort Bragg Mill Bay Contour Map Final with Outfall*. Sea Surveyor utilized a 28' survey vessel and a *Videoray* ROV to collect underwater videos of the seafloor at predetermined GPS locations to visually confirm the seafloor features depicted on the side scan sonar map. Each location was video recorded, with operator comments included. This report describes the findings from the ROV survey. Ocean swells were moderate, and the surge was fair at the time of the survey.

ROV Transect Locations

Three locations were selected as priority to be accomplished within the work window (Figure 1) and are identified as follows:

- Line 1+00: This location is closest to shore and extends from the beach to the shoreward extent of the side scan sonar survey. A large rock protrudes from the water at this site, and this rock, located 150' from the shore, prevented the side scan sonar survey from reaching the beach. The intent of this survey location is to identify the optimal route to the beach around this rock, either to the North or to the South.

- Line 5+00: This location is 500 feet offshore of the beach, and approximately midway between the shoreline and the offshore rocks. The intent of this survey location is to identify and document the hard bottom seafloor terrain leading to the large offshore sand anchoring area.

- Line 30+00: This location is the furthest offshore, located 3,000 feet from the beach in the anchor target area with a sand seafloor. The intent of this survey location is to identify and confirm the seafloor is sand, appropriate for anchoring, and consistent with the side scan findings.

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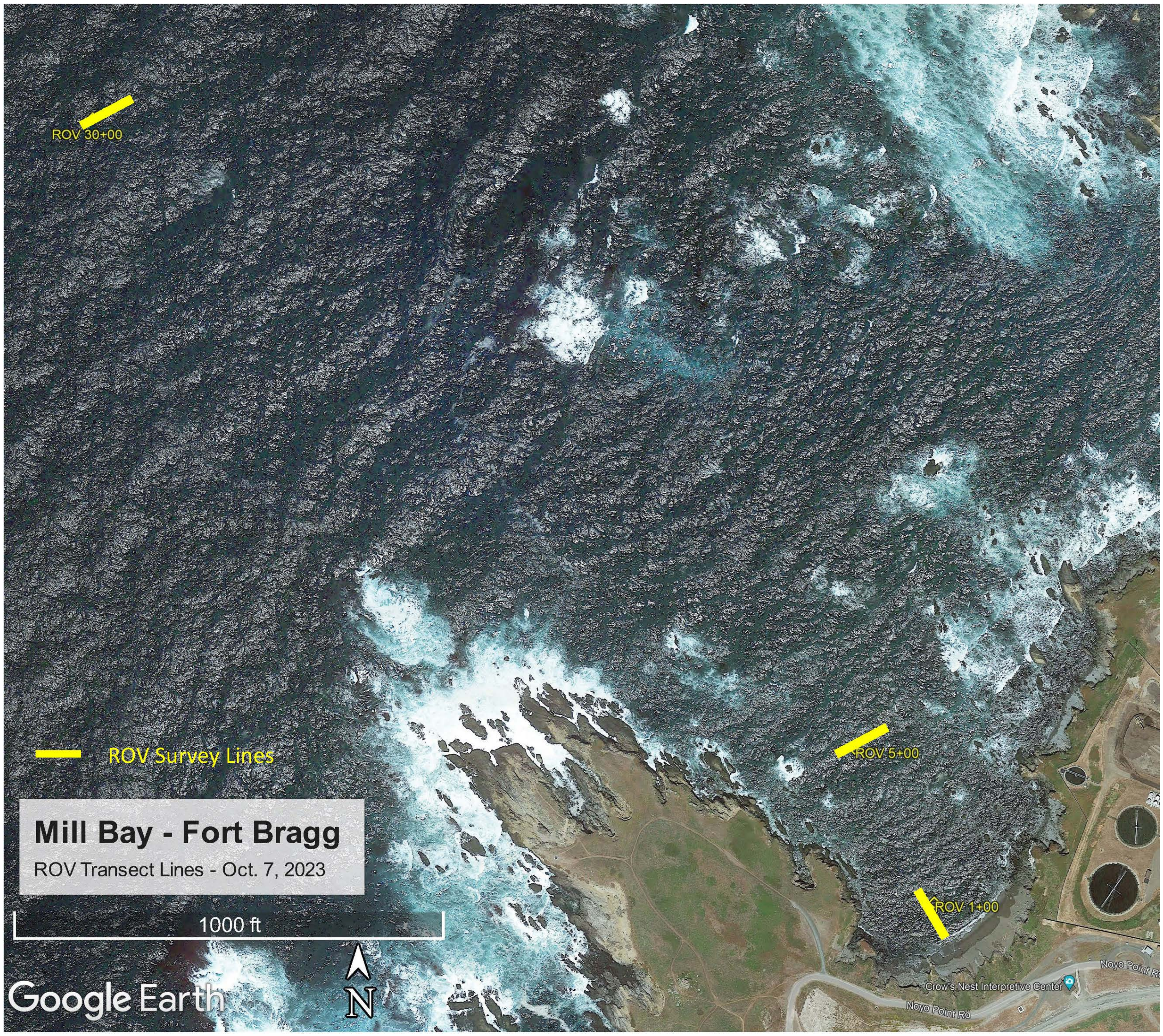

Figure 1: Location of ROV Survey Lines

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FINDINGS

Location ID: Line 1+00

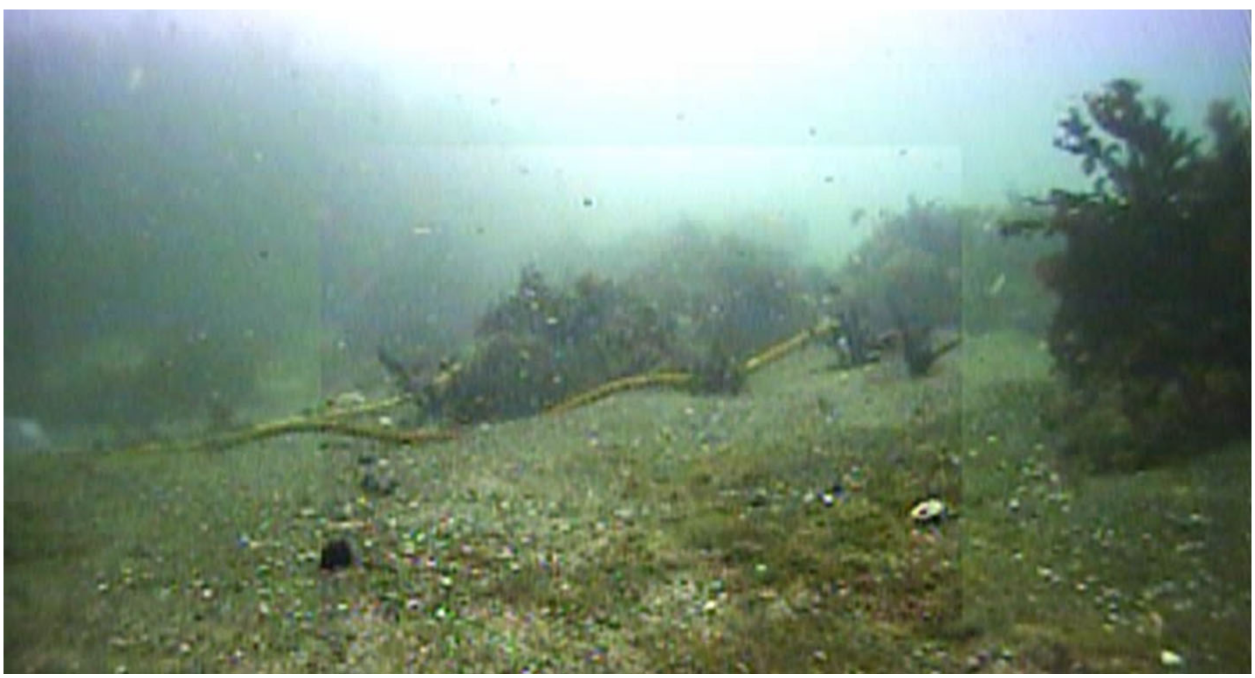
California State Plane, Zone 2 (NAD83) Coordinates:

Beginning of Survey: E6,048,589' N2,290,950'

End of Survey: E6,048,678' N2,290,773'

SUMMARY

The ROV inspection at this location shows a potential route on the North side of the rock obstruction. This area surrounding the rock obstruction is consistent with the side scan images and a sporadic rocky bottom is found throughout the survey. The North side route appears to have more sand pockets than the Southern route. Once past the rock obstruction and closer to the shoreline the seafloor becomes a sand/gravel type bottom.



Sea Surveyor, Inc.

77 Solano Square, #349
Benicia, CA 94510
Tel: 707-746-1853
www.seasurveyor.com

FINDINGS

Location ID: Line 5+00

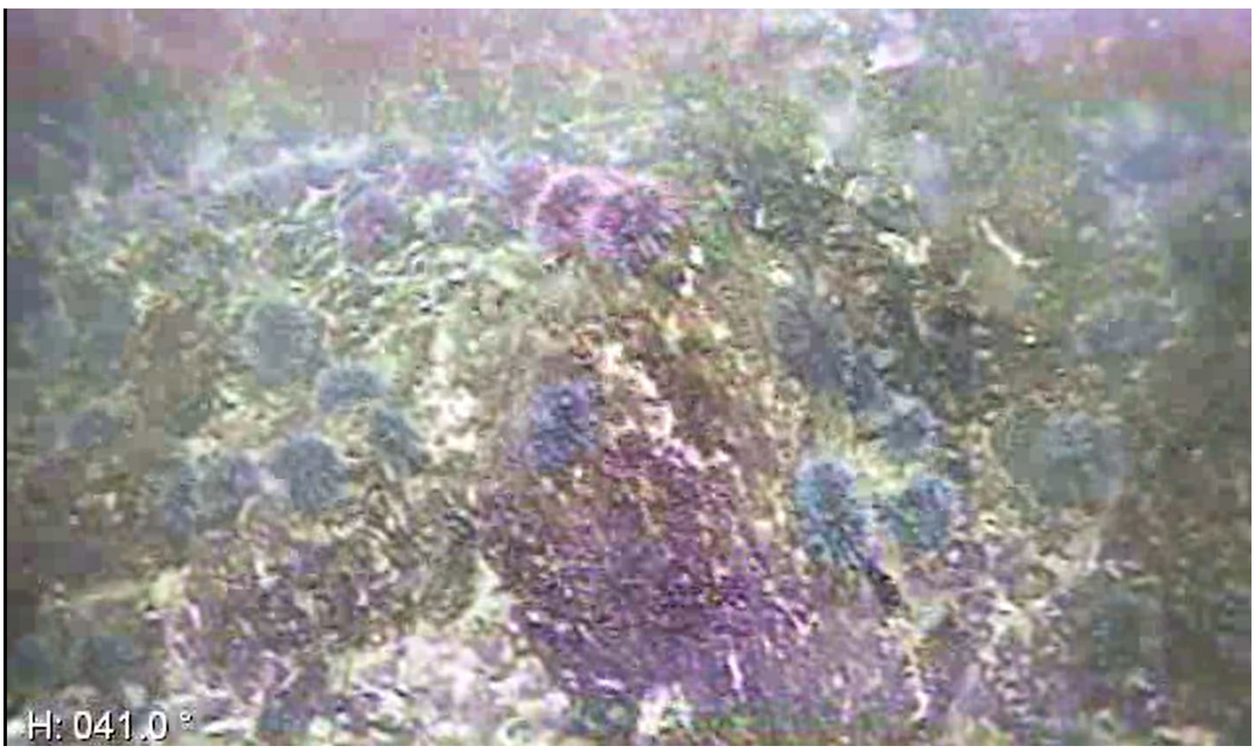
California State Plane, Zone 2 (NAD83) Coordinates:

Beginning of Survey: E6,048,393' N2,291,177'

End of Survey: E6,048,518' N2,291,259'

SUMMARY

The ROV inspection at this location shows a very uneven and rocky bottom, there is a small sand area that crosses through the survey area, which is consistent with the side scan images.



Sea Surveyor, Inc.

77 Solano Square, #349
Benicia, CA 94510
Tel: 707-746-1853
www.seasurveyor.com

FINDINGS

Location ID: Line 30+00

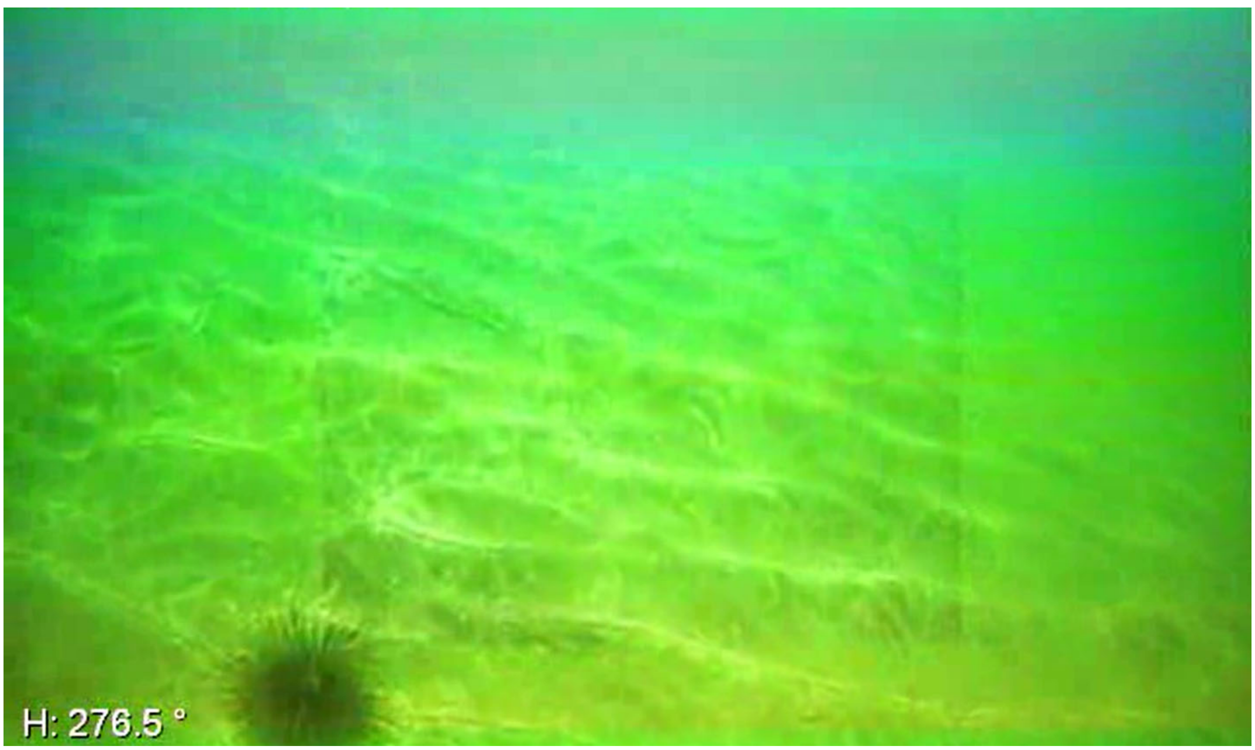
California State Plane, Zone 2 (NAD83) Coordinates:

Beginning of Survey: E6,046,688' N2,292,705'

End of Survey: E6,046,820' N2,292,774'

SUMMARY

The ROV inspection at this location shows a sand bottom. Few to zero rocks were found in this area. This is consistent with the side scan images.



End of Report

APPENDIX 2: CITY OF FORT BRAGG EXISTING WASTEWATER OUTFALL PATHWAY FOR BUOY WATER CONVEYANCE CORRIDOR TECHNICAL MEMORANDUM

Technical Memorandum

Date: November 9, 2023
Prepared for: Oneka Technologies
Prepared by: Eric Miller, Miller Marine Science & Consulting, Inc.
Subject: City of Fort Bragg Existing Wastewater Outfall Pathway for Buoy Water Conveyance Corridor

PURPOSE

Miller Marine Science & Consulting, Inc. (MMSC) reviewed reports and video survey footage from the two most recent outfall inspections (2018 and 2020) conducted for the City of Fort Bragg Wastewater Treatment Plant. The City and Oneka Technologies intend to deploy an Oneka wave-powered seawater desalination buoy offshore and require a water conveyance line to shore to transport the desalination buoy permeate. In accordance with the project permitting plan previously discussed with the applicable California regulatory agency staffs, this review was undertaken to characterize the area's habitat as a potential route for the conveyance line. A pathway for the conveyance line where minimal disturbance to healthy, productive marine habitat is desired.

METHODS

The complete inspection methods are described in the two reports by Underwater Resources Inc. (URI) included as Attachments 1 and 2 to this report. In brief, the outfall conduit and diffuser ports were inspected by commercial diver(s) equipped with a video camera feed on their dive helmet.

Additional information regarding the area was supplied by reviewing the engineering drawings and maps developed in support of the 1977 outfall extension.

The kelp canopy survey GIS shapefile from the 2016 aerial survey reported by the California Department of Fish and Wildlife. This represents the latest shapefile available for the area posted on the Department's website[1]. The kelp canopy in the Fort Bragg area was overlaid on a map of the identified habitats and Wastewater Treatment Plant outfall to examine the proximities of known kelp forests and the proposed project sites.

CHARACTERIZATION

When extended, the new outfall was laid through unconsolidated cobbles and boulders overlying bedrock (Figure 1, AMS 2023[2]). The outfall was laid in a trench dug through the unconsolidated cobbles and boulders with a concrete encasement laid over the top to fill the trench and protect the outfall (Figure 2). All work was completed within a 50-ft wide easement (Figure 3).

[1] https://filelib.wildlife.ca.gov/Public/R7_MR/BIOLOGICAL/Kelp/
[2] Applied Marine Sciences. 2023. Receiving Water Monitoring Report: Fort Bragg Municipal Improvement District No. 1. Prepared for the City of Fort Bragg.

During the inspections, the divers noted the concrete cap overlying the outfall was exposed on the seafloor. Attachments 1 and 2 contain multiple still images captured from the video near a diffuser port showing the exposed concrete encasement. The inspection videos indicate a sparse biological community inhabiting the concrete cap. The community is dominated by purple sea urchins (*Strongylocentrotus purpuratus*) with some red sea urchins (*S. franscianus*), spiny sand stars (*Astropecten armatus/verilli*), bat stars (*Patiria miniata*), and a sea perch (likely Rainbow Seaperch {*Embiotoca caryi*} or Striped Seaperch {*E. lateralis}*) observed. No foliose or canopy forming algae were observed in the inspection videos.

Lastly, no kelp canopy overlaps with the potential project locations from the most recent survey available (Figure 4). In recent years, extensive kelp deforestation has occurred along nearly all the north and central California coastline. Sea urchin overgrazing has been cited as one of the leading causes in the wake of sea star wasting disease. The loss of large numbers of sea stars releases smaller sea urchins, especially purple sea urchins, from predation and habitat competition. Left unchecked, the purple sea urchins formed urchin barrens as seen in some of the video still images. Urchin barrens overgraze the area's algae denuding the habitat and negatively impacting the habitat quality.

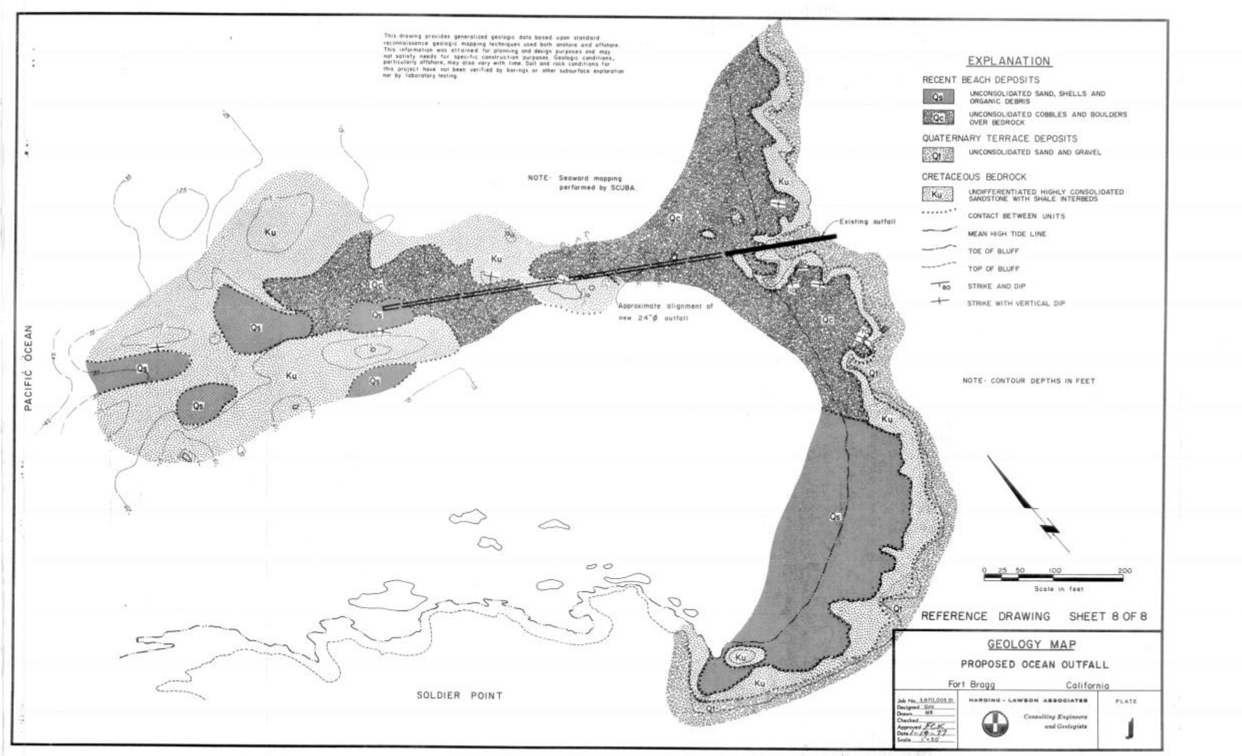


Figure 1. 1977 Geology map prepared for the proposed wastewater treatment plant ocean outfall extension to create the present-day outfall, City of Fort Bragg, CA.

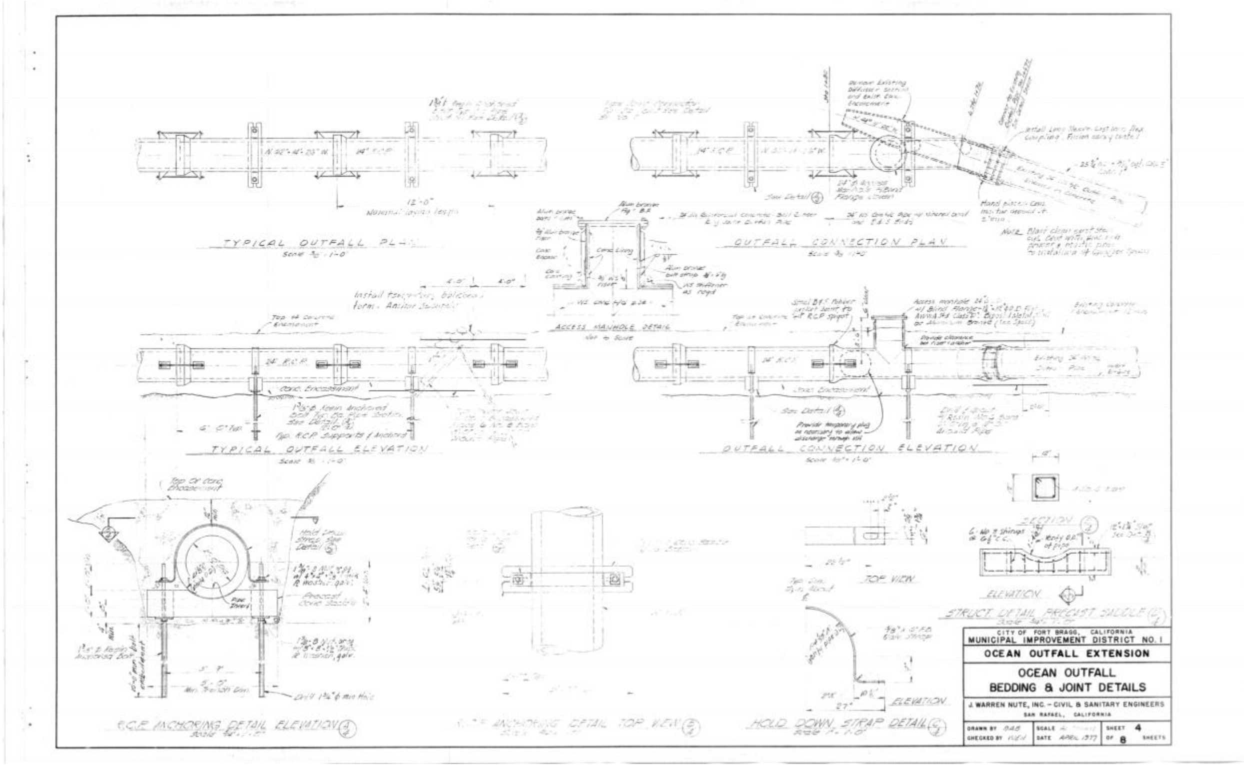


Figure 2. Engineering drawings of the wastewater ocean outfall as designed and installed in 1977 for the City of Fort Bragg.

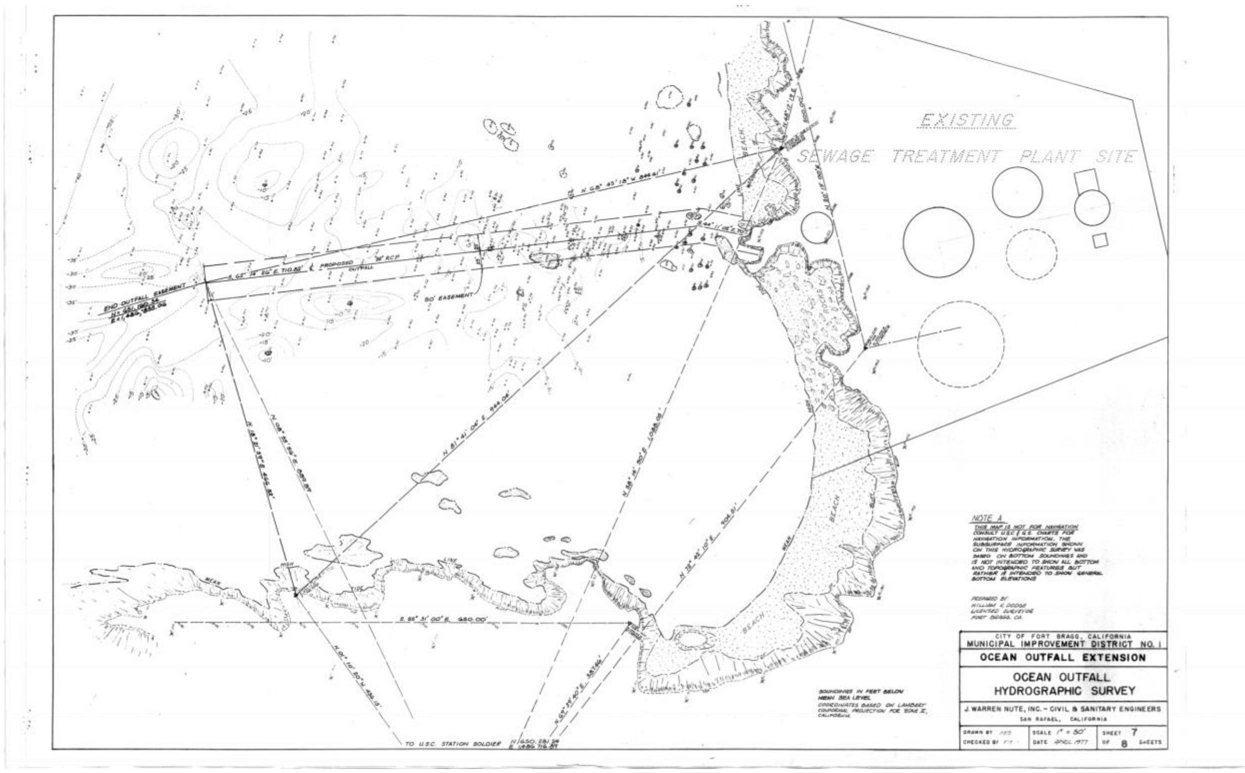


Figure 3. Easement map for City of Fort Bragg wastewater treatment plant ocean outfall 1977 extension.

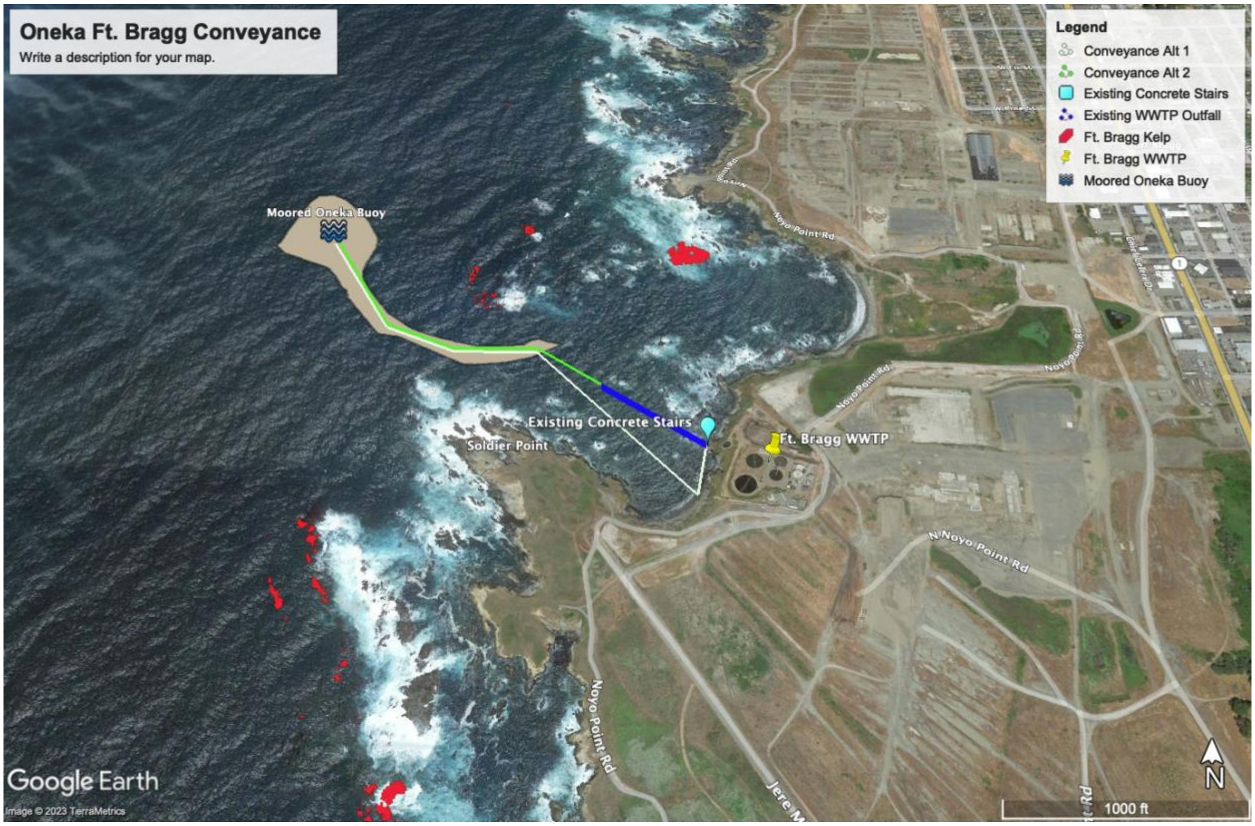


Figure 4. Map of conveyance route alternatives, kelp canopy observed in 2016 aerial surveys, existing concrete stairwell, proposed buoy mooring location, and the City of Fort Bragg wastewater treatment plant.

Attachments 1 & 2: Underwater Resources Inc. 2018 and 2020 City of Fort Bragg Outfall Diffuser Section Cleaning & Inspection Reports.

June 21, 2018

City of Fort Bragg
416 N. Franklin Street
Fort Bragg, CA 95437
Attention: John Smith

Subject: Outfall Diffuser Section Maintenance Report

BACKGROUND

Underwater Resources Inc. (URI) was contracted by the City of Fort Bragg to perform maintenance of the Fort Bragg Municipal Irrigation District's Wastewater Outfall. Work included adjusting the fastening nuts on the flapper valves, clearing sediment, marine growth and debris from the diffuser ports, and attempting to clear boulders from above the end gate. Work was performed over the course of three days between Monday June 18th and Wednesday June 20th, 2018 with a three-person dive team consisting of a supervisor and two divers operating out of a 50-foot captained utility vessel. According to the GPS onboard the dive vessel, the crew found the first inshore diffuser at 39°26'25.31"N, 123°49'4.27"W (WGS84).

METHODOLOGY

Flapper Valve Adjustment: To allow the flapper valves to rest closer to a flush position, the divers were directed to slightly loosen the fastening nuts. The bolt threads just beyond the nuts were struck with a chisel to keep the nuts from walking off the bolts.

Diffuser Port Cleaning: The crew came prepared with several tools to remove sediment from inside the diffuser ports including a venturi jetting/dredge system, a motorized drain snake, and a pressure washer with a flexible hose and sewer cleaning head attachment. The pressure washer proved to be the most effective tool. The sewer cleaning head had four jets coming out of the top of the nozzle at different angles and six jets around the perimeter of the nozzle facing the reverse direction so that that could effectively be used to pull material out of the pipe. The divers would insert up to five feet of hose into the pipeline through a diffuser port, activated the pressure washer, and pull it in and out of the pipe to remove sediment. According to the plans, five feet is the distance from the center of each diffuser port to the invert of the pipeline. Substantial amounts of sediment can be seen exiting the ports on the video during this process. This tool was also effective in removing accumulated marine growth from the interior of the diffuser risers.

Moving Boulders from Above the End Gate: The crew had planned to set anchors in the boulders sitting on top of the outfall terminus with a pneumatic rock drill then use inflatable lift bags to relocate the boulders away from the outfall. While attempting to set the anchors, the boulders, which averaged 5-feet in diameter, all crumbled into smaller pieces creating a pile of rubble. The diver tried drilling into five boulders before deciding that this method was fruitless.

FINDINGS

Diffuser Port Cleaning: The table on the next page lists the flow rate from each diffuser riser after the cleaning efforts were completed along with the corresponding video timestamp. Results were similar to the inspection performed in November of 2017 with strong flow coming from diffusers 1 through 10 and reduced flow from diffusers 11 through 14. The divers were able to clean diffusers 11 through 13 sufficiently to generate light flow. During this inspection diffuser 14 had no flow while in 2017 it had medium flow.

6-20-2018 Video Log – Fort Bragg Outfall Diffuser Inspection			
Diffuser Number	**Video Time**	**Flow Rate**	**Notes**
14	08:49:36	No Flow	Diffuser was cleaned on both 6/19 and 6/20/18.
13	08:49:08	Light	Diffuser was cleaned on both 6/19 and 6/20/18.
12	08:48:21	Light	The top 8 inches of the riser was exposed. Diffuser was cleaned on both 6/19 and 6/20/18.
11	08:47:48	Light	The top 6 inches of the riser was exposed. Diffuser was cleaned on both 6/19 and 6/20/18.
10	08:47:16	Strong	The top 5 inches of the riser was exposed. Diffuser flow created a trench in adjacent sediment.
9	08:46:49	Strong	The top 8 inches of the riser was exposed
8	08:46:24	Strong	The top 8 inches of the riser was exposed
7	08:46:05	Strong	The top 12 inches of the riser was exposed
6	08:43:43	Strong	The top 12 inches of the riser was exposed. Diffuser flow created a trench in adjacent sediment.
5	08:43:21	Strong	
4	08:43:00	Strong	
3	08:42:43	Strong	
2	08:42:32	Strong	
1	08:42:09	Strong	Diver flipped the flapper valve around to test resting position.

Moving Boulders from Above the End Gate: The method of removing boulders by installing rock anchors as lift points proved unsuccessful. After breaking 5 large boulders into rubble, the divers performed a concentrated jetting effort to expose the concrete sliding bulkhead to assess its condition. The divers exposed the lifting eye of the bulkhead but opted not to attempt to remove it due to the high probability that surrounding rubble and sediment would fall into the 3-1/2-inch wide slot and make it impossible to replace the bulkhead. After surveying the area, the divers estimated that a minimum of 20 cubic yards of sediment and rock would need to be displaced to safely gain access to the end gate. The attached diagram summarizes the findings near the end gate.

If there are any questions regarding this report, please do not hesitate to contact me.

Regards,
Chris Levesque

Operations Manager
415-559-3484

Note: Drawing is a rendition based upon as-builts drawings and diver visual inspection notes from 6/20/2018

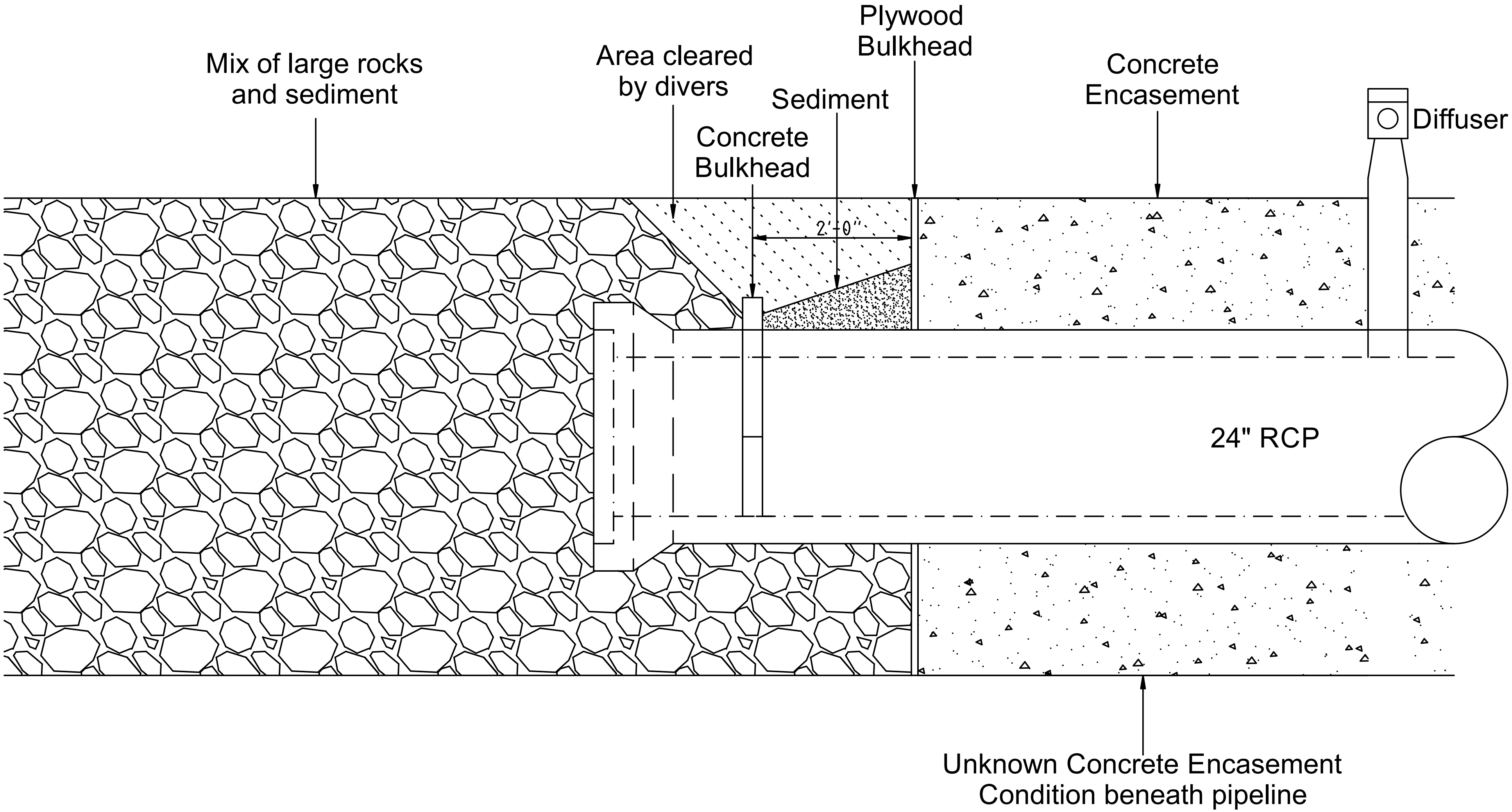


Photo 1 – Diffuser 1 showing strong flow

Photo 2 – Diffuser 2 showing strong flow

Photo 3 – Diffuser 3 showing strong flow

Photo 4 – Diffuser 4 showing strong flow

UNDERWATER RESOURCES INC

Photo 5 – Diffuser 5 showing strong flow

Photo 6 – Diffuser 6 showing strong flow

Photo 7 – Diffuser 7 showing strong flow

Photo 8 – Diffuser 8 showing strong flow

Photo 9 – Diffuser 9 showing strong flow

Photo 10 – Diffuser 10 showing strong flow

Photo 11 – Diffuser 11 showing light flow

Photo 12 – Diffuser 12 showing light flow

Photo 13 – Diffuser 13 showing light flow

Photo 14 – Diffuser 14 showing no flow

Photo 15 – Plywood bulkhead at the end of concrete encasement

Photo 16 – Lifting eye for concrete bulkhead buried in sediment

August 7, 2020

John Smith
City of Fort Bragg

Subject: Outfall Diffuser Section Cleaning & Inspection

BACKGROUND

In 1971, the District completed construction of a regional wastewater collection and treatment facility. At that time, wastewater was discharged through a 30-inch outfall that emptied into nearshore, shallow water. Following a thorough evaluation of outfall performance and biological communities in the vicinity of the outfall in 1973, the outfall was extended approximately 650 feet offshore in 1977. An average dry-weather flow of approximately 0.56 MGD currently is discharged through 14 diffuser ports spanning approximately 100-130 feet in 25–30 feet of water.

Underwater Resources Inc. (URI) was contracted by Wahlund Construction, Inc. to perform maintenance and inspection of the Fort Bragg Municipal Improvement District's Wastewater Outfall. Work included cleaning out the built-up sediment from the pipe interior between diffuser 11 and the end gate and installing new TideFlex check valves on all 14 diffusers. Work was performed over the course of eight days between Monday July 27th and Tuesday August 4th, 2020 with a three-person dive team consisting of a supervisor and two divers operating out of a 35-foot charter vessel. The crew used coordinates from our previous work to find the diffuser section at 39°26'25.31"N, 123°49'4.27"W (WGS84).

METHODOLOGY & FINDINGS

Diffuser Port Cleaning: To clean out the pipe interior, the crew had originally planned to core drill 12-inch holes through the top of the pipe in two locations between the end gate and diffuser 11 and place a venturi jetting/dredge system inside the pipe. During the initial dive, it was discovered that diffuser 14 had broken off leaving a 6-inch hole in the top of the pipe that had filled with sand and rocks. Divers were able to successfully clean the pipe and establish strong effluent flow through all diffusers by placing pump hoses in the open diffuser 14 riser. The crew attempted to core drill one hole between diffusers 13 and 14. However, the drill bit seized in place when it apparently hit a metal hold down strap. This strap was in a different location than shown on the as-built drawings. Divers were unable to recover the core drill bit and left it in place inside the concrete pipe casing. The mild steel bit is expected to corrode away, and the remaining hole will naturally fill with sand and rocks. In order to set the drill stand prior to the coring attempt, divers had to remove a large boulder from the top of the pipe. This was accomplished by breaking it into pieces with hydraulic hand tools then using lift bags and rigging to set the rocks aside.

Teleflex Valve Installation: To install the TideFlex check valves, the divers first removed the existing bronze plates and rubber flapper valves. They then drilled two additional holes on the bottom corners of the vertical rectangular diffuser flanges to fit the pattern of the new valves. Once the holes were drilled, the divers installed four sets of 316L stainless steel bolts with associated 316L washers and locking nuts. After the installation was complete the diver performed a narrated video inspection and found that all 14 diffusers were installed tightly and that the TideFlex valves were functioning properly with strong flow coming from the diffuser ports providing proper dilution. Inspection video is available upon request.

Diffuser 14 Repair: The City of Fort Bragg provided a stainless-steel sleeve clamp for the repair of diffuser 14. The diver installed the clamp by tightening it to the lower 3.5-inches of the diffuser riser protruding from the pipe and the separated top portion of the diffuser. Diffuser 14 was set to face in the opposite direction of diffuser 13.

RECOMMENDATIONS

After the mild steel core bit corrodes, the core hole should be cleaned out and filled with grout. Currently the bit is seized on a stainless-steel hold down strap which means that the 4.125-inch pipe wall remains intact to protect the pipe interior from the elements. Inspection is required within the next five years.

Photo 1 – Diffuser 14 clamp repair

Photo 2 – Diffuser 14 showing strong flow

Photo 3 – Diffuser 13 showing strong flow

Photo 4 – Diffuser 12 showing strong flow

Photo 5 – Diffuser 11 showing strong flow

Photo 6 – Diffuser 10 showing strong flow

Photo 7 – Diffuser 9 showing strong flow

Photo 8 – Diffuser 8 showing strong flow

UNDERWATER RESOURCES INC

Photo 9 – Diffuser 7 showing strong flow

Photo 10 – Diffuser 6 showing strong flow

Photo 11 – Diffuser 5 showing strong flow

Photo 12 – Diffuser 4 showing strong flow

Photo 13 – Diffuser 3 showing strong flow

Photo 14 – Diffuser 2 showing strong flow

Photo 15 – Diffuser 1 showing strong flow

APPENDIX 3: ESSENTIAL FISH HABITAT MAPPER OUTPUT

EFH Mapper Report

EFH Data Notice

Essential Fish Habitat (EFH) is defined by textual descriptions contained in the fishery management plans developed by the regional fishery management councils. In most cases mapping data can not fully represent the complexity of the habitats that make up EFH. This report should be used for general interest queries only and should not be interpreted as a definitive evaluation of EFH at this location. A location-specific evaluation of EFH for any official purposes must be performed by a regional expert. Please refer to the following links for the appropriate regional resources.

West Coast Regional Office

Query Results

Degrees, Minutes, Seconds: Latitude = 39º 26' 27" N, Longitude = 124º 10' 56" W
Decimal Degrees: Latitude = 39.441, Longitude = -123.818

The query location intersects with spatial data representing EFH and/or HAPCs for the following species/management units.

EFH

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Coastal Pelagic Species	ALL	Pacific	
		Finfish	ALL	Pacific	
		Groundfish	ALL	Pacific	Groundfish
		Krill - Euphausia Pacifica	ALL	Pacific	
		Krill - Thysanoessa Spinifera	ALL	Pacific	
		Other Krill Species	ALL	Pacific	

Pacific Salmon EFH

No Pacific Salmon Essential Fish Habitat (EFH) were identified at the report location.

Atlantic Salmon

No Atlantic Salmon were identified at the report location.

HAPCs

Link	Data Caveats	HAPC Name	Management Council
		Canopy Kelp	Pacific Fishery Management Council
		Rocky Reefs	Pacific Fishery Management Council

EFH Areas Protected from Fishing

No EFH Areas Protected from Fishing (EFHA) were identified at the report location.

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data. ****For links to all EFH text descriptions see the complete data inventory: open data inventory -->**
Pacific Coastal Pelagic Species, Jack Mackerel, Pacific (Chub) Mackerel, Pacific Sardine, Northern Anchovy - Central Subpopulation, Northern Anchovy - Northern Subpopulation, **Pacific Highly Migratory Species**, Bigeye Thresher Shark - North Pacific, Bluefin Tuna - Pacific, Dolphinfish (Dorado or Mahimahi) - Pacific, Pelagic Thresher Shark - North Pacific, Swordfish - North Pacific

APPENDIX 2: WATER SAMPLE CHEMICAL ANALYSIS LABORATORY REPORT

Alpha Analytical Laboratories, Inc. email: clientservices@alpha-labs.com
Corporate: 208 Mason Street | Ukiah, CA 95482 | T: 707-468-0401 | F: 707-468-5267 | ELAP# 1551

18 September 2023

Fort Bragg, City of
Attn: Frank Kemper
416 N. Franklin St.
Ft. Bragg, CA 95437
RE: Ocean Discharge Plan
Work Order: 23H1936

Enclosed are the results of analyses for samples received by the laboratory on 08/10/23 14:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Sheri Speaks

Sheri L. Speaks
Project Manager

Alpha Analytical Laboratories, Inc.
email: clientservices@alpha-labs.com
Corporate: 208 Mason Street | Ukiah, CA 95482 | T: 707-468-0401 | F: 707-468-5267 | ELAP# 1551

Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Bay Area: 262 Rickenbacker Circle | Livermore, CA 94551 | 925-828-6226 | ELAP# 2728
Central Valley: 9090 Union Park Way Suite 113 | Elk Grove, CA 95624 | 916-686-5190 | ELAP# 2922
North Bay: 737 Southpoint Blvd Unit D| Petaluma, CA 94954 | 707-769-3128 | ELAP# 2303
San Diego: 2722 Loker Avenue West Suite A | Carlsbad, CA 92010 | 760-930-2555 | ELAP# 3055
Los Angeles: 1230 E. 223rd Street Suite 205 | Carson, CA 90745 | 424-267-5032 | ELAP# 3091

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Buoy Project	23H1936-01	Water	08/09/23 14:30	08/10/23 14:30

This represents an amended copy of the original report.

Subcontracted results added. Complete report.

Alpha Analytical Laboratories, Inc. email: clientservices@alpha-labs.com
Corporate: 208 Mason Street | Ukiah, CA 95482 | T: 707-468-0401 | F: 707-468-5267 | ELAP# 1551

Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Metals by EPA 200 Series Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Analyst	ELAP #	Notes
Buoy Project (23H1936-01) Water Sampled: 08/09/23 14:30 Received: 08/10/23 14:30												
Chromium, hexavalent	ND	0.30	1.0	ug/L	1	AH34205	08/24/23 22:11	08/24/23 22:11	EPA 218.6	JVO	1551	
Mercury	ND	0.000060	0.0010	mg/L	1	AH33946	08/14/23 05:59	08/14/23 13:50	EPA 245.1	LMR	1551	

Alpha Analytical Laboratories, Inc. email: clientservices@alpha-labs.com
Corporate: 208 Mason Street | Ukiah, CA 95482 | T: 707-468-0401 | F: 707-468-5267 | ELAP# 1551

Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Metals by EPA Method 200.8 ICP/MS

Buoy Project (23H1936-01) Water Sampled: 08/09/23 14:30 Received: 08/10/23 14:30

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Analyst	ELAP #	Notes
Antimony	ND	2.0	5.0	ug/L	10	AH34150	08/16/23 13:41	08/18/23 09:51	EPA 200.8	SMP	1551	R-01
Arsenic	ND	4.0	5.0	ug/L	10	AH34150	08/16/23 13:41	08/21/23 14:38	EPA 200.8	SMP	1551	R-01
Beryllium	ND	0.50	1.0	ug/L	10	AH34150	08/16/23 13:41	08/18/23 09:51	EPA 200.8	SMP	1551	R-01
Cadmium	ND	0.60	1.0	ug/L	10	AH34150	08/16/23 13:41	08/18/23 09:51	EPA 200.8	SMP	1551	R-01
Chromium	ND	5.0	5.0	ug/L	10	AH34150	08/16/23 13:41	08/18/23 09:51	EPA 200.8	SMP	1551	R-01
Copper	**5.4**	**4.0**	**5.0**	**ug/L**	10	AH34150	08/16/23 13:41	08/18/23 09:51	EPA 200.8	SMP	1551	
Lead	ND	0.60	2.5	ug/L	10	AH34150	08/16/23 13:41	08/18/23 09:51	EPA 200.8	SMP	1551	R-01
Nickel	**8.1**	**3.0**	**5.0**	**ug/L**	10	AH34150	08/16/23 13:41	08/18/23 09:51	EPA 200.8	SMP	1551	
Selenium	ND	3.0	20	ug/L	10	AH34150	08/16/23 13:41	08/18/23 09:51	EPA 200.8	SMP	1551	R-01
Silver	ND	2.0	2.0	ug/L	10	AH34150	08/16/23 13:41	08/18/23 09:51	EPA 200.8	SMP	1551	R-01
Thallium	ND	0.50	1.0	ug/L	10	AH34150	08/16/23 13:41	08/18/23 09:51	EPA 200.8	SMP	1551	R-01
Zinc	ND	20	50	ug/L	10	AH34150	08/16/23 13:41	08/18/23 09:51	EPA 200.8	SMP	1551	R-01

Fort Bragg, City of 416 N. Franklin St. Ft. Bragg CA, 95437	Project Manager: Frank Kemper Project: Ocean Discharge Plan Project Number: [none]	Reported: 09/18/23 16:53

Metals by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Analyst	ELAP #	Notes
Buoy Project (23H1936-01) Water Sampled: 08/09/23 14:30 Received: 08/10/23 14:30												
Chromium, trivalent	ND	0.50	0.50	ug/L	1	AH34033	08/14/23 16:40	08/22/23 16:21	Calculation	MMY	1551*	

Alpha Analytical Laboratories, Inc. email: clientservices@alpha-labs.com
Corporate: 208 Mason Street | Ukiah, CA 95482 | T: 707-468-0401 | F: 707-468-5267 | ELAP# 1551

Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Analyst	ELAP #	Notes
Buoy Project (23H1936-01) Water Sampled: 08/09/23 14:30 Received: 08/10/23 14:30												
Ammonia as N	**0.17**	**0.10**	**0.20**	**mg/L**	1	AH34906	08/28/23 10:38	08/31/23 19:13	SM4500-NH3 G	SM	1551	J

Alpha Analytical Laboratories, Inc. email: clientservices@alpha-labs.com
Corporate: 208 Mason Street | Ukiah, CA 95482 | T: 707-468-0401 | F: 707-468-5267 | ELAP# 1551

Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Miscellaneous Physical/Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Analyst	ELAP #	Notes
Buoy Project (23H1936-01) Water Sampled: 08/09/23 14:30 Received: 08/10/23 14:30												
Cyanide (total)	ND	0.0020	0.0030	mg/L	1	AH34154	08/16/23 08:05	08/16/23 14:00	10-204-00-1-X	MAP	1551	

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Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Acrolein by EPA Method 624.1

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Analyst	ELAP #	Notes
Buoy Project (23H1936-01) Water Sampled: 08/09/23 14:30 Received: 08/10/23 14:30												**HDSP**
Acrolein	ND	0.90	5.0	ug/L	1	AH33807	08/10/23 17:00	08/11/23 11:58	EPA 624.1	JV	1551	U
Surrogate: Bromofluorobenzene		*109 %*	*70-130*			*AH33807*	*08/10/23 17:00*	*08/11/23 11:58*	*EPA 624.1*	*JV*	1551	
Surrogate: Dibromofluoromethane		*96.6 %*	*70-130*			*AH33807*	*08/10/23 17:00*	*08/11/23 11:58*	*EPA 624.1*	*JV*	1551	
Surrogate: Toluene-d8		*103 %*	*70-130*			*AH33807*	*08/10/23 17:00*	*08/11/23 11:58*	*EPA 624.1*	*JV*	1551	

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Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

2-Chloroethylvinyl Ether by EPA Method 624.1

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Analyst	ELAP #	Notes
Buoy Project (23H1936-01) Water Sampled: 08/09/23 14:30 Received: 08/10/23 14:30												**HDSP**
2-Chloroethylvinyl ether	ND	0.70	1.0	ug/L	1	AH33807	08/10/23 17:00	08/11/23 11:58	EPA 624.1	JV	1551	U
Surrogate: Bromofluorobenzene		*109 %*	*70-130*			*AH33807*	*08/10/23 17:00*	*08/11/23 11:58*	*EPA 624.1*	*JV*	1551	
Surrogate: Dibromofluoromethane		*96.6 %*	*70-130*			*AH33807*	*08/10/23 17:00*	*08/11/23 11:58*	*EPA 624.1*	*JV*	1551	
Surrogate: Toluene-d8		*103 %*	*70-130*			*AH33807*	*08/10/23 17:00*	*08/11/23 11:58*	*EPA 624.1*	*JV*	1551	

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Corporate: 208 Mason Street | Ukiah, CA 95482 | T: 707-468-0401 | F: 707-468-5267 | ELAP# 1551

Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Volatile Organic Compounds by EPA Method 624.1

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Analyst	ELAP #	Notes
Buoy Project (23H1936-01) Water Sampled: 08/09/23 14:30 Received: 08/10/23 14:30												**HDSP**
Acetone	**5.5**	**0.70**	**5.0**	**ug/L**	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	
Acrylonitrile	ND	0.10	2.0	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Benzene	ND	0.060	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Bromodichloromethane	ND	0.080	0.40	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Bromoform	ND	0.30	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Bromomethane	ND	0.40	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Carbon tetrachloride	ND	0.10	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Chlorobenzene	ND	0.050	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Chloroethane	ND	0.10	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Chloroform	ND	0.060	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Chloromethane	ND	0.40	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Dibromochloromethane	ND	0.10	0.40	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
1,2-Dibromoethane (EDB)	ND	0.10	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551*	U
1,2-Dichlorobenzene	ND	0.060	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
1,3-Dichlorobenzene	ND	0.080	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
1,4-Dichlorobenzene	ND	0.050	2.0	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
1,1-Dichloroethane	ND	0.080	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
1,2-Dichloroethane	ND	0.40	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
1,1-Dichloroethene	ND	0.10	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
cis-1,2-Dichloroethene	ND	0.10	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551*	U
trans-1,2-Dichloroethene	ND	0.10	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
1,2-Dichloropropane	ND	0.40	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
cis-1,3-Dichloropropene	ND	0.40	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
trans-1,3-Dichloropropene	ND	0.40	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
1,3-Dichloropropene (total)	ND	0.40	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Ethylbenzene	ND	0.10	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Methyl ethyl ketone	ND	0.30	1.0	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Methyl isobutyl ketone	ND	0.60	1.0	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Methyl tert-butyl ether	ND	0.50	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551*	U
Methylene chloride	ND	0.20	1.0	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Styrene	ND	0.10	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551*	U
1,1,2,2-Tetrachloroethane	ND	0.080	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Tetrachloroethene	ND	0.10	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Toluene	ND	0.10	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
1,1,1-Trichloroethane	ND	0.10	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
1,1,2-Trichloroethane	ND	0.080	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Trichloroethene	ND	0.10	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U

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Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Volatile Organic Compounds by EPA Method 624.1

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Analyst	ELAP #	Notes
Buoy Project (23H1936-01) Water	**Sampled: 08/09/23 14:30**		**Received: 08/10/23 14:30**									**HDSP**
Vinyl chloride	ND	0.40	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
o-Xylene	ND	0.10	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
m,p-Xylene	ND	0.20	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Xylenes (total)	ND	0.50	0.50	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Dichlorobenzenes	ND	0.14	1.0	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Halomethanes	ND	1.1	1.5	ug/L	1	AH34024	08/14/23 16:00	08/16/23 11:35	EPA 624.1	JV	1551	U
Surrogate: Bromofluorobenzene		*113 %*	*70-130*			*AH34024*	*08/14/23 16:00*	*08/16/23 11:35*	*EPA 624.1*	*JV*	1551	
Surrogate: Dibromofluoromethane		*111 %*	*70-130*			*AH34024*	*08/14/23 16:00*	*08/16/23 11:35*	*EPA 624.1*	*JV*	1551	
Surrogate: Toluene-d8		*119 %*	*70-130*			*AH34024*	*08/14/23 16:00*	*08/16/23 11:35*	*EPA 624.1*	*JV*	1551	

Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Semivolatile Organic Compounds by EPA Method 625.1

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Analyst	ELAP #	Notes
Buoy Project (23H1936-01) Water Sampled: 08/09/23 14:30 Received: 08/10/23 14:30												
Acenaphthene	ND	1.0	1.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Acenaphthylene	ND	1.0	10	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Anthracene	ND	0.40	10	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Benzo (a) anthracene	ND	0.30	10	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Benzo (a) pyrene	ND	0.50	10	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Benzo (b) fluoranthene	ND	0.60	2.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Benzo (g,h,i) perylene	ND	0.90	5.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Benzo (k) fluoranthene	ND	0.50	10	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Bis(2-chloroethoxy)methane	ND	0.90	5.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Bis(2-chloroethyl)ether	ND	0.90	1.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Bis(2-chloroisopropyl)ether	ND	1.0	2.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Bis(2-ethylhexyl)phthalate	ND	5.0	5.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
4-Bromophenyl phenyl ether	ND	1.0	5.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Butyl benzyl phthalate	ND	3.0	10	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
4-Chloro-3-methylphenol	ND	1.0	1.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
2-Chloronaphthalene	ND	1.0	10	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
2-Chlorophenol	ND	0.70	5.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
4-Chlorophenyl phenyl ether	ND	0.90	5.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Chrysene	ND	0.80	10	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Dibenz (a,h) anthracene	ND	0.80	10	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
2,4-Dichlorophenol	ND	0.70	5.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Diethyl phthalate	ND	1.0	2.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Dimethyl phthalate	ND	2.0	2.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
2,4-Dimethylphenol	ND	1.0	2.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Di-n-butyl phthalate	**6.2**	**6.0**	**10**	**ug/L**	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	J
Di-n-octyl phthalate	ND	0.50	10	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
4,6-Dinitro-2-methylphenol	ND	3.0	5.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
2,4-Dinitrophenol	ND	5.0	5.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
2,4-Dinitrotoluene	ND	0.80	5.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
2,6-Dinitrotoluene	ND	0.80	5.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
1,2-Diphenylhydrazine	ND	0.60	1.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Fluoranthene	ND	0.20	1.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Fluorene	ND	0.80	10	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Hexachlorobenzene	ND	0.90	1.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Hexachlorobutadiene	ND	0.80	1.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Hexachlorocyclopentadiene	ND	2.0	5.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Hexachloroethane	ND	0.60	1.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U

Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Semivolatile Organic Compounds by EPA Method 625.1

Buoy Project (23H1936-01) Water Sampled: 08/09/23 14:30 Received: 08/10/23 14:30

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Analyst	ELAP #	Notes
Indeno (1,2,3-cd) pyrene	ND	0.60	10	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Isophorone	ND	0.90	1.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
2-Methylphenol (o-cresol)	ND	0.60	2.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
3 & 4-Methylphenol (m & p-cresol)	ND	0.60	2.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Naphthalene	ND	0.70	1.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Nitrobenzene	ND	0.90	1.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
2-Nitrophenol	ND	3.0	10	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
4-Nitrophenol	ND	3.0	10	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
N-Nitrosodi-n-propylamine	ND	0.80	5.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
N-Nitrosodimethylamine	ND	0.70	5.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
N-Nitrosodiphenylamine	ND	1.0	1.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Pentachlorophenol	ND	4.0	5.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Phenanthrene	ND	0.90	10	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Phenol	ND	0.50	1.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Pyrene	ND	0.30	10	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
1,2,4-Trichlorobenzene	ND	0.60	5.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
2,4,5-Trichlorophenol	ND	2.0	2.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
2,4,6-Trichlorophenol	ND	2.0	5.0	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Chlorinated Phenolics	ND	10	18	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Non-chlorinated Phenolics	ND	17	37	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551*	U
PAHs	ND	8.0	120	ug/L	1	AH33949	08/14/23 06:00	08/18/23 14:27	EPA 625.1	JV	1551	U
Surrogate: 2-Fluorobiphenyl		*88.4 %*	*27-119*			*AH33949*	*08/14/23 06:00*	*08/18/23 14:27*	*EPA 625.1*	*JV*	1551	
Surrogate: 2-Fluorophenol		*50.5 %*	*7-85*			*AH33949*	*08/14/23 06:00*	*08/18/23 14:27*	*EPA 625.1*	*JV*	1551	
Surrogate: Nitrobenzene-d5		*88.8 %*	*15-314*			*AH33949*	*08/14/23 06:00*	*08/18/23 14:27*	*EPA 625.1*	*JV*	1551	
Surrogate: p-Terphenyl-d14		*98.2 %*	*36-141*			*AH33949*	*08/14/23 06:00*	*08/18/23 14:27*	*EPA 625.1*	*JV*	1551	
Surrogate: Phenol-d6		*52.8 %*	*1-65*			*AH33949*	*08/14/23 06:00*	*08/18/23 14:27*	*EPA 625.1*	*JV*	1551	
Surrogate: 2,4,6-Tribromophenol		*73.8 %*	*4-168*			*AH33949*	*08/14/23 06:00*	*08/18/23 14:27*	*EPA 625.1*	*JV*	1551	

Fort Bragg, City of	Project Manager: Frank Kemper	
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Benzidines by EPA Method 625.1

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Analyst	ELAP #	Notes
Buoy Project (23H1936-01) Water Sampled: 08/09/23 14:30 Received: 08/10/23 14:30												
Benzidine	ND	3.00	5.00	ug/L	1	AH33948	08/14/23 06:52	08/24/23 02:01	EPA 625.1	NBH	1551	U
3,3′-Dichlorobenzidine	ND	2.00	5.00	ug/L	1	AH33948	08/14/23 06:52	08/24/23 02:01	EPA 625.1	NBH	1551	U
Surrogate: 2-Fluorobiphenyl		*79.6 %*	*27-119*			*AH33948*	*08/14/23 06:52*	*08/24/23 02:01*	*EPA 625.1*	*NBH*	1551	
Surrogate: Nitrobenzene-d5		*80.9 %*	*15-314*			*AH33948*	*08/14/23 06:52*	*08/24/23 02:01*	*EPA 625.1*	*NBH*	1551	
Surrogate: p-Terphenyl-d14		*58.3 %*	*36-141*			*AH33948*	*08/14/23 06:52*	*08/24/23 02:01*	*EPA 625.1*	*NBH*	1551	

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416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Semivolatile Organic Compounds by EPA Method 625.1 SIM

Buoy Project (23H1936-01) Water Sampled: 08/09/23 14:30 Received: 08/10/23 14:30

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Analyst	ELAP #	Notes
Acenaphthene	ND	0.20	0.20	ug/L	1	AH34474	08/14/23 06:00	08/23/23 04:27	EPA 625.1SIM	JV	1551	U
Acenaphthylene	ND	0.20	0.20	ug/L	1	AH34474	08/14/23 06:00	08/23/23 04:27	EPA 625.1SIM	JV	1551	U
Anthracene	ND	0.090	0.20	ug/L	1	AH34474	08/14/23 06:00	08/23/23 04:27	EPA 625.1SIM	JV	1551	U
Benzo (a) anthracene	ND	0.20	0.20	ug/L	1	AH34474	08/14/23 06:00	08/23/23 04:27	EPA 625.1SIM	JV	1551	U
Benzo (a) pyrene	ND	0.20	0.20	ug/L	1	AH34474	08/14/23 06:00	08/23/23 04:27	EPA 625.1SIM	JV	1551	U
Benzo (b) fluoranthene	ND	0.20	0.20	ug/L	1	AH34474	08/14/23 06:00	08/23/23 04:27	EPA 625.1SIM	JV	1551	U
Benzo (g,h,i) perylene	ND	0.10	0.20	ug/L	1	AH34474	08/14/23 06:00	08/23/23 04:27	EPA 625.1SIM	JV	1551	U
Benzo (k) fluoranthene	ND	0.20	0.20	ug/L	1	AH34474	08/14/23 06:00	08/23/23 04:27	EPA 625.1SIM	JV	1551	U
Chrysene	ND	0.20	0.20	ug/L	1	AH34474	08/14/23 06:00	08/23/23 04:27	EPA 625.1SIM	JV	1551	U
Dibenz (a,h) anthracene	ND	0.10	0.20	ug/L	1	AH34474	08/14/23 06:00	08/23/23 04:27	EPA 625.1SIM	JV	1551	U
Fluoranthene	ND	0.070	0.20	ug/L	1	AH34474	08/14/23 06:00	08/23/23 04:27	EPA 625.1SIM	JV	1551	U
Fluorene	ND	0.20	0.20	ug/L	1	AH34474	08/14/23 06:00	08/23/23 04:27	EPA 625.1SIM	JV	1551	U
Indeno (1,2,3-cd) pyrene	ND	0.030	0.20	ug/L	1	AH34474	08/14/23 06:00	08/23/23 04:27	EPA 625.1SIM	JV	1551	U
Naphthalene	ND	0.090	0.20	ug/L	1	AH34474	08/14/23 06:00	08/23/23 04:27	EPA 625.1SIM	JV	1551	U
Phenanthrene	ND	0.10	0.20	ug/L	1	AH34474	08/14/23 06:00	08/23/23 04:27	EPA 625.1SIM	JV	1551	U
Pyrene	ND	0.20	0.20	ug/L	1	AH34474	08/14/23 06:00	08/23/23 04:27	EPA 625.1SIM	JV	1551	U
Surrogate: 2-Fluorobiphenyl		*63.2 %*	*24-119*			*AH34474*	*08/14/23 06:00*	*08/23/23 04:27*	*EPA 625.1SIM*	*JV*	1551	
Surrogate: Nitrobenzene-d5		*68.2 %*	*15-314*			*AH34474*	*08/14/23 06:00*	*08/23/23 04:27*	*EPA 625.1SIM*	*JV*	1551	
Surrogate: p-Terphenyl-d14		*83.2 %*	*37-139*			*AH34474*	*08/14/23 06:00*	*08/23/23 04:27*	*EPA 625.1SIM*	*JV*	1551	

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Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Metals by EPA 200 Series Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AH33946 - Hg Digest											
Blank (AH33946-BLK1)					Prepared & Analyzed: 08/14/23						
Mercury	ND	0.000060	0.0010	mg/L							
LCS (AH33946-BS1)					Prepared & Analyzed: 08/14/23						
Mercury	0.00241	0.000060	0.0010	mg/L	0.00250		96.4	85-115			
Duplicate (AH33946-DUP1)		**Source: 23H1875-01**			Prepared & Analyzed: 08/14/23						
Mercury	ND	0.000060	0.0010	mg/L		ND				20	
Matrix Spike (AH33946-MS1)		**Source: 23H1875-01**			Prepared & Analyzed: 08/14/23						
Mercury	0.00238	0.000060	0.0010	mg/L	0.00250	ND	95.1	70-130			
Matrix Spike Dup (AH33946-MSD1)		**Source: 23H1875-01**			Prepared & Analyzed: 08/14/23						
Mercury	0.00228	0.000060	0.0010	mg/L	0.00250	ND	91.3	70-130	4.08	20	
Batch AH34205 - EPA 218.6											
Blank (AH34205-BLK1)					Prepared & Analyzed: 08/24/23						
Chromium, hexavalent	ND	0.30	1.0	ug/L							
LCS (AH34205-BS1)					Prepared & Analyzed: 08/24/23						
Chromium, hexavalent	9.98	0.30	1.0	ug/L	10.0		99.8	90-110			
Duplicate (AH34205-DUP1)		**Source: 23H1936-01**			Prepared & Analyzed: 08/24/23						
Chromium, hexavalent	ND	0.30	1.0	ug/L		ND				20	
Matrix Spike (AH34205-MS1)		**Source: 23H1936-01**			Prepared & Analyzed: 08/26/23						
Chromium, hexavalent	ND	0.30	1.0	ug/L	10.0	ND		90-110			QM-01

Fort Bragg, City of 416 N. Franklin St. Ft. Bragg CA, 95437	Project Manager: Frank Kemper Project: Ocean Discharge Plan Project Number: [none]	Reported: 09/18/23 16:53

Metals by EPA 200 Series Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AH34205 - EPA 218.6											
Matrix Spike Dup (AH34205-MSD1)		**Source: 23H1936-01**			Prepared & Analyzed: 08/24/23						
Chromium, hexavalent	ND	0.30	1.0	ug/L	10.0	ND		90-110		20	QM-01

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Metals by EPA Method 200.8 ICP/MS - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AH34150 - EPA 200.8											
Blank (AH34150-BLK1)					Prepared: 08/16/23 Analyzed: 08/18/23						
Antimony	ND	0.20	0.50	ug/L							
Arsenic	ND	0.40	0.50	ug/L							
Beryllium	ND	0.050	0.10	ug/L							
Cadmium	ND	0.060	0.10	ug/L							
Chromium	ND	0.50	0.50	ug/L							
Copper	ND	0.40	0.50	ug/L							
Lead	ND	0.060	0.25	ug/L							
Nickel	ND	0.30	0.50	ug/L							
Selenium	ND	0.30	2.0	ug/L							
Silver	ND	0.20	0.20	ug/L							
Thallium	ND	0.050	0.10	ug/L							
Zinc	ND	2.0	5.0	ug/L							
LCS (AH34150-BS1)					Prepared: 08/16/23 Analyzed: 08/18/23						
Antimony	21.7	0.20	0.50	ug/L	20.0		108	85-115			
Arsenic	21.0	0.40	0.50	ug/L	20.0		105	85-115			
Beryllium	21.0	0.050	0.10	ug/L	20.0		105	85-115			
Cadmium	21.3	0.060	0.10	ug/L	20.0		106	85-115			
Chromium	20.9	0.50	0.50	ug/L	20.0		105	85-115			
Copper	20.6	0.40	0.50	ug/L	20.0		103	85-115			
Lead	21.2	0.060	0.25	ug/L	20.0		106	85-115			
Nickel	21.2	0.30	0.50	ug/L	20.0		106	85-115			
Selenium	21.2	0.30	2.0	ug/L	20.0		106	85-115			
Silver	20.8	0.20	0.20	ug/L	20.0		104	85-115			
Thallium	20.9	0.050	0.10	ug/L	20.0		105	85-115			
Zinc	104	2.0	5.0	ug/L	100		104	85-115			
Duplicate (AH34150-DUP1)		**Source: 23H1936-01**			Prepared: 08/16/23 Analyzed: 08/18/23						
Antimony	ND	2.0	5.0	ug/L		ND				20	R-01
Arsenic	ND	4.0	5.0	ug/L		ND				20	R-01
Beryllium	ND	0.50	1.0	ug/L		ND				20	R-01
Cadmium	ND	0.60	1.0	ug/L		ND				20	R-01
Chromium	ND	5.0	5.0	ug/L		ND				20	R-01
Copper	4.93	4.0	5.0	ug/L		5.37			8.48	20	R-01
Lead	ND	0.60	2.5	ug/L		ND				20	R-01
Nickel	7.95	3.0	5.0	ug/L		8.15			2.40	20	
Selenium	ND	3.0	20	ug/L		ND				20	R-01

Fort Bragg, City of	Project Manager: Frank Kemper	
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Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Metals by EPA Method 200.8 ICP/MS - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AH34150 - EPA 200.8											
Duplicate (AH34150-DUP1)		**Source: 23H1936-01**		Prepared: 08/16/23 Analyzed: 08/17/23							
Silver	ND	2.0	2.0	ug/L		ND				20	R-01
Thallium	ND	0.50	1.0	ug/L		ND				20	R-01
Zinc	ND	20	50	ug/L		ND				20	R-01

Fort Bragg, City of	Project Manager: Frank Kemper	
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Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AH34906 - SEAL											
Blank (AH34906-BLK1)					Prepared: 08/28/23 Analyzed: 08/31/23						
Ammonia as N	ND	0.10	0.20	mg/L							U
LCS (AH34906-BS1)					Prepared: 08/28/23 Analyzed: 08/31/23						
Ammonia as N	5.63	0.10	0.20	mg/L	5.00		113	85-115			
Duplicate (AH34906-DUP1)		**Source: 23H2743-01**			Prepared: 08/28/23 Analyzed: 08/31/23						
Ammonia as N	ND	0.10	0.20	mg/L		ND				200	U
Matrix Spike (AH34906-MS1)		**Source: 23H2743-01**			Prepared: 08/28/23 Analyzed: 08/31/23						
Ammonia as N	5.89	0.10	0.20	mg/L	5.00	ND	118	80-120			
Matrix Spike Dup (AH34906-MSD1)		**Source: 23H2743-01**			Prepared: 08/28/23 Analyzed: 08/31/23						
Ammonia as N	5.79	0.10	0.20	mg/L	5.00	ND	116	80-120	1.73	20	

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Miscellaneous Physical/Conventional Chemistry Parameters - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AH34154 - General Preparation											
Blank (AH34154-BLK1)					Prepared & Analyzed: 08/16/23						
Cyanide (total)	ND	0.0020	0.0030	mg/L							
LCS (AH34154-BS1)					Prepared & Analyzed: 08/16/23						
Cyanide (total)	0.198	0.0020	0.0030	mg/L	0.200		99.0	85-115			
Duplicate (AH34154-DUP1)		**Source: 23H1878-01**			Prepared & Analyzed: 08/16/23						
Cyanide (total)	ND	0.0020	0.0030	mg/L		ND				25	
Matrix Spike (AH34154-MS1)		**Source: 23H1878-01**			Prepared & Analyzed: 08/16/23						
Cyanide (total)	0.197	0.0020	0.0030	mg/L	0.200	ND	98.6	85-115			
Matrix Spike (AH34154-MS2)		**Source: 23H2081-01**			Prepared & Analyzed: 08/16/23						
Cyanide (total)	0.194	0.0020	0.0030	mg/L	0.200	ND	97.1	85-115			
Matrix Spike Dup (AH34154-MSD1)		**Source: 23H1878-01**			Prepared & Analyzed: 08/16/23						
Cyanide (total)	0.199	0.0020	0.0030	mg/L	0.200	ND	99.4	85-115	0.732	25	

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Acrolein by EPA Method 624.1 - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AH33807 - VOAs in Water GCMS											
Blank (AH33807-BLK1)					Prepared & Analyzed: 08/10/23						
Acrolein	ND	0.90	5.0	ug/L							U
Surrogate: Bromofluorobenzene	*27.5*			*ug/L*	*25.0*		*110*	*70-130*			
Surrogate: Dibromofluoromethane	*24.4*			*ug/L*	*25.0*		*97.4*	*70-130*			
Surrogate: Toluene-d8	*25.7*			*ug/L*	*25.0*		*103*	*70-130*			
LCS (AH33807-BS1)					Prepared & Analyzed: 08/10/23						
Acrolein	45.0	0.90	5.0	ug/L	50.0		90.0	60-140			
Surrogate: Bromofluorobenzene	*27.6*			*ug/L*	*25.0*		*111*	*70-130*			
Surrogate: Dibromofluoromethane	*24.2*			*ug/L*	*25.0*		*96.8*	*70-130*			
Surrogate: Toluene-d8	*26.0*			*ug/L*	*25.0*		*104*	*70-130*			
LCS Dup (AH33807-BSD1)					Prepared & Analyzed: 08/10/23						
Acrolein	44.0	0.90	5.0	ug/L	50.0		88.1	60-140	2.18	25	
Surrogate: Bromofluorobenzene	*27.4*			*ug/L*	*25.0*		*110*	*70-130*			
Surrogate: Dibromofluoromethane	*25.9*			*ug/L*	*25.0*		*104*	*70-130*			
Surrogate: Toluene-d8	*25.7*			*ug/L*	*25.0*		*103*	*70-130*			
Matrix Spike (AH33807-MS1)		**Source: 23H1806-15**			Prepared: 08/10/23 Analyzed: 08/11/23						
Acrolein	30.6	0.90	5.0	ug/L	50.0	ND	61.2	40-160			
Surrogate: Bromofluorobenzene	*29.2*			*ug/L*	*25.0*		*117*	*70-130*			
Surrogate: Dibromofluoromethane	*25.0*			*ug/L*	*25.0*		*100*	*70-130*			
Surrogate: Toluene-d8	*26.5*			*ug/L*	*25.0*		*106*	*70-130*			
Matrix Spike Dup (AH33807-MSD1)		**Source: 23H1806-15**			Prepared: 08/10/23 Analyzed: 08/11/23						
Acrolein	31.7	0.90	5.0	ug/L	50.0	ND	63.4	40-160	3.66	60	
Surrogate: Bromofluorobenzene	*27.4*			*ug/L*	*25.0*		*110*	*70-130*			
Surrogate: Dibromofluoromethane	*23.5*			*ug/L*	*25.0*		*94.0*	*70-130*			
Surrogate: Toluene-d8	*25.0*			*ug/L*	*25.0*		*99.9*	*70-130*			

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Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

2-Chloroethylvinyl Ether by EPA Method 624.1 - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AH33807 - VOAs in Water GCMS											
Blank (AH33807-BLK1)					Prepared & Analyzed: 08/10/23						
2-Chloroethylvinyl ether	ND	0.70	1.0	ug/L							U
Surrogate: Bromofluorobenzene	*27.5*			*ug/L*	*25.0*		*110*	*70-130*			
Surrogate: Dibromofluoromethane	*24.4*			*ug/L*	*25.0*		*97.4*	*70-130*			
Surrogate: Toluene-d8	*25.7*			*ug/L*	*25.0*		*103*	*70-130*			
LCS (AH33807-BS1)					Prepared & Analyzed: 08/10/23						
2-Chloroethylvinyl ether	22.9	0.70	1.0	ug/L	25.0		91.5	3-225			
Surrogate: Bromofluorobenzene	*27.6*			*ug/L*	*25.0*		*111*	*70-130*			
Surrogate: Dibromofluoromethane	*24.2*			*ug/L*	*25.0*		*96.8*	*70-130*			
Surrogate: Toluene-d8	*26.0*			*ug/L*	*25.0*		*104*	*70-130*			
LCS Dup (AH33807-BSD1)					Prepared & Analyzed: 08/10/23						
2-Chloroethylvinyl ether	23.0	0.70	1.0	ug/L	25.0		92.1	3-225	0.653	30	
Surrogate: Bromofluorobenzene	*27.4*			*ug/L*	*25.0*		*110*	*70-130*			
Surrogate: Dibromofluoromethane	*25.9*			*ug/L*	*25.0*		*104*	*70-130*			
Surrogate: Toluene-d8	*25.7*			*ug/L*	*25.0*		*103*	*70-130*			
Matrix Spike (AH33807-MS1)		**Source: 23H1806-15**			Prepared: 08/10/23 Analyzed: 08/11/23						
2-Chloroethylvinyl ether	22.1	0.70	1.0	ug/L	25.0	ND	88.2	3-305			
Surrogate: Bromofluorobenzene	*29.2*			*ug/L*	*25.0*		*117*	*70-130*			
Surrogate: Dibromofluoromethane	*25.0*			*ug/L*	*25.0*		*100*	*70-130*			
Surrogate: Toluene-d8	*26.5*			*ug/L*	*25.0*		*106*	*70-130*			
Matrix Spike Dup (AH33807-MSD1)		**Source: 23H1806-15**			Prepared: 08/10/23 Analyzed: 08/11/23						
2-Chloroethylvinyl ether	22.4	0.70	1.0	ug/L	25.0	ND	89.6	3-305	1.57	71	
Surrogate: Bromofluorobenzene	*27.4*			*ug/L*	*25.0*		*110*	*70-130*			
Surrogate: Dibromofluoromethane	*23.5*			*ug/L*	*25.0*		*94.0*	*70-130*			
Surrogate: Toluene-d8	*25.0*			*ug/L*	*25.0*		*99.9*	*70-130*			

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Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Volatile Organic Compounds by EPA Method 624.1 - Quality Control

Batch AH34024 - VOAs in Water GCMS

Blank (AH34024-BLK1) Prepared: 08/14/23 Analyzed: 08/15/23

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Acetone	ND	0.70	5.0	ug/L							U
Acrylonitrile	ND	0.10	2.0	ug/L							U
Benzene	ND	0.060	0.50	ug/L							U
Bromodichloromethane	ND	0.080	0.40	ug/L							U
Bromoform	ND	0.30	0.50	ug/L							U
Bromomethane	ND	0.40	0.50	ug/L							U
Carbon tetrachloride	ND	0.10	0.50	ug/L							U
Chlorobenzene	ND	0.050	0.50	ug/L							U
Chloroethane	ND	0.10	0.50	ug/L							U
Chloroform	ND	0.060	0.50	ug/L							U
Chloromethane	ND	0.40	0.50	ug/L							U
Dibromochloromethane	ND	0.10	0.40	ug/L							U
1,2-Dibromoethane (EDB)	ND	0.10	0.50	ug/L							U
1,2-Dichlorobenzene	ND	0.060	0.50	ug/L							U
1,3-Dichlorobenzene	ND	0.080	0.50	ug/L							U
1,4-Dichlorobenzene	ND	0.050	2.0	ug/L							U
1,1-Dichloroethane	ND	0.080	0.50	ug/L							U
1,2-Dichloroethane	ND	0.40	0.50	ug/L							U
1,1-Dichloroethene	ND	0.10	0.50	ug/L							U
cis-1,2-Dichloroethene	ND	0.10	0.50	ug/L							U
trans-1,2-Dichloroethene	ND	0.10	0.50	ug/L							U
1,2-Dichloropropane	ND	0.40	0.50	ug/L							U
cis-1,3-Dichloropropene	ND	0.40	0.50	ug/L							U
trans-1,3-Dichloropropene	ND	0.40	0.50	ug/L							U
1,3-Dichloropropene (total)	ND	0.40	0.50	ug/L							U
Ethylbenzene	ND	0.10	0.50	ug/L							U
Methyl ethyl ketone	ND	0.30	1.0	ug/L							U
Methyl isobutyl ketone	ND	0.60	1.0	ug/L							U
Methyl tert-butyl ether	ND	0.50	0.50	ug/L							U
Methylene chloride	ND	0.20	1.0	ug/L							U
Styrene	ND	0.10	0.50	ug/L							U
1,1,2,2-Tetrachloroethane	ND	0.080	0.50	ug/L							U
Tetrachloroethene	ND	0.10	0.50	ug/L							U
Toluene	ND	0.10	0.50	ug/L							U
1,1,1-Trichloroethane	ND	0.10	0.50	ug/L							U
1,1,2-Trichloroethane	ND	0.080	0.50	ug/L							U

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Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Volatile Organic Compounds by EPA Method 624.1 - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AH34024 - VOAs in Water GCMS											
Blank (AH34024-BLK1)					Prepared: 08/14/23 Analyzed: 08/15/23						
Trichloroethene	ND	0.10	0.50	ug/L							U
Vinyl chloride	ND	0.40	0.50	ug/L							U
o-Xylene	ND	0.10	0.50	ug/L							U
m,p-Xylene	ND	0.20	0.50	ug/L							U
Xylenes (total)	ND	0.50	0.50	ug/L							U
Dichlorobenzenes	ND	0.14	1.0	ug/L							U
Halomethanes	ND	1.1	1.5	ug/L							U
Surrogate: Bromofluorobenzene	*26.7*			*ug/L*	*25.0*		*107*	*70-130*			
Surrogate: Dibromofluoromethane	*27.4*			*ug/L*	*25.0*		*110*	*70-130*			
Surrogate: Toluene-d8	*29.0*			*ug/L*	*25.0*		*116*	*70-130*			
LCS (AH34024-BS1)					Prepared: 08/14/23 Analyzed: 08/15/23						
Acetone	60.7	0.70	5.0	ug/L	80.0		75.9	55-146			
Acrylonitrile	16.8	0.10	2.0	ug/L	20.0		84.1	60-140			
Benzene	22.2	0.060	0.50	ug/L	20.0		111	65-135			
Bromodichloromethane	21.0	0.080	0.40	ug/L	20.0		105	65-135			
Bromoform	21.0	0.30	0.50	ug/L	20.0		105	70-130			
Bromomethane	20.9	0.40	0.50	ug/L	20.0		105	15-185			
Carbon tetrachloride	22.4	0.10	0.50	ug/L	20.0		112	70-130			
Chlorobenzene	20.5	0.050	0.50	ug/L	20.0		102	65-135			
Chloroethane	19.5	0.10	0.50	ug/L	20.0		97.4	40-160			
Chloroform	21.4	0.060	0.50	ug/L	20.0		107	70-135			
Chloromethane	21.9	0.40	0.50	ug/L	20.0		110	2-205			
Dibromochloromethane	20.0	0.10	0.40	ug/L	20.0		100	70-135			
1,2-Dibromoethane (EDB)	19.9	0.10	0.50	ug/L	20.0		99.6	70-130			
1,2-Dichlorobenzene	20.2	0.060	0.50	ug/L	20.0		101	65-135			
1,3-Dichlorobenzene	22.0	0.080	0.50	ug/L	20.0		110	70-130			
1,4-Dichlorobenzene	19.8	0.050	2.0	ug/L	20.0		99.2	65-135			
1,1-Dichloroethane	18.3	0.080	0.50	ug/L	20.0		91.6	70-130			
1,2-Dichloroethane	22.8	0.40	0.50	ug/L	20.0		114	70-130			
1,1-Dichloroethene	17.2	0.10	0.50	ug/L	20.0		86.2	50-150			
cis-1,2-Dichloroethene	21.7	0.10	0.50	ug/L	20.0		108	70-130			
trans-1,2-Dichloroethene	20.7	0.10	0.50	ug/L	20.0		104	70-130			
1,2-Dichloropropane	21.1	0.40	0.50	ug/L	20.0		105	35-165			
cis-1,3-Dichloropropene	22.1	0.40	0.50	ug/L	20.0		111	25-175			
trans-1,3-Dichloropropene	20.9	0.40	0.50	ug/L	20.0		104	50-150			
Ethylbenzene	22.6	0.10	0.50	ug/L	20.0		113	60-140			

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Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Volatile Organic Compounds by EPA Method 624.1 - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AH34024 - VOAs in Water GCMS											
LCS (AH34024-BS1)					Prepared: 08/14/23 Analyzed: 08/15/23						
Methyl ethyl ketone	39.5	0.30	1.0	ug/L	40.0		98.7	70-136			
Methyl isobutyl ketone	40.4	0.60	1.0	ug/L	40.0		101	70-130			
Methyl tert-butyl ether	21.6	0.50	0.50	ug/L	20.0		108	70-130			
Methylene chloride	15.5	0.20	1.0	ug/L	20.0		77.4	60-140			
Styrene	24.8	0.10	0.50	ug/L	20.0		124	70-130			
1,1,2,2-Tetrachloroethane	19.7	0.080	0.50	ug/L	20.0		98.6	60-140			
Tetrachloroethene	20.0	0.10	0.50	ug/L	20.0		99.8	70-130			
Toluene	21.5	0.10	0.50	ug/L	20.0		108	70-130			
1,1,1-Trichloroethane	21.7	0.10	0.50	ug/L	20.0		109	70-130			
1,1,2-Trichloroethane	20.3	0.080	0.50	ug/L	20.0		102	70-130			
Trichloroethene	21.4	0.10	0.50	ug/L	20.0		107	65-135			
Vinyl chloride	22.9	0.40	0.50	ug/L	20.0		114	5-195			
o-Xylene	22.7	0.10	0.50	ug/L	20.0		114	70-130			
m,p-Xylene	44.5	0.20	0.50	ug/L	40.0		111	70-130			
Xylenes (total)	67.2	0.50	0.50	ug/L	60.0		112	70-130			
Surrogate: Bromofluorobenzene	*30.0*			*ug/L*	*25.0*		*120*	*70-130*			
Surrogate: Dibromofluoromethane	*28.4*			*ug/L*	*25.0*		*114*	*70-130*			
Surrogate: Toluene-d8	*28.3*			*ug/L*	*25.0*		*113*	*70-130*			
LCS Dup (AH34024-BSD1)					Prepared: 08/14/23 Analyzed: 08/15/23						
Acetone	58.3	0.70	5.0	ug/L	80.0		72.9	55-146	4.10	25	
Acrylonitrile	17.1	0.10	2.0	ug/L	20.0		85.7	60-140	1.88	25	
Benzene	22.6	0.060	0.50	ug/L	20.0		113	65-135	1.88	25	
Bromodichloromethane	21.6	0.080	0.40	ug/L	20.0		108	65-135	3.19	25	
Bromoform	20.7	0.30	0.50	ug/L	20.0		103	70-130	1.39	25	
Bromomethane	22.2	0.40	0.50	ug/L	20.0		111	15-185	5.80	25	
Carbon tetrachloride	21.7	0.10	0.50	ug/L	20.0		109	70-130	3.17	25	
Chlorobenzene	20.5	0.050	0.50	ug/L	20.0		102	65-135	0.0488	25	
Chloroethane	19.6	0.10	0.50	ug/L	20.0		98.1	40-160	0.665	25	
Chloroform	22.2	0.060	0.50	ug/L	20.0		111	70-135	3.39	25	
Chloromethane	20.8	0.40	0.50	ug/L	20.0		104	2-205	5.33	25	
Dibromochloromethane	20.1	0.10	0.40	ug/L	20.0		101	70-135	0.498	25	
1,2-Dibromoethane (EDB)	19.9	0.10	0.50	ug/L	20.0		99.4	70-130	0.151	25	
1,2-Dichlorobenzene	21.3	0.060	0.50	ug/L	20.0		106	65-135	5.16	25	
1,3-Dichlorobenzene	21.7	0.080	0.50	ug/L	20.0		108	70-130	1.46	25	
1,4-Dichlorobenzene	20.1	0.050	2.0	ug/L	20.0		101	65-135	1.40	25	
1,1-Dichloroethane	18.5	0.080	0.50	ug/L	20.0		92.4	70-130	0.924	25	

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Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Volatile Organic Compounds by EPA Method 624.1 - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AH34024 - VOAs in Water GCMS											
LCS Dup (AH34024-BSD1)					Prepared: 08/14/23 Analyzed: 08/15/23						
1,2-Dichloroethane	25.4	0.40	0.50	ug/L	20.0		127	70-130	10.7	25	
1,1-Dichloroethene	18.1	0.10	0.50	ug/L	20.0		90.6	50-150	4.98	25	
cis-1,2-Dichloroethene	21.8	0.10	0.50	ug/L	20.0		109	70-130	0.322	25	
trans-1,2-Dichloroethene	21.7	0.10	0.50	ug/L	20.0		109	70-130	4.71	25	
1,2-Dichloropropane	21.1	0.40	0.50	ug/L	20.0		106	35-165	0.379	25	
cis-1,3-Dichloropropene	22.3	0.40	0.50	ug/L	20.0		112	25-175	0.945	25	
trans-1,3-Dichloropropene	20.8	0.40	0.50	ug/L	20.0		104	50-150	0.335	25	
Ethylbenzene	22.4	0.10	0.50	ug/L	20.0		112	60-140	0.932	25	
Methyl ethyl ketone	41.7	0.30	1.0	ug/L	40.0		104	70-136	5.49	25	
Methyl isobutyl ketone	42.0	0.60	1.0	ug/L	40.0		105	70-130	3.76	25	
Methyl tert-butyl ether	22.1	0.50	0.50	ug/L	20.0		110	70-130	2.06	25	
Methylene chloride	16.2	0.20	1.0	ug/L	20.0		81.0	60-140	4.67	25	
Styrene	24.3	0.10	0.50	ug/L	20.0		122	70-130	1.79	25	
1,1,2,2-Tetrachloroethane	18.2	0.080	0.50	ug/L	20.0		91.2	60-140	7.90	25	
Tetrachloroethene	19.2	0.10	0.50	ug/L	20.0		95.9	70-130	4.04	25	
Toluene	21.9	0.10	0.50	ug/L	20.0		109	70-130	1.57	25	
1,1,1-Trichloroethane	22.5	0.10	0.50	ug/L	20.0		113	70-130	3.71	25	
1,1,2-Trichloroethane	20.5	0.080	0.50	ug/L	20.0		102	70-130	0.588	25	
Trichloroethene	22.9	0.10	0.50	ug/L	20.0		115	65-135	7.14	25	
Vinyl chloride	21.7	0.40	0.50	ug/L	20.0		108	5-195	5.47	25	
o-Xylene	22.6	0.10	0.50	ug/L	20.0		113	70-130	0.618	25	
m,p-Xylene	44.2	0.20	0.50	ug/L	40.0		111	70-130	0.609	25	
Xylenes (total)	66.8	0.50	0.50	ug/L	60.0		111	70-130	0.612	25	
Surrogate: Bromofluorobenzene	*29.8*			*ug/L*	*25.0*		*119*	*70-130*			
Surrogate: Dibromofluoromethane	*29.5*			*ug/L*	*25.0*		*118*	*70-130*			
Surrogate: Toluene-d8	*28.8*			*ug/L*	*25.0*		*115*	*70-130*			
Matrix Spike (AH34024-MS1)		**Source: 23H0854-01**			Prepared: 08/14/23 Analyzed: 08/16/23						
Acetone	59.6	0.70	5.0	ug/L	80.0	4.19	69.2	39-175			
Acrylonitrile	14.9	0.10	2.0	ug/L	20.0	ND	74.4	40-160			
Benzene	21.8	0.060	0.50	ug/L	20.0	ND	109	37-151			
Bromodichloromethane	21.2	0.080	0.40	ug/L	20.0	0.900	101	35-155			
Bromoform	21.6	0.30	0.50	ug/L	20.0	ND	108	45-169			
Bromomethane	19.4	0.40	0.50	ug/L	20.0	ND	97.0	2-242			
Carbon tetrachloride	22.5	0.10	0.50	ug/L	20.0	ND	112	70-140			
Chlorobenzene	21.4	0.050	0.50	ug/L	20.0	ND	107	37-160			
Chloroethane	ND	0.10	0.50	ug/L	20.0	ND		14-230			QM-05, U

Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Volatile Organic Compounds by EPA Method 624.1 - Quality Control

Batch AH34024 - VOAs in Water GCMS

Matrix Spike (AH34024-MS1) **Source: 23H0854-01** Prepared: 08/14/23 Analyzed: 08/16/23

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chloroform	38.4	0.060	0.50	ug/L	20.0	16.6	109	51-138			
Chloromethane	25.2	0.40	0.50	ug/L	20.0	ND	126	2-273			
Dibromochloromethane	20.6	0.10	0.40	ug/L	20.0	ND	103	53-149			
1,2-Dibromoethane (EDB)	20.2	0.10	0.50	ug/L	20.0	ND	101	70-130			
1,2-Dichlorobenzene	20.9	0.060	0.50	ug/L	20.0	ND	105	18-190			
1,3-Dichlorobenzene	22.7	0.080	0.50	ug/L	20.0	ND	113	59-156			
1,4-Dichlorobenzene	20.2	0.050	2.0	ug/L	20.0	ND	101	18-190			
1,1-Dichloroethane	17.4	0.080	0.50	ug/L	20.0	ND	87.0	59-155			
1,2-Dichloroethane	22.3	0.40	0.50	ug/L	20.0	ND	112	49-155			
1,1-Dichloroethene	17.8	0.10	0.50	ug/L	20.0	ND	88.8	2-234			
cis-1,2-Dichloroethene	21.6	0.10	0.50	ug/L	20.0	ND	108	70-130			
trans-1,2-Dichloroethene	18.9	0.10	0.50	ug/L	20.0	ND	94.6	54-156			
1,2-Dichloropropane	20.8	0.40	0.50	ug/L	20.0	ND	104	2-210			
cis-1,3-Dichloropropene	12.0	0.40	0.50	ug/L	20.0	ND	60.2	2-227			
trans-1,3-Dichloropropene	17.3	0.40	0.50	ug/L	20.0	ND	86.5	17-183			
Ethylbenzene	23.6	0.10	0.50	ug/L	20.0	ND	118	37-162			
Methyl ethyl ketone	48.5	0.30	1.0	ug/L	40.0	ND	121	54-159			
Methyl isobutyl ketone	45.3	0.60	1.0	ug/L	40.0	ND	113	70-139			
Methyl tert-butyl ether	21.0	0.50	0.50	ug/L	20.0	ND	105	65-130			
Methylene chloride	11.7	0.20	1.0	ug/L	20.0	ND	58.4	2-221			
Styrene	18.2	0.10	0.50	ug/L	20.0	ND	91.0	70-141			
1,1,2,2-Tetrachloroethane	20.8	0.080	0.50	ug/L	20.0	ND	104	46-157			
Tetrachloroethene	20.3	0.10	0.50	ug/L	20.0	ND	101	64-148			
Toluene	22.9	0.10	0.50	ug/L	20.0	ND	114	47-150			
1,1,1-Trichloroethane	22.0	0.10	0.50	ug/L	20.0	ND	110	52-162			
1,1,2-Trichloroethane	20.3	0.080	0.50	ug/L	20.0	ND	101	52-150			
Trichloroethene	21.0	0.10	0.50	ug/L	20.0	ND	105	70-157			
Vinyl chloride	21.0	0.40	0.50	ug/L	20.0	ND	105	2-251			
o-Xylene	23.4	0.10	0.50	ug/L	20.0	ND	117	70-146			
m,p-Xylene	46.1	0.20	0.50	ug/L	40.0	ND	115	70-152			
Xylenes (total)	69.5	0.50	0.50	ug/L	60.0	ND	116	70-149			
Surrogate: Bromofluorobenzene	*30.7*			*ug/L*	*25.0*		*123*	*70-130*			
Surrogate: Dibromofluoromethane	*27.6*			*ug/L*	*25.0*		*111*	*70-130*			
Surrogate: Toluene-d8	*29.1*			*ug/L*	*25.0*		*116*	*70-130*			

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Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Volatile Organic Compounds by EPA Method 624.1 - Quality Control

Batch AH34024 - VOAs in Water GCMS

Matrix Spike Dup (AH34024-MSD1) **Source: 23H0854-01** Prepared: 08/14/23 Analyzed: 08/16/23

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Acetone	61.4	0.70	5.0	ug/L	80.0	4.19	71.6	39-175	3.04	25	
Acrylonitrile	15.0	0.10	2.0	ug/L	20.0	ND	75.2	40-160	1.20	60	
Benzene	21.8	0.060	0.50	ug/L	20.0	ND	109	37-151	0.183	61	
Bromodichloromethane	21.8	0.080	0.40	ug/L	20.0	0.900	105	35-155	2.98	56	
Bromoform	21.4	0.30	0.50	ug/L	20.0	ND	107	45-169	1.16	42	
Bromomethane	27.2	0.40	0.50	ug/L	20.0	ND	136	2-242	33.6	61	
Carbon tetrachloride	22.6	0.10	0.50	ug/L	20.0	ND	113	70-140	0.533	41	
Chlorobenzene	21.4	0.050	0.50	ug/L	20.0	ND	107	37-160	0.187	53	
Chloroethane	ND	0.10	0.50	ug/L	20.0	ND		14-230		78	QM-05, U
Chloroform	38.3	0.060	0.50	ug/L	20.0	16.6	109	51-138	0.365	54	
Chloromethane	27.8	0.40	0.50	ug/L	20.0	ND	139	2-273	9.65	60	
Dibromochloromethane	20.5	0.10	0.40	ug/L	20.0	ND	103	53-149	0.0973	50	
1,2-Dibromoethane (EDB)	20.0	0.10	0.50	ug/L	20.0	ND	99.9	70-130	1.14	25	
1,2-Dichlorobenzene	21.0	0.060	0.50	ug/L	20.0	ND	105	18-190	0.572	57	
1,3-Dichlorobenzene	22.6	0.080	0.50	ug/L	20.0	ND	113	59-156	0.177	43	
1,4-Dichlorobenzene	20.3	0.050	2.0	ug/L	20.0	ND	101	18-190	0.148	57	
1,1-Dichloroethane	17.3	0.080	0.50	ug/L	20.0	ND	86.5	59-155	0.519	40	
1,2-Dichloroethane	22.1	0.40	0.50	ug/L	20.0	ND	110	49-155	0.946	49	
1,1-Dichloroethene	18.3	0.10	0.50	ug/L	20.0	ND	91.4	2-234	2.77	32	
cis-1,2-Dichloroethene	20.7	0.10	0.50	ug/L	20.0	ND	104	70-130	3.88	25	
trans-1,2-Dichloroethene	19.4	0.10	0.50	ug/L	20.0	ND	97.1	54-156	2.56	45	
1,2-Dichloropropane	20.4	0.40	0.50	ug/L	20.0	ND	102	2-210	1.79	55	
cis-1,3-Dichloropropene	12.0	0.40	0.50	ug/L	20.0	ND	60.0	2-227	0.250	58	
trans-1,3-Dichloropropene	17.2	0.40	0.50	ug/L	20.0	ND	86.0	17-183	0.638	86	
Ethylbenzene	23.3	0.10	0.50	ug/L	20.0	ND	117	37-162	1.19	63	
Methyl ethyl ketone	48.5	0.30	1.0	ug/L	40.0	ND	121	54-159	0.103	61	
Methyl isobutyl ketone	46.0	0.60	1.0	ug/L	40.0	ND	115	70-139	1.62	25	
Methyl tert-butyl ether	20.8	0.50	0.50	ug/L	20.0	ND	104	65-130	1.15	25	
Methylene chloride	12.0	0.20	1.0	ug/L	20.0	ND	60.1	2-221	2.78	28	
Styrene	17.4	0.10	0.50	ug/L	20.0	ND	87.2	70-141	4.15	25	
1,1,2,2-Tetrachloroethane	20.8	0.080	0.50	ug/L	20.0	ND	104	46-157	0.192	61	
Tetrachloroethene	20.3	0.10	0.50	ug/L	20.0	ND	102	64-148	0.197	39	
Toluene	22.8	0.10	0.50	ug/L	20.0	ND	114	47-150	0.482	41	
1,1,1-Trichloroethane	22.2	0.10	0.50	ug/L	20.0	ND	111	52-162	0.813	36	
1,1,2-Trichloroethane	20.2	0.080	0.50	ug/L	20.0	ND	101	52-150	0.395	45	
Trichloroethene	20.5	0.10	0.50	ug/L	20.0	ND	103	70-157	2.22	48	

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Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Volatile Organic Compounds by EPA Method 624.1 - Quality Control

Batch AH34024 - VOAs in Water GCMS

Matrix Spike Dup (AH34024-MSD1) **Source: 23H0854-01** Prepared: 08/14/23 Analyzed: 08/16/23

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Vinyl chloride	20.1	0.40	0.50	ug/L	20.0	ND	101	2-251	4.32	66	
o-Xylene	23.0	0.10	0.50	ug/L	20.0	ND	115	70-146	1.51	25	
m,p-Xylene	45.7	0.20	0.50	ug/L	40.0	ND	114	70-152	0.959	25	
Xylenes (total)	68.7	0.50	0.50	ug/L	60.0	ND	115	70-149	1.14	25	
Surrogate: Bromofluorobenzene	*30.5*			*ug/L*	*25.0*		*122*	*70-130*			
Surrogate: Dibromofluoromethane	*28.0*			*ug/L*	*25.0*		*112*	*70-130*			
Surrogate: Toluene-d8	*29.2*			*ug/L*	*25.0*		*117*	*70-130*			

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416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Semivolatile Organic Compounds by EPA Method 625.1 - Quality Control

Batch AH33949 - SVOAs in Water GCMS

Blank (AH33949-BLK1) Prepared: 08/14/23 Analyzed: 08/17/23

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Acenaphthene	ND	1.0	1.0	ug/L							U
Acenaphthylene	ND	1.0	10	ug/L							U
Anthracene	ND	0.40	10	ug/L							U
Benzo (a) anthracene	ND	0.30	10	ug/L							U
Benzo (a) pyrene	ND	0.50	10	ug/L							U
Benzo (b) fluoranthene	ND	0.60	2.0	ug/L							U
Benzo (g,h,i) perylene	ND	0.90	5.0	ug/L							U
Benzo (k) fluoranthene	ND	0.50	10	ug/L							U
Bis(2-chloroethoxy)methane	ND	0.90	5.0	ug/L							U
Bis(2-chloroethyl)ether	ND	0.90	1.0	ug/L							U
Bis(2-chloroisopropyl)ether	ND	1.0	2.0	ug/L							U
Bis(2-ethylhexyl)phthalate	ND	5.0	5.0	ug/L							U
4-Bromophenyl phenyl ether	ND	1.0	5.0	ug/L							U
Butyl benzyl phthalate	ND	3.0	10	ug/L							U
4-Chloro-3-methylphenol	ND	1.0	1.0	ug/L							U
2-Chloronaphthalene	ND	1.0	10	ug/L							U
2-Chlorophenol	ND	0.70	5.0	ug/L							U
4-Chlorophenyl phenyl ether	ND	0.90	5.0	ug/L							U
Chrysene	ND	0.80	10	ug/L							U
Dibenz (a,h) anthracene	ND	0.80	10	ug/L							U
2,4-Dichlorophenol	ND	0.70	5.0	ug/L							U
Diethyl phthalate	ND	1.0	2.0	ug/L							U
Dimethyl phthalate	ND	2.0	2.0	ug/L							U
2,4-Dimethylphenol	ND	1.0	2.0	ug/L							U
Di-n-butyl phthalate	7.23	6.0	10	ug/L							J
Di-n-octyl phthalate	ND	0.50	10	ug/L							U
4,6-Dinitro-2-methylphenol	ND	3.0	5.0	ug/L							U
2,4-Dinitrophenol	ND	5.0	5.0	ug/L							U
2,4-Dinitrotoluene	ND	0.80	5.0	ug/L							U
2,6-Dinitrotoluene	ND	0.80	5.0	ug/L							U
1,2-Diphenylhydrazine	ND	0.60	1.0	ug/L							U
Fluoranthene	ND	0.20	1.0	ug/L							U
Fluorene	ND	0.80	10	ug/L							U
Hexachlorobenzene	ND	0.90	1.0	ug/L							U
Hexachlorobutadiene	ND	0.80	1.0	ug/L							U
Hexachlorocyclopentadiene	ND	2.0	5.0	ug/L							U

Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Semivolatile Organic Compounds by EPA Method 625.1 - Quality Control

Batch AH33949 - SVOAs in Water GCMS

Blank (AH33949-BLK1) Prepared: 08/14/23 Analyzed: 08/17/23

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Hexachloroethane	ND	0.60	1.0	ug/L							U
Indeno (1,2,3-cd) pyrene	ND	0.60	10	ug/L							U
Isophorone	ND	0.90	1.0	ug/L							U
2-Methylphenol (o-cresol)	ND	0.60	2.0	ug/L							U
3 & 4-Methylphenol (m & p-cresol)	ND	0.60	2.0	ug/L							U
Naphthalene	ND	0.70	1.0	ug/L							U
Nitrobenzene	ND	0.90	1.0	ug/L							U
2-Nitrophenol	ND	3.0	10	ug/L							U
4-Nitrophenol	ND	3.0	10	ug/L							U
N-Nitrosodi-n-propylamine	ND	0.80	5.0	ug/L							U
N-Nitrosodimethylamine	ND	0.70	5.0	ug/L							U
N-Nitrosodiphenylamine	ND	1.0	1.0	ug/L							U
Pentachlorophenol	ND	4.0	5.0	ug/L							U
Phenol	ND	0.50	1.0	ug/L							U
Phenanthrene	ND	0.90	10	ug/L							U
Pyrene	ND	0.30	10	ug/L							U
1,2,4-Trichlorobenzene	ND	0.60	5.0	ug/L							U
2,4,5-Trichlorophenol	ND	2.0	2.0	ug/L							U
2,4,6-Trichlorophenol	ND	2.0	5.0	ug/L							U
Chlorinated Phenolics	ND	10	18	ug/L							U
Non-chlorinated Phenolics	ND	17	37	ug/L							U
PAHs	ND	8.0	120	ug/L							U
Surrogate: 2-Fluorobiphenyl	*35.4*			*ug/L*	*40.0*		*88.4*	*27-119*			
Surrogate: 2-Fluorophenol	*20.1*			*ug/L*	*40.0*		*50.2*	*7-85*			
Surrogate: Nitrobenzene-d5	*32.8*			*ug/L*	*40.0*		*82.0*	*15-314*			
Surrogate: p-Terphenyl-d14	*39.0*			*ug/L*	*40.0*		*97.6*	*36-141*			
Surrogate: Phenol-d6	*12.3*			*ug/L*	*40.0*		*30.8*	*1-65*			
Surrogate: 2,4,6-Tribromophenol	*33.2*			*ug/L*	*40.0*		*83.1*	*4-168*			

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Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Semivolatile Organic Compounds by EPA Method 625.1 - Quality Control

Batch AH33949 - SVOAs in Water GCMS

LCS (AH33949-BS1) Prepared: 08/14/23 Analyzed: 08/17/23

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Acenaphthene	33.4	1.0	1.0	ug/L	40.0		83.5	60-132			
Acenaphthylene	36.0	1.0	10	ug/L	40.0		90.1	54-126			
Anthracene	37.1	0.40	10	ug/L	40.0		92.6	43-120			
Benzo (a) anthracene	38.5	0.30	10	ug/L	40.0		96.2	42-133			
Benzo (a) pyrene	38.4	0.50	10	ug/L	40.0		96.0	32-148			
Benzo (b) fluoranthene	38.6	0.60	2.0	ug/L	40.0		96.6	42-140			
Benzo (g,h,i) perylene	38.4	0.90	5.0	ug/L	40.0		95.9	2-195			
Benzo (k) fluoranthene	38.0	0.50	10	ug/L	40.0		95.0	25-146			
Bis(2-chloroethoxy)methane	34.3	0.90	5.0	ug/L	40.0		85.6	49-165			
Bis(2-chloroethyl)ether	31.1	0.90	1.0	ug/L	40.0		77.7	43-126			
Bis(2-chloroisopropyl)ether	30.7	1.0	2.0	ug/L	40.0		76.6	63-139			
Bis(2-ethylhexyl)phthalate	42.2	5.0	5.0	ug/L	40.0		106	29-137			
4-Bromophenyl phenyl ether	38.6	1.0	5.0	ug/L	40.0		96.5	65-120			
Butyl benzyl phthalate	13.2	3.0	10	ug/L	40.0		32.9	2-140			
4-Chloro-3-methylphenol	37.7	1.0	1.0	ug/L	40.0		94.2	41-128			
2-Chloronaphthalene	32.6	1.0	10	ug/L	40.0		81.4	65-120			
2-Chlorophenol	31.9	0.70	5.0	ug/L	40.0		79.6	36-120			
4-Chlorophenyl phenyl ether	36.3	0.90	5.0	ug/L	40.0		90.6	38-145			
Chrysene	38.2	0.80	10	ug/L	40.0		95.6	44-140			
Dibenz (a,h) anthracene	39.0	0.80	10	ug/L	40.0		97.4	2-200			
2,4-Dichlorophenol	36.9	0.70	5.0	ug/L	40.0		92.3	53-122			
Diethyl phthalate	20.3	1.0	2.0	ug/L	40.0		50.8	2-120			
Dimethyl phthalate	5.02	2.0	2.0	ug/L	40.0		12.6	2-120			
2,4-Dimethylphenol	21.2	1.0	2.0	ug/L	50.0		42.4	42-120			
Di-n-butyl phthalate	34.4	6.0	10	ug/L	40.0		86.0	8-120			
Di-n-octyl phthalate	44.3	0.50	10	ug/L	40.0		111	19-132			
4,6-Dinitro-2-methylphenol	35.9	3.0	5.0	ug/L	40.0		89.8	53-130			
2,4-Dinitrophenol	28.4	5.0	5.0	ug/L	40.0		70.9	10-173			
2,4-Dinitrotoluene	39.9	0.80	5.0	ug/L	40.0		99.8	48-127			
2,6-Dinitrotoluene	38.7	0.80	5.0	ug/L	40.0		96.8	68-137			
1,2-Diphenylhydrazine	33.4	0.60	1.0	ug/L	40.0		83.5	52-115			
Fluoranthene	40.3	0.20	1.0	ug/L	40.0		101	43-121			
Fluorene	36.6	0.80	10	ug/L	40.0		91.6	70-120			
Hexachlorobenzene	38.6	0.90	1.0	ug/L	40.0		96.5	8-142			
Hexachlorobutadiene	31.3	0.80	1.0	ug/L	40.0		78.2	38-120			
Hexachlorocyclopentadiene	18.8	2.0	5.0	ug/L	40.0		47.1	16-93			

Fort Bragg, City of	Project Manager:	Frank Kemper	
416 N. Franklin St.	Project:	Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number:	[none]	09/18/23 16:53

Semivolatile Organic Compounds by EPA Method 625.1 - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AH33949 - SVOAs in Water GCMS											
LCS (AH33949-BS1)					Prepared: 08/14/23 Analyzed: 08/17/23						
Hexachloroethane	28.3	0.60	1.0	ug/L	40.0		70.8	55-120			
Indeno (1,2,3-cd) pyrene	50.5	0.60	10	ug/L	40.0		126	2-151			
Isophorone	35.9	0.90	1.0	ug/L	40.0		89.8	47-180			
2-Methylphenol (o-cresol)	25.3	0.60	2.0	ug/L	40.0		63.2	36-102			
3 & 4-Methylphenol (m & p-cresol)	25.2	0.60	2.0	ug/L	40.0		62.9	38-93			
Naphthalene	32.1	0.70	1.0	ug/L	40.0		80.3	36-120			
Nitrobenzene	32.5	0.90	1.0	ug/L	40.0		81.2	54-158			
2-Nitrophenol	37.3	3.0	10	ug/L	40.0		93.2	45-167			
4-Nitrophenol	16.9	3.0	10	ug/L	40.0		42.3	13-129			
N-Nitrosodi-n-propylamine	33.5	0.80	5.0	ug/L	40.0		83.8	14-198			
N-Nitrosodimethylamine	20.4	0.70	5.0	ug/L	40.0		50.9	19-81			
N-Nitrosodiphenylamine	33.6	1.0	1.0	ug/L	40.0		84.0	54-111			
Pentachlorophenol	38.8	4.0	5.0	ug/L	40.0		96.9	38-152			
Phenol	14.0	0.50	1.0	ug/L	40.0		35.0	17-120			
Phenanthrene	37.2	0.90	10	ug/L	40.0		93.0	65-120			
Pyrene	39.7	0.30	10	ug/L	40.0		99.2	70-120			
1,2,4-Trichlorobenzene	31.2	0.60	5.0	ug/L	40.0		77.9	57-130			
2,4,5-Trichlorophenol	39.6	2.0	2.0	ug/L	40.0		98.9	44-141			
2,4,6-Trichlorophenol	36.5	2.0	5.0	ug/L	40.0		91.2	52-129			
Surrogate: 2-Fluorobiphenyl	*35.1*			*ug/L*	*40.0*		*87.7*	*27-119*			
Surrogate: 2-Fluorophenol	*21.6*			*ug/L*	*40.0*		*53.9*	*7-85*			
Surrogate: Nitrobenzene-d5	*34.9*			*ug/L*	*40.0*		*87.2*	*15-314*			
Surrogate: p-Terphenyl-d14	*41.5*			*ug/L*	*40.0*		*104*	*36-141*			
Surrogate: Phenol-d6	*14.2*			*ug/L*	*40.0*		*35.6*	*1-65*			
Surrogate: 2,4,6-Tribromophenol	*38.8*			*ug/L*	*40.0*		*97.0*	*4-168*			
Matrix Spike (AH33949-MS1)		**Source: 23H1825-01**			Prepared: 08/14/23 Analyzed: 08/18/23						
Acenaphthene	34.7	1.0	1.0	ug/L	40.0	ND	86.8	47-145			
Acenaphthylene	37.6	1.0	10	ug/L	40.0	ND	93.9	33-145			
Anthracene	36.8	0.40	10	ug/L	40.0	ND	92.0	27-133			
Benzo (a) anthracene	32.3	0.30	10	ug/L	40.0	ND	80.8	33-143			
Benzo (a) pyrene	29.6	0.50	10	ug/L	40.0	ND	74.1	17-163			
Benzo (b) fluoranthene	30.2	0.60	2.0	ug/L	40.0	ND	75.6	24-159			
Benzo (g,h,i) perylene	29.2	0.90	5.0	ug/L	40.0	ND	73.1	2-219			
Benzo (k) fluoranthene	29.4	0.50	10	ug/L	40.0	ND	73.5	11-162			
Bis(2-chloroethoxy)methane	32.3	0.90	5.0	ug/L	40.0	ND	80.7	33-184			
Bis(2-chloroethyl)ether	30.4	0.90	1.0	ug/L	40.0	ND	75.9	12-158			

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Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Semivolatile Organic Compounds by EPA Method 625.1 - Quality Control

Batch AH33949 - SVOAs in Water GCMS

Matrix Spike (AH33949-MS1) **Source: 23H1825-01** Prepared: 08/14/23 Analyzed: 08/18/23

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Bis(2-chloroisopropyl)ether	28.3	1.0	2.0	ug/L	40.0	ND	70.8	36-166			
Bis(2-ethylhexyl)phthalate	31.6	5.0	5.0	ug/L	40.0	ND	79.1	8-158			
4-Bromophenyl phenyl ether	38.0	1.0	5.0	ug/L	40.0	ND	94.9	53-127			
Butyl benzyl phthalate	8.44	3.0	10	ug/L	40.0	ND	21.1	2-152			J
4-Chloro-3-methylphenol	36.6	1.0	1.0	ug/L	40.0	ND	91.5	22-147			
2-Chloronaphthalene	33.6	1.0	10	ug/L	40.0	ND	83.9	60-120			
2-Chlorophenol	30.1	0.70	5.0	ug/L	40.0	ND	75.3	23-134			
4-Chlorophenyl phenyl ether	38.2	0.90	5.0	ug/L	40.0	ND	95.5	25-158			
Chrysene	32.4	0.80	10	ug/L	40.0	ND	80.9	17-168			
Dibenz (a,h) anthracene	30.5	0.80	10	ug/L	40.0	ND	76.2	2-227			
2,4-Dichlorophenol	33.1	0.70	5.0	ug/L	40.0	ND	82.7	39-135			
Diethyl phthalate	12.6	1.0	2.0	ug/L	40.0	ND	31.5	2-120			
Dimethyl phthalate	2.02	2.0	2.0	ug/L	40.0	ND	5.05	2-120			
2,4-Dimethylphenol	7.26	1.0	2.0	ug/L	50.0	ND	14.5	32-120			QM-05
Di-n-butyl phthalate	30.0	6.0	10	ug/L	40.0	6.64	58.4	1-120			
Di-n-octyl phthalate	31.2	0.50	10	ug/L	40.0	ND	77.9	4-146			
4,6-Dinitro-2-methylphenol	20.8	3.0	5.0	ug/L	40.0	ND	51.9	7-181			
2,4-Dinitrophenol	16.8	5.0	5.0	ug/L	40.0	ND	42.1	10-191			
2,4-Dinitrotoluene	41.5	0.80	5.0	ug/L	40.0	ND	104	39-139			
2,6-Dinitrotoluene	40.1	0.80	5.0	ug/L	40.0	ND	100	50-158			
1,2-Diphenylhydrazine	35.4	0.60	1.0	ug/L	40.0	ND	88.4	39-116			
Fluoranthene	37.6	0.20	1.0	ug/L	40.0	ND	94.1	26-137			
Fluorene	38.2	0.80	10	ug/L	40.0	ND	95.6	59-121			
Hexachlorobenzene	35.1	0.90	1.0	ug/L	40.0	ND	87.8	2-152			
Hexachlorobutadiene	30.6	0.80	1.0	ug/L	40.0	ND	76.5	24-120			
Hexachlorocyclopentadiene	16.6	2.0	5.0	ug/L	40.0	ND	41.4	10-93			
Hexachloroethane	27.6	0.60	1.0	ug/L	40.0	ND	68.9	40-120			
Indeno (1,2,3-cd) pyrene	31.2	0.60	10	ug/L	40.0	ND	78.0	2-171			
Isophorone	34.0	0.90	1.0	ug/L	40.0	ND	85.0	21-196			
2-Methylphenol (o-cresol)	24.9	0.60	2.0	ug/L	40.0	ND	62.3	9-124			
3 & 4-Methylphenol (m & p-cresol)	26.3	0.60	2.0	ug/L	40.0	ND	65.8	12-99			
Naphthalene	31.2	0.70	1.0	ug/L	40.0	ND	77.9	21-133			
Nitrobenzene	31.1	0.90	1.0	ug/L	40.0	ND	77.8	35-180			
2-Nitrophenol	33.2	3.0	10	ug/L	40.0	ND	83.1	29-182			
4-Nitrophenol	15.7	3.0	10	ug/L	40.0	ND	39.2	7-132			
N-Nitrosodi-n-propylamine	32.5	0.80	5.0	ug/L	40.0	ND	81.4	2-230			

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Fort Bragg, City of	Project Manager:	Frank Kemper	
416 N. Franklin St.	Project:	Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number:	[none]	09/18/23 16:53

Semivolatile Organic Compounds by EPA Method 625.1 - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AH33949 - SVOAs in Water GCMS											
Matrix Spike (AH33949-MS1)		**Source: 23H1825-01**			Prepared: 08/14/23	Analyzed: 08/18/23					
N-Nitrosodimethylamine	24.5	0.70	5.0	ug/L	40.0	ND	61.2	10-84			
N-Nitrosodiphenylamine	36.2	1.0	1.0	ug/L	40.0	ND	90.6	40-115			
Pentachlorophenol	14.2	4.0	5.0	ug/L	40.0	ND	35.4	14-176			
Phenol	20.4	0.50	1.0	ug/L	40.0	ND	51.0	5-120			
Pyrene	36.2	0.30	10	ug/L	40.0	ND	90.5	52-120			
Phenanthrene	38.1	0.90	10	ug/L	40.0	ND	95.2	54-120			
1,2,4-Trichlorobenzene	30.3	0.60	5.0	ug/L	40.0	ND	75.8	44-142			
2,4,5-Trichlorophenol	32.9	2.0	2.0	ug/L	40.0	ND	82.2	65-125			
2,4,6-Trichlorophenol	26.1	2.0	5.0	ug/L	40.0	ND	65.2	37-144			
Surrogate: 2-Fluorobiphenyl	*35.8*			*ug/L*	*40.0*		*89.6*	*27-119*			
Surrogate: 2-Fluorophenol	*24.2*			*ug/L*	*40.0*		*60.5*	*7-85*			
Surrogate: Nitrobenzene-d5	*33.1*			*ug/L*	*40.0*		*82.8*	*15-314*			
Surrogate: p-Terphenyl-d14	*32.1*			*ug/L*	*40.0*		*80.2*	*36-141*			
Surrogate: Phenol-d6	*19.5*			*ug/L*	*40.0*		*48.8*	*1-65*			
Surrogate: 2,4,6-Tribromophenol	*29.4*			*ug/L*	*40.0*		*73.4*	*4-168*			
Matrix Spike Dup (AH33949-MSD1)		**Source: 23H1825-01**			Prepared: 08/14/23	Analyzed: 08/18/23					
Acenaphthene	34.3	1.0	1.0	ug/L	40.0	ND	85.6	47-145	1.28	48	
Acenaphthylene	36.7	1.0	10	ug/L	40.0	ND	91.8	33-145	2.23	74	
Anthracene	36.0	0.40	10	ug/L	40.0	ND	89.9	27-133	2.34	66	
Benzo (a) anthracene	32.9	0.30	10	ug/L	40.0	ND	82.2	33-143	1.75	53	
Benzo (a) pyrene	30.1	0.50	10	ug/L	40.0	ND	75.4	17-163	1.64	72	
Benzo (b) fluoranthene	30.8	0.60	2.0	ug/L	40.0	ND	77.1	24-159	2.00	71	
Benzo (g,h,i) perylene	29.2	0.90	5.0	ug/L	40.0	ND	73.0	2-219	0.137	97	
Benzo (k) fluoranthene	30.8	0.50	10	ug/L	40.0	ND	77.0	11-162	4.62	63	
Bis(2-chloroethoxy)methane	31.6	0.90	5.0	ug/L	40.0	ND	79.1	33-184	2.03	54	
Bis(2-chloroethyl)ether	29.7	0.90	1.0	ug/L	40.0	ND	74.2	12-158	2.27	108	
Bis(2-chloroisopropyl)ether	27.3	1.0	2.0	ug/L	40.0	ND	68.2	36-166	3.74	76	
Bis(2-ethylhexyl)phthalate	30.8	5.0	5.0	ug/L	40.0	ND	77.0	8-158	2.72	82	
4-Bromophenyl phenyl ether	37.7	1.0	5.0	ug/L	40.0	ND	94.3	53-127	0.634	43	
Butyl benzyl phthalate	6.76	3.0	10	ug/L	40.0	ND	16.9	2-152	22.1	60	J
4-Chloro-3-methylphenol	36.2	1.0	1.0	ug/L	40.0	ND	90.5	22-147	1.13	73	
2-Chloronaphthalene	32.7	1.0	10	ug/L	40.0	ND	81.8	60-120	2.47	24	
2-Chlorophenol	29.4	0.70	5.0	ug/L	40.0	ND	73.4	23-134	2.56	61	
4-Chlorophenyl phenyl ether	37.8	0.90	5.0	ug/L	40.0	ND	94.6	25-158	1.00	61	
Chrysene	33.2	0.80	10	ug/L	40.0	ND	82.9	17-168	2.41	87	
Dibenz (a,h) anthracene	29.9	0.80	10	ug/L	40.0	ND	74.8	2-227	1.79	126	

Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Semivolatile Organic Compounds by EPA Method 625.1 - Quality Control

Batch AH33949 - SVOAs in Water GCMS

Matrix Spike Dup (AH33949-MSD1) **Source: 23H1825-01** Prepared: 08/14/23 Analyzed: 08/18/23

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
2,4-Dichlorophenol	32.3	0.70	5.0	ug/L	40.0	ND	80.7	39-135	2.45	50	
Diethyl phthalate	10.1	1.0	2.0	ug/L	40.0	ND	25.2	2-120	22.1	100	
Dimethyl phthalate	ND	2.0	2.0	ug/L	40.0	ND		2-120	200	183	QM-05, U
2,4-Dimethylphenol	7.39	1.0	2.0	ug/L	50.0	ND	14.8	32-120	1.77	58	QM-05
Di-n-butyl phthalate	25.6	6.0	10	ug/L	40.0	6.64	47.3	1-120	15.9	47	
Di-n-octyl phthalate	31.0	0.50	10	ug/L	40.0	ND	77.6	4-146	0.450	69	
4,6-Dinitro-2-methylphenol	27.7	3.0	5.0	ug/L	40.0	ND	69.2	7-181	28.6	203	
2,4-Dinitrophenol	24.4	5.0	5.0	ug/L	40.0	ND	61.1	10-191	36.8	132	
2,4-Dinitrotoluene	41.2	0.80	5.0	ug/L	40.0	ND	103	39-139	0.870	42	
2,6-Dinitrotoluene	39.4	0.80	5.0	ug/L	40.0	ND	98.6	50-158	1.58	48	
1,2-Diphenylhydrazine	33.8	0.60	1.0	ug/L	40.0	ND	84.6	39-116	4.45	25	
Fluoranthene	37.5	0.20	1.0	ug/L	40.0	ND	93.7	26-137	0.453	66	
Fluorene	37.2	0.80	10	ug/L	40.0	ND	93.1	59-121	2.65	38	
Hexachlorobenzene	36.1	0.90	1.0	ug/L	40.0	ND	90.3	2-152	2.89	55	
Hexachlorobutadiene	29.6	0.80	1.0	ug/L	40.0	ND	73.9	24-120	3.46	62	
Hexachlorocyclopentadiene	14.8	2.0	5.0	ug/L	40.0	ND	37.0	10-93	11.1	55	
Hexachloroethane	26.5	0.60	1.0	ug/L	40.0	ND	66.2	40-120	4.03	52	
Indeno (1,2,3-cd) pyrene	31.1	0.60	10	ug/L	40.0	ND	77.6	2-171	0.514	99	
Isophorone	33.4	0.90	1.0	ug/L	40.0	ND	83.6	21-196	1.72	93	
2-Methylphenol (o-cresol)	28.1	0.60	2.0	ug/L	40.0	ND	70.3	9-124	12.0	28	
3 & 4-Methylphenol (m & p-cresol)	28.7	0.60	2.0	ug/L	40.0	ND	71.7	12-99	8.58	25	
Naphthalene	30.8	0.70	1.0	ug/L	40.0	ND	77.0	21-133	1.10	65	
Nitrobenzene	29.4	0.90	1.0	ug/L	40.0	ND	73.4	35-180	5.79	62	
2-Nitrophenol	31.9	3.0	10	ug/L	40.0	ND	79.8	29-182	4.05	55	
4-Nitrophenol	19.7	3.0	10	ug/L	40.0	ND	49.2	7-132	22.6	131	
N-Nitrosodi-n-propylamine	33.2	0.80	5.0	ug/L	40.0	ND	83.0	2-230	2.04	87	
N-Nitrosodimethylamine	22.6	0.70	5.0	ug/L	40.0	ND	56.5	10-84	7.99	59	
N-Nitrosodiphenylamine	35.4	1.0	1.0	ug/L	40.0	ND	88.4	40-115	2.40	25	
Pentachlorophenol	19.3	4.0	5.0	ug/L	40.0	ND	48.2	14-176	30.6	86	
Phenol	19.6	0.50	1.0	ug/L	40.0	ND	49.0	5-120	3.95	64	
Phenanthrene	37.3	0.90	10	ug/L	40.0	ND	93.3	54-120	1.96	39	
Pyrene	37.2	0.30	10	ug/L	40.0	ND	93.0	52-120	2.64	49	
1,2,4-Trichlorobenzene	29.1	0.60	5.0	ug/L	40.0	ND	72.7	44-142	4.18	50	
2,4,5-Trichlorophenol	33.2	2.0	2.0	ug/L	40.0	ND	82.9	65-125	0.909	25	
2,4,6-Trichlorophenol	28.5	2.0	5.0	ug/L	40.0	ND	71.2	37-144	8.73	58	
Surrogate: 2-Fluorobiphenyl	*35.3*			*ug/L*	*40.0*		*88.2*	*27-119*			

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Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Semivolatile Organic Compounds by EPA Method 625.1 - Quality Control

Batch AH33949 - SVOAs in Water GCMS

Matrix Spike Dup (AH33949-MSD1) **Source: 23H1825-01** Prepared: 08/14/23 Analyzed: 08/18/23

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Surrogate: 2-Fluorophenol	*24.1*			*ug/L*	*40.0*		*60.3*	*7-85*			
Surrogate: Nitrobenzene-d5	*31.8*			*ug/L*	*40.0*		*79.6*	*15-314*			
Surrogate: p-Terphenyl-d14	*34.5*			*ug/L*	*40.0*		*86.2*	*36-141*			
Surrogate: Phenol-d6	*20.3*			*ug/L*	*40.0*		*50.8*	*1-65*			
Surrogate: 2,4,6-Tribromophenol	*32.4*			*ug/L*	*40.0*		*81.1*	*4-168*			

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Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Benzidines by EPA Method 625.1 - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AH33948 - SVOAs in Water GCMS											
Blank (AH33948-BLK1)					Prepared: 08/14/23 Analyzed: 08/23/23						
Benzidine	ND	3.00	5.00	ug/L							U
3,3´-Dichlorobenzidine	ND	2.00	5.00	ug/L							U
Surrogate: 2-Fluorobiphenyl	*29.8*			*ug/L*	*40.0*		*74.4*	*27-119*			
Surrogate: Nitrobenzene-d5	*28.6*			*ug/L*	*40.0*		*71.6*	*15-314*			
Surrogate: p-Terphenyl-d14	*28.5*			*ug/L*	*40.0*		*71.3*	*36-141*			
LCS (AH33948-BS1)					Prepared: 08/14/23 Analyzed: 08/23/23						
Benzidine	90.1	3.00	5.00	ug/L	80.0		113	12-151			
3,3´-Dichlorobenzidine	86.9	2.00	5.00	ug/L	80.0		109	8-120			
Surrogate: 2-Fluorobiphenyl	*29.0*			*ug/L*	*40.0*		*72.6*	*27-119*			
Surrogate: Nitrobenzene-d5	*27.8*			*ug/L*	*40.0*		*69.6*	*15-314*			
Surrogate: p-Terphenyl-d14	*23.8*			*ug/L*	*40.0*		*59.4*	*36-141*			
Matrix Spike (AH33948-MS1)		**Source: 23H1507-01**			Prepared: 08/14/23 Analyzed: 08/23/23						
Benzidine	21.2	3.00	5.00	ug/L	80.0	ND	26.4	4-262			
3,3´-Dichlorobenzidine	64.8	2.00	5.00	ug/L	80.0	ND	81.0	4-262			
Surrogate: 2-Fluorobiphenyl	*31.9*			*ug/L*	*40.0*		*79.8*	*27-119*			
Surrogate: Nitrobenzene-d5	*33.4*			*ug/L*	*40.0*		*83.5*	*15-314*			
Surrogate: p-Terphenyl-d14	*32.1*			*ug/L*	*40.0*		*80.4*	*36-141*			
Matrix Spike Dup (AH33948-MSD1)		**Source: 23H1507-01**			Prepared: 08/14/23 Analyzed: 08/23/23						
Benzidine	18.2	3.00	5.00	ug/L	80.0	ND	22.7	4-262	15.3	108	
3,3´-Dichlorobenzidine	74.1	2.00	5.00	ug/L	80.0	ND	92.6	4-262	13.4	108	
Surrogate: 2-Fluorobiphenyl	*32.9*			*ug/L*	*40.0*		*82.3*	*27-119*			
Surrogate: Nitrobenzene-d5	*33.3*			*ug/L*	*40.0*		*83.3*	*15-314*			
Surrogate: p-Terphenyl-d14	*30.3*			*ug/L*	*40.0*		*75.8*	*36-141*			

Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Semivolatile Organic Compounds by EPA Method 625.1 SIM - Quality Control

Batch AH34474 - SVOAs in Water GCMS

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (AH34474-BLK1)					Prepared: 08/14/23 Analyzed: 08/23/23						
Acenaphthene	ND	0.20	0.20	ug/L							U
Acenaphthylene	ND	0.20	0.20	ug/L							U
Anthracene	ND	0.090	0.20	ug/L							U
Benzo (a) anthracene	ND	0.20	0.20	ug/L							U
Benzo (a) pyrene	ND	0.20	0.20	ug/L							U
Benzo (b) fluoranthene	ND	0.20	0.20	ug/L							U
Benzo (g,h,i) perylene	ND	0.10	0.20	ug/L							U
Benzo (k) fluoranthene	ND	0.20	0.20	ug/L							U
Chrysene	ND	0.20	0.20	ug/L							U
Dibenz (a,h) anthracene	ND	0.10	0.20	ug/L							U
Fluoranthene	ND	0.070	0.20	ug/L							U
Fluorene	ND	0.20	0.20	ug/L							U
Indeno (1,2,3-cd) pyrene	ND	0.030	0.20	ug/L							U
Naphthalene	ND	0.090	0.20	ug/L							U
Phenanthrene	ND	0.10	0.20	ug/L							U
Pyrene	ND	0.20	0.20	ug/L							U
Surrogate: 2-Fluorobiphenyl	*29.1*			*ug/L*	*40.0*		*72.8*	*24-119*			
Surrogate: Nitrobenzene-d5	*20.2*			*ug/L*	*40.0*		*50.6*	*15-314*			
Surrogate: p-Terphenyl-d14	*30.8*			*ug/L*	*40.0*		*77.0*	*37-139*			
LCS (AH34474-BS1)					Prepared: 08/14/23 Analyzed: 08/22/23						
Acenaphthene	26.2	0.20	0.20	ug/L	40.0		65.4	60-132			
Acenaphthylene	41.5	0.20	0.20	ug/L	40.0		104	54-126			
Anthracene	22.8	0.090	0.20	ug/L	40.0		56.9	43-120			
Benzo (a) anthracene	39.8	0.20	0.20	ug/L	40.0		99.5	42-133			
Benzo (a) pyrene	33.2	0.20	0.20	ug/L	40.0		83.1	32-148			
Benzo (b) fluoranthene	49.8	0.20	0.20	ug/L	40.0		124	42-140			
Benzo (g,h,i) perylene	45.7	0.10	0.20	ug/L	40.0		114	2-195			
Benzo (k) fluoranthene	24.9	0.20	0.20	ug/L	40.0		62.2	25-146			
Chrysene	33.2	0.20	0.20	ug/L	40.0		83.0	44-140			
Dibenz (a,h) anthracene	44.4	0.10	0.20	ug/L	40.0		111	2-200			
Fluoranthene	37.4	0.070	0.20	ug/L	40.0		93.5	43-121			
Fluorene	32.2	0.20	0.20	ug/L	40.0		80.4	70-120			
Indeno (1,2,3-cd) pyrene	45.9	0.030	0.20	ug/L	40.0		115	2-151			
Naphthalene	27.5	0.090	0.20	ug/L	40.0		68.7	36-120			
Phenanthrene	34.1	0.10	0.20	ug/L	40.0		85.2	65-120			

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Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Semivolatile Organic Compounds by EPA Method 625.1 SIM - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch AH34474 - SVOAs in Water GCMS											
LCS (AH34474-BS1)					Prepared: 08/14/23 Analyzed: 08/22/23						
Pyrene	31.4	0.20	0.20	ug/L	40.0		78.5	70-120			
Surrogate: 2-Fluorobiphenyl	*33.2*			*ug/L*	*40.0*		*83.1*	*24-119*			
Surrogate: Nitrobenzene-d5	*30.6*			*ug/L*	*40.0*		*76.6*	*15-314*			
Surrogate: p-Terphenyl-d14	*41.9*			*ug/L*	*40.0*		*105*	*37-139*			
Matrix Spike (AH34474-MS1)		**Source: 23H1825-01**			Prepared: 08/14/23 Analyzed: 08/23/23						
Acenaphthene	22.7	0.20	0.20	ug/L	40.0	ND	56.8	47-145			
Acenaphthylene	66.1	0.20	0.20	ug/L	40.0	ND	165	33-145			QM-05
Anthracene	19.0	0.090	0.20	ug/L	40.0	ND	47.4	27-133			
Benzo (a) anthracene	31.2	0.20	0.20	ug/L	40.0	ND	77.9	33-143			
Benzo (a) pyrene	24.4	0.20	0.20	ug/L	40.0	ND	61.0	17-163			
Benzo (b) fluoranthene	35.1	0.20	0.20	ug/L	40.0	ND	87.7	24-159			
Benzo (g,h,i) perylene	32.5	0.10	0.20	ug/L	40.0	ND	81.3	2-219			
Benzo (k) fluoranthene	17.9	0.20	0.20	ug/L	40.0	ND	44.6	11-162			
Chrysene	27.6	0.20	0.20	ug/L	40.0	ND	69.0	17-168			
Dibenz (a,h) anthracene	32.2	0.10	0.20	ug/L	40.0	ND	80.5	2-227			
Fluoranthene	38.6	0.070	0.20	ug/L	40.0	ND	96.6	26-137			
Fluorene	37.9	0.20	0.20	ug/L	40.0	ND	94.8	59-121			
Indeno (1,2,3-cd) pyrene	30.2	0.030	0.20	ug/L	40.0	ND	75.5	2-171			
Naphthalene	59.4	0.090	0.20	ug/L	40.0	ND	148	21-133			QM-05
Phenanthrene	17.0	0.10	0.20	ug/L	40.0	ND	42.6	54-120			QM-05
Pyrene	26.2	0.20	0.20	ug/L	40.0	ND	65.4	52-120			
Surrogate: 2-Fluorobiphenyl	*27.4*			*ug/L*	*40.0*		*68.4*	*24-119*			
Surrogate: Nitrobenzene-d5	*29.4*			*ug/L*	*40.0*		*73.6*	*15-314*			
Surrogate: p-Terphenyl-d14	*28.6*			*ug/L*	*40.0*		*71.5*	*37-139*			
Matrix Spike Dup (AH34474-MSD1)		**Source: 23H1825-01**			Prepared: 08/14/23 Analyzed: 08/23/23						
Acenaphthene	20.8	0.20	0.20	ug/L	40.0	ND	52.1	47-145	8.68	48	
Acenaphthylene	63.2	0.20	0.20	ug/L	40.0	ND	158	33-145	4.53	74	QM-05
Anthracene	19.0	0.090	0.20	ug/L	40.0	ND	47.4	27-133	0.105	66	
Benzo (a) anthracene	31.6	0.20	0.20	ug/L	40.0	ND	79.1	33-143	1.46	53	
Benzo (a) pyrene	25.9	0.20	0.20	ug/L	40.0	ND	64.8	17-163	5.92	72	
Benzo (b) fluoranthene	37.2	0.20	0.20	ug/L	40.0	ND	92.9	24-159	5.79	71	
Benzo (g,h,i) perylene	34.1	0.10	0.20	ug/L	40.0	ND	85.2	2-219	4.71	97	
Benzo (k) fluoranthene	19.0	0.20	0.20	ug/L	40.0	ND	47.4	11-162	6.08	63	
Chrysene	26.4	0.20	0.20	ug/L	40.0	ND	66.1	17-168	4.40	87	
Dibenz (a,h) anthracene	32.3	0.10	0.20	ug/L	40.0	ND	80.8	2-227	0.434	126	

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Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Semivolatile Organic Compounds by EPA Method 625.1 SIM - Quality Control

Batch AH34474 - SVOAs in Water GCMS

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (AH34474-MSD1)		**Source: 23H1825-01**		Prepared: 08/14/23 Analyzed: 08/23/23							
Fluoranthene	39.5	0.070	0.20	ug/L	40.0	ND	98.8	26-137	2.33	66	
Fluorene	35.1	0.20	0.20	ug/L	40.0	ND	87.7	59-121	7.83	38	
Indeno (1,2,3-cd) pyrene	32.6	0.030	0.20	ug/L	40.0	ND	81.5	2-171	7.61	99	
Naphthalene	45.0	0.090	0.20	ug/L	40.0	ND	112	21-133	27.6	65	
Phenanthrene	18.7	0.10	0.20	ug/L	40.0	ND	46.8	54-120	9.57	39	QM-05
Pyrene	25.9	0.20	0.20	ug/L	40.0	ND	64.7	52-120	1.15	49	
Surrogate: 2-Fluorobiphenyl	*26.4*			*ug/L*	*40.0*		*65.9*	*24-119*			
Surrogate: Nitrobenzene-d5	*25.8*			*ug/L*	*40.0*		*64.4*	*15-314*			
Surrogate: p-Terphenyl-d14	*32.6*			*ug/L*	*40.0*		*81.4*	*37-139*			

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Fort Bragg, City of	Project Manager: Frank Kemper	
416 N. Franklin St.	Project: Ocean Discharge Plan	Reported:
Ft. Bragg CA, 95437	Project Number: [none]	09/18/23 16:53

Notes and Definitions

HDSP	Sample aliquot taken from container with headspace.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration, detected but not quantified (DNQ).
QM-01	The spike recovery for this QC sample is outside of established control limits possibly due to a sample matrix interference.
QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
R-01	The Reporting Limit for this analyte has been raised to account for matrix interference.
U	Analyte included in analysis, but not detected at or above MDL.
ND	Analyte NOT DETECTED at or above the reporting limit
dry	Sample results reported on a dry weight basis
MDL	Method detection limit
Rec	Recovery
RPD	Relative Percent Difference

* ELAP does not offer accreditation in this matrix for the requested analyte/method combination.

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 2308B21

Report Created for: Alpha Analytical Laboratories

262 Rickenbacker Circle
Livermore, CA 94551

Project Contact: Sheri Speaks
Project P.O.:
Project: 23H1936

Project Received: 08/15/2023

Analytical Report reviewed & approved for release on 08/29/2023 by:

Christine Askari
Project Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in a case narrative.

NELAP ACCREDITED TNI LABORATORY

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CA ELAP 1644 ♦ NELAP 4033 ORELAP

Glossary of Terms & Qualifier Definitions

Client: Alpha Analytical Laboratories **WorkOrder:** 2308B21

Project: 23H1936

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
CPT	Consumer Product Testing not NELAP Accredited
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
LQL	Lowest Quantitation Level
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit [1]
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NA	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit [2]
RPD	Relative Percent Difference
RRT	Relative Retention Time
RSD	Relative Standard Deviation
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure

[1] MDL is the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results. Definition and Procedure for the Determination of the Method Detection Limit, Revision 2, 40CFR, Part 136, Appendix B, EPA 821-R-16-006, December 2016. Values are based upon our default extraction volume/amount and are subject to change.

[2] RL is the lowest level that can be reliably determined within specified limits of precision and accuracy during routine laboratory operating conditions. (The RL cannot be lower than the lowest calibration standard used in the initial calibration of the instrument and must be greater than the MDL.) Values are based upon our default extraction volume/amount and are subject to change.

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Glossary of Terms & Qualifier Definitions

Client: Alpha Analytical Laboratories **WorkOrder:** 2308B21

Project: 23H1936

TEQ	Toxicity Equivalents
TNTC	"Too Numerous to Count;" greater than 250 colonies observed on the plate.
TZA	TimeZone Net Adjustment for sample collected outside of MAI's UTC.
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

Analytical Qualifiers

H	Sample was analyzed out of hold time
a7	Reporting limit raised due to limited sample amount.

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Analytical Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	2308B21
Date Received:	08/15/2023 13:30	**Extraction Method:**	E1613B
Project:	23H1936	**Analytical Method:**	E1613B
		Unit:	pg/L

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected
Buoy Project	**2308B21-001B**	**Water**	**08/09/2023 14:30**

Analytes	TEF WHO '05	Result	ML	DF	Ion Ratio	RRT	TEQ	Date Analyzed
2,3,7,8-TCDD		ND	10.4	1				08/28/2023 18:22
1,2,3,7,8-PeCDD		ND	52.2	1				08/28/2023 18:22
1,2,3,4,7,8-HxCDD		ND	52.2	1				08/28/2023 18:22
1,2,3,6,7,8-HxCDD		ND	52.2	1				08/28/2023 18:22
1,2,3,7,8,9-HxCDD		ND	52.2	1				08/28/2023 18:22
1,2,3,4,6,7,8-HpCDD		ND	52.2	1				08/28/2023 18:22
OCDD		ND	104	1				08/28/2023 18:22
2,3,7,8-TCDF		ND	10.4	1				08/28/2023 18:22
1,2,3,7,8-PeCDF		ND	52.2	1				08/28/2023 18:22
2,3,4,7,8-PeCDF		ND	52.2	1				08/28/2023 18:22
1,2,3,4,7,8-HxCDF		ND	52.2	1				08/28/2023 18:22
1,2,3,6,7,8-HxCDF		ND	52.2	1				08/28/2023 18:22
1,2,3,7,8,9-HxCDF		ND	52.2	1				08/28/2023 18:22
2,3,4,6,7,8-HxCDF		ND	52.2	1				08/28/2023 18:22
1,2,3,4,6,7,8-HpCDF		ND	52.2	1				08/28/2023 18:22
1,2,3,4,7,8,9-HpCDF		ND	52.2	1				08/28/2023 18:22
OCDF		ND	104	1				08/28/2023 18:22
Total-Tetradioxins		ND	10.4	1				08/28/2023 18:22
Total-Pentadioxins		ND	52.2	1				08/28/2023 18:22
Total-Hexadioxins		ND	52.2	1				08/28/2023 18:22
Total-Heptadioxins		ND	52.2	1				08/28/2023 18:22
Total-Tetrafurans		ND	10.4	1				08/28/2023 18:22
Total-Pentafurans		ND	52.2	1				08/28/2023 18:22
Total-Hexafurans		ND	52.2	1				08/28/2023 18:22
Total-Heptafurans		ND	52.2	1				08/28/2023 18:22
Total PCDD+PCDF		ND	10.4	1				08/28/2023 18:22
Total Toxicity Equivalence (TEQ):							**0**	

Cleanup Standard	REC (%)	Limits	
37Cl-2,3,7,8-TCDD	90	35-197	08/28/2023 18:22

Labeled Compound Recovery	REC (%)	Limits	
13C-2,3,7,8-TCDD	81	25-164	08/28/2023 18:22
13C-1,2,3,7,8-PeCDD	96	25-181	08/28/2023 18:22
13C-1,2,3,4,7,8-HxCDD	79	32-141	08/28/2023 18:22
13C-1,2,3,6,7,8-HxCDD	80	28-130	08/28/2023 18:22
13C-1,2,3,4,6,7,8-HpCDD	95	23-140	08/28/2023 18:22

(Cont.)

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Analytical Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	2308B21
Date Received:	08/15/2023 13:30	**Extraction Method:**	E1613B
Project:	23H1936	**Analytical Method:**	E1613B
		Unit:	pg/L

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected
Buoy Project	**2308B21-001B**	**Water**	**08/09/2023 14:30**

Analytes	TEF WHO '05	Result	ML	DF	Ion Ratio	RRT	TEQ	Date Analyzed
Labeled Compound Recovery		REC (%)	Limits					
13C-OCDD		97	17-157					08/28/2023 18:22
13C-2,3,7,8-TCDF		85	24-169					08/28/2023 18:22
13C-1,2,3,7,8-PeCDF		93	24-185					08/28/2023 18:22
13C-2,3,4,7,8-PeCDF		95	21-178					08/28/2023 18:22
13C-1,2,3,4,7,8-HxCDF		73	26-152					08/28/2023 18:22
13C-1,2,3,6,7,8-HxCDF		70	26-123					08/28/2023 18:22
13C-2,3,4,6,7,8-HxCDF		76	28-136					08/28/2023 18:22
13C-1,2,3,7,8,9-HxCDF		86	29-147					08/28/2023 18:22
13C-1,2,3,4,6,7,8-HpCDF		83	28-143					08/28/2023 18:22
13C-1,2,3,4,7,8,9-HpCDF		92	26-138					08/28/2023 18:22

Date Analyzed	InstrumentID	FileID	Analyst	Comments	BatchID	Date Prepared
08/28/2023 18:22	**GC52**	**8282309**	**KBO**	**a7**	**276684**	**08/24/2023 15:26**

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Analytical Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	2308B21
Date Received:	08/15/2023 13:30	**Extraction Method:**	E608.3/SW3620B
Date Prepared:	08/17/2023	**Analytical Method:**	E608.3
Project:	23H1936	**Unit:**	µg/L

Organochlorine Pesticides + PCBs w/ Florisil Clean-up

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Buoy Project	**2308B21-001A**	**Water**	**08/09/2023 14:30**	**GC40 08172350.d**	**276113**

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Aldrin	ND	H	0.0010	1	08/17/2023 22:09
a-BHC	ND	H	0.0010	1	08/17/2023 22:09
b-BHC	ND	H	0.0010	1	08/17/2023 22:09
d-BHC	ND	H	0.0010	1	08/17/2023 22:09
g-BHC	ND	H	0.0010	1	08/17/2023 22:09
Chlordane (Technical)	ND	H	0.020	1	08/17/2023 22:09
a-Chlordane	ND	H	0.0010	1	08/17/2023 22:09
g-Chlordane	ND	H	0.0010	1	08/17/2023 22:09
p,p-DDD	ND	H	0.0010	1	08/17/2023 22:09
p,p-DDE	ND	H	0.0010	1	08/17/2023 22:09
p,p-DDT	ND	H	0.0010	1	08/17/2023 22:09
Dieldrin	ND	H	0.0010	1	08/17/2023 22:09
Endosulfan I	ND	H	0.0010	1	08/17/2023 22:09
Endosulfan II	ND	H	0.0010	1	08/17/2023 22:09
Endosulfan sulfate	ND	H	0.0020	1	08/17/2023 22:09
Endrin	ND	H	0.0010	1	08/17/2023 22:09
Endrin aldehyde	ND	H	0.0010	1	08/17/2023 22:09
Endrin ketone	ND	H	0.0010	1	08/17/2023 22:09
Heptachlor	ND	H	0.0010	1	08/17/2023 22:09
Heptachlor epoxide	ND	H	0.0010	1	08/17/2023 22:09
Methoxychlor	ND	H	0.0010	1	08/17/2023 22:09
Toxaphene	ND	H	0.020	1	08/17/2023 22:09
Aroclor1016	ND	H	0.020	1	08/17/2023 22:09
Aroclor1221	ND	H	0.020	1	08/17/2023 22:09
Aroclor1232	ND	H	0.020	1	08/17/2023 22:09
Aroclor1242	ND	H	0.020	1	08/17/2023 22:09
Aroclor1248	ND	H	0.020	1	08/17/2023 22:09
Aroclor1254	ND	H	0.020	1	08/17/2023 22:09
Aroclor1260	ND	H	0.020	1	08/17/2023 22:09
PCBs, total	ND	H	0.020	1	08/17/2023 22:09

Surrogates	REC (%)	Qualifiers	Limits	Date Analyzed
Decachlorobiphenyl	75	H	60-130	08/17/2023 22:09

Analyst(s): SVE

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Analytical Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	2308B21
Date Received:	08/15/2023 13:30	**Extraction Method:**	SW3510C
Date Prepared:	08/16/2023	**Analytical Method:**	MAI-Organic Tin
Project:	23H1936	**Unit:**	µg/L

Organotins by GC-MS

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Buoy Project	**2308B21-001C**	**Water**	**08/09/2023 14:30**	**GC8 08172309.D**	**276004**

Analytes	Result	RL	DF	Date Analyzed
Tributyltin	ND	0.060	1	08/17/2023 11:11

Surrogates	REC (%)	Limits	Date Analyzed
Tripropyltin	98	50-150	08/17/2023 11:11

Analyst(s): TD

CLIENT: Alpha Analytical Laboratories
Work Order: 2308B21
Project: 23H1936

ANALYTICAL QC SUMMARY REPORT

BatchID: **276684**

SampleID: **MB-276684** TestCode: **1613_FULL_W** Units: **pg/L** Prep Date: **8/24/2023**
Batch ID: **276684** TestNo: **E1613B** Run ID: **GC52_230829A** Analysis Date: **8/28/2023**

Analyte	Result	MDL	ML	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD	ND	3.20	10.0				-				
1,2,3,7,8-PeCDD	ND	11.0	50.0				-				
1,2,3,4,7,8-HxCDD	ND	9.90	50.0				-				
1,2,3,6,7,8-HxCDD	ND	11.0	50.0				-				
1,2,3,7,8,9-HxCDD	ND	12.0	50.0				-				
1,2,3,4,6,7,8-HpCDD	ND	9.00	50.0				-				
OCDD	ND	17.0	100				-				
2,3,7,8-TCDF	ND	3.20	10.0				-				
1,2,3,7,8-PeCDF	ND	13.0	50.0				-				
2,3,4,7,8-PeCDF	ND	13.0	50.0				-				
1,2,3,4,7,8-HxCDF	ND	11.0	50.0				-				
1,2,3,6,7,8-HxCDF	ND	8.80	50.0				-				
1,2,3,7,8,9-HxCDF	ND	11.0	50.0				-				
2,3,4,6,7,8-HxCDF	ND	12.0	50.0				-				
1,2,3,4,6,7,8-HpCDF	ND	9.60	50.0				-				
1,2,3,4,7,8,9-HpCDF	ND	9.00	50.0				-				
OCDF	ND	17.0	100				-				
Total-Tetradioxins	ND	3.20	10.0				-				
Total-Pentadioxins	ND	11.0	50.0				-				
Total-Hexadioxins	ND	12.0	50.0				-				
Total-Heptadioxins	ND	9.00	50.0				-				
Total-Tetrafurans	ND	3.20	10.0				-				
Total-Pentafurans	ND	13.0	50.0				-				
Total-Hexafurans	ND	12.0	50.0				-				
Total-Heptafurans	ND	9.60	50.0				-				
Total PCDD+PCDF	ND	0	10.0				-				

Cleanup Standard

Analyte	Result	MDL	ML	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
37Cl-2,3,7,8-TCDD	83.0			100		83	35 - 197				

Labeled Compound Recovery

Analyte	Result	MDL	ML	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
13C-2,3,7,8-TCDD	806			1000		81	25 - 164				
13C-1,2,3,7,8-PeCDD	902			1000		90	25 - 181				
13C-1,2,3,4,7,8-HxCDD	807			1000		81	32 - 141				
13C-1,2,3,6,7,8-HxCDD	830			1000		83	28 - 130				
13C-1,2,3,4,6,7,8-HpCDD	890			1000		89	23 - 140				
13C-OCDD	1920			2000		96	17 - 157				
13C-2,3,7,8-TCDF	878			1000		88	24 - 169				
13C-1,2,3,7,8-PeCDF	926			1000		93	24 - 185				
13C-2,3,4,7,8-PeCDF	947			1000		95	21 - 178				
13C-1,2,3,4,7,8-HxCDF	777			1000		78	26 - 152				
13C-1,2,3,6,7,8-HxCDF	733			1000		73	26 - 123				
13C-2,3,4,6,7,8-HxCDF	823			1000		82	28 - 136				
13C-1,2,3,7,8,9-HxCDF	918			1000		92	29 - 147				
13C-1,2,3,4,6,7,8-HpCDF	863			1000		86	28 - 143				
13C-1,2,3,4,7,8,9-HpCDF	913			1000		91	26 - 138				

CLIENT: Alpha Analytical Laboratories
Work Order: 2308B21
Project: 23H1936

ANALYTICAL QC SUMMARY REPORT

BatchID: **276684**

SampleID: **LCS-276684** TestCode: **1613_FULL_W** Units: **pg/L** Prep Date: **8/24/2023**
Batch ID: **276684** TestNo: **E1613B** Run ID: **GC52_230829A** Analysis Date: **8/28/2023**

Analyte	Result	ML	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD	107	10.0	100	0	107	67 - 158				
1,2,3,7,8-PeCDD	557	50.0	500	0	111	70 - 142				
1,2,3,4,7,8-HxCDD	530	50.0	500	0	106	70 - 164				
1,2,3,6,7,8-HxCDD	553	50.0	500	0	111	76 - 134				
1,2,3,7,8,9-HxCDD	561	50.0	500	0	112	64 - 162				
1,2,3,4,6,7,8-HpCDD	555	50.0	500	0	111	70 - 140				
OCDD	1120	100	1000	0	113	78 - 144				
2,3,7,8-TCDF	101	10.0	100	0	101	75 - 158				
1,2,3,7,8-PeCDF	521	50.0	500	0	104	80 - 134				
2,3,4,7,8-PeCDF	526	50.0	500	0	105	68 - 160				
1,2,3,4,7,8-HxCDF	537	50.0	500	0	107	72 - 134				
1,2,3,6,7,8-HxCDF	542	50.0	500	0	108	84 - 130				
1,2,3,7,8,9-HxCDF	535	50.0	500	0	107	78 - 130				
2,3,4,6,7,8-HxCDF	551	50.0	500	0	110	70 - 156				
1,2,3,4,6,7,8-HpCDF	530	50.0	500	0	106	82 - 122				
1,2,3,4,7,8,9-HpCDF	533	50.0	500	0	107	78 - 138				
OCDF	1200	100	1000	0	120	63 - 170				
Cleanup Standard										
37Cl-2,3,7,8-TCDD	90.2		100		90	31 - 191				
Labeled Compound Recovery										
13C-2,3,7,8-TCDD	890		1000		89	20 - 175				
13C-1,2,3,7,8-PeCDD	987		1000		99	21 - 227				
13C-1,2,3,4,7,8-HxCDD	817		1000		82	21 - 193				
13C-1,2,3,6,7,8-HxCDD	802		1000		80	25 - 163				
13C-1,2,3,4,6,7,8-HpCDD	901		1000		90	26 - 166				
13C-OCDD	1940		2000		97	13 - 199				
13C-2,3,7,8-TCDF	934		1000		93	22 - 152				
13C-1,2,3,7,8-PeCDF	985		1000		98	21 - 192				
13C-2,3,4,7,8-PeCDF	992		1000		99	13 - 328				
13C-1,2,3,4,7,8-HxCDF	748		1000		75	19 - 202				
13C-1,2,3,6,7,8-HxCDF	740		1000		74	21 - 159				
13C-2,3,4,6,7,8-HxCDF	774		1000		77	22 - 176				
13C-1,2,3,7,8,9-HxCDF	904		1000		90	17 - 205				
13C-1,2,3,4,6,7,8-HpCDF	877		1000		88	21 - 158				
13C-1,2,3,4,7,8,9-HpCDF	946		1000		95	20 - 186				

CLIENT: Alpha Analytical Laboratories
Work Order: 2308B21
Project: 23H1936

ANALYTICAL QC SUMMARY REPORT

BatchID: **276684**

SampleID: **LCSD-276684**	TestCode: **1613_FULL_W**	Units: **pg/L**	Prep Date: **8/24/2023**
Batch ID: **276684**	TestNo: **E1613B**	Run ID: **GC52_230829A**	Analysis Date: **8/28/2023**

Analyte	Result	ML	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD	108	10.0	100	0	108	67 - 158	107.2	0.372	20	
1,2,3,7,8-PeCDD	583	50.0	500	0	117	70 - 142	557	4.60	20	
1,2,3,4,7,8-HxCDD	556	50.0	500	0	111	70 - 164	530.4	4.78	20	
1,2,3,6,7,8-HxCDD	520	50.0	500	0	104	76 - 134	552.6	6.08	20	
1,2,3,7,8,9-HxCDD	556	50.0	500	0	111	64 - 162	561	0.823	20	
1,2,3,4,6,7,8-HpCDD	549	50.0	500	0	110	70 - 140	555.4	1.09	20	
OCDD	1100	100	1000	0	110	78 - 144	1125	2.19	20	
2,3,7,8-TCDF	104	10.0	100	0	104	75 - 158	100.8	3.51	20	
1,2,3,7,8-PeCDF	534	50.0	500	0	107	80 - 134	521.4	2.31	20	
2,3,4,7,8-PeCDF	540	50.0	500	0	108	68 - 160	526	2.66	20	
1,2,3,4,7,8-HxCDF	537	50.0	500	0	107	72 - 134	537.2	0	20	
1,2,3,6,7,8-HxCDF	562	50.0	500	0	112	84 - 130	541.8	3.59	20	
1,2,3,7,8,9-HxCDF	529	50.0	500	0	106	78 - 130	535.4	1.24	20	
2,3,4,6,7,8-HxCDF	528	50.0	500	0	106	70 - 156	551.4	4.41	20	
1,2,3,4,6,7,8-HpCDF	522	50.0	500	0	104	82 - 122	529.8	1.41	20	
1,2,3,4,7,8,9-HpCDF	531	50.0	500	0	106	78 - 138	533.2	0.338	20	
OCDF	1180	100	1000	0	118	63 - 170	1199.8	1.36	20	
Cleanup Standard										
37Cl-2,3,7,8-TCDD	83.6		100		84	31 - 191				
Labeled Compound Recovery										
13C-2,3,7,8-TCDD	876		1000		88	20 - 175				
13C-1,2,3,7,8-PeCDD	942		1000		94	21 - 227				
13C-1,2,3,4,7,8-HxCDD	862		1000		86	21 - 193				
13C-1,2,3,6,7,8-HxCDD	897		1000		90	25 - 163				
13C-1,2,3,4,6,7,8-HpCDD	955		1000		95	26 - 166				
13C-OCDD	2020		2000		101	13 - 199				
13C-2,3,7,8-TCDF	937		1000		94	22 - 152				
13C-1,2,3,7,8-PeCDF	976		1000		98	21 - 192				
13C-2,3,4,7,8-PeCDF	955		1000		96	13 - 328				
13C-1,2,3,4,7,8-HxCDF	785		1000		79	19 - 202				
13C-1,2,3,6,7,8-HxCDF	755		1000		76	21 - 159				
13C-2,3,4,6,7,8-HxCDF	872		1000		87	22 - 176				
13C-1,2,3,7,8,9-HxCDF	962		1000		96	17 - 205				
13C-1,2,3,4,6,7,8-HpCDF	939		1000		94	21 - 158				
13C-1,2,3,4,7,8,9-HpCDF	996		1000		100	20 - 186				

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Quality Control Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	2308B21
Date Prepared:	08/17/2023	**BatchID:**	276113
Date Analyzed:	08/17/2023 - 08/18/2023	**Extraction Method:**	E608.3/SW3620B
Instrument:	GC40	**Analytical Method:**	E608.3
Matrix:	Water	**Unit:**	µg/L
Project:	23H1936	**Sample ID:**	MB/LCS/LCSD-276113

QC Summary Report for E608.3 w/ Florisil Clean-up

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Aldrin	ND	0.00028	0.0010	-	-	-
a-BHC	ND	0.00031	0.0010	-	-	-
b-BHC	ND	0.00069	0.0010	-	-	-
d-BHC	ND	0.00014	0.0010	-	-	-
g-BHC	ND	0.00045	0.0010	-	-	-
Chlordane (Technical)	ND	0.0023	0.020	-	-	-
a-Chlordane	ND	0.00085	0.0010	-	-	-
g-Chlordane	ND	0.00015	0.0010	-	-	-
p,p-DDD	ND	0.00011	0.0010	-	-	-
p,p-DDE	ND	0.00018	0.0010	-	-	-
p,p-DDT	ND	0.00017	0.0010	-	-	-
Dieldrin	ND	0.00014	0.0010	-	-	-
Endosulfan I	ND	0.00011	0.0010	-	-	-
Endosulfan II	ND	0.00046	0.0010	-	-	-
Endosulfan sulfate	ND	0.00033	0.0020	-	-	-
Endrin	ND	0.00018	0.0010	-	-	-
Endrin aldehyde	ND	0.00053	0.0010	-	-	-
Endrin ketone	ND	0.00026	0.0010	-	-	-
Heptachlor	ND	0.00041	0.0010	-	-	-
Heptachlor epoxide	ND	0.00025	0.0010	-	-	-
Methoxychlor	ND	0.00012	0.0010	-	-	-
Toxaphene	ND	0.0020	0.020	-	-	-
Aroclor1016	ND	0.0019	0.020	-	-	-
Aroclor1221	ND	0.0024	0.020	-	-	-
Aroclor1232	ND	0.0038	0.020	-	-	-
Aroclor1242	ND	0.0028	0.020	-	-	-
Aroclor1248	ND	0.0018	0.020	-	-	-
Aroclor1254	ND	0.0015	0.020	-	-	-
Aroclor1260	ND	0.0028	0.020	-	-	-
Surrogate Recovery						
Decachlorobiphenyl	0.048			0.05	95	60-130

(Cont.)

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Quality Control Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	2308B21
Date Prepared:	08/17/2023	**BatchID:**	276113
Date Analyzed:	08/17/2023 - 08/18/2023	**Extraction Method:**	E608.3/SW3620B
Instrument:	GC40	**Analytical Method:**	E608.3
Matrix:	Water	**Unit:**	µg/L
Project:	23H1936	**Sample ID:**	MB/LCS/LCSD-276113

QC Summary Report for E608.3 w/ Florisil Clean-up

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Aldrin	0.046	0.048	0.050	91	96	54-130	5.59	20
a-BHC	0.044	0.047	0.050	87	93	70-130	6.59	20
b-BHC	0.045	0.047	0.050	89	93	70-130	4.90	20
d-BHC	0.044	0.046	0.050	88	93	70-130	4.58	20
g-BHC	0.043	0.045	0.050	85	91	60-130	6.08	20
a-Chlordane	0.045	0.047	0.050	90	94	55-130	4.06	20
g-Chlordane	0.045	0.047	0.050	91	94	55-130	4.00	20
p,p-DDD	0.051	0.053	0.050	103	105	70-130	2.24	20
p,p-DDE	0.048	0.049	0.050	95	99	70-130	3.46	20
p,p-DDT	0.045	0.046	0.050	90	92	70-130	1.79	20
Dieldrin	0.045	0.047	0.050	90	94	70-130	4.21	20
Endosulfan I	0.046	0.048	0.050	92	96	70-130	4.49	20
Endosulfan II	0.049	0.052	0.050	98	103	70-130	4.51	20
Endosulfan sulfate	0.049	0.051	0.050	98	101	70-130	3.36	20
Endrin	0.055	0.057	0.050	110	115	70-130	4.14	20
Endrin aldehyde	0.049	0.050	0.050	97	100	60-130	3.26	20
Endrin ketone	0.047	0.049	0.050	94	97	60-130	2.65	20
Heptachlor	0.045	0.048	0.050	89	96	43-130	6.64	20
Heptachlor epoxide	0.045	0.047	0.050	90	94	70-130	4.87	20
Methoxychlor	0.046	0.047	0.050	92	95	70-130	3.50	20
Aroclor1016	0.13	0.15	0.15	87	98	70-130	11.8	20
Aroclor1260	0.13	0.14	0.15	89	95	70-130	5.61	20
Surrogate Recovery								
Decachlorobiphenyl	0.043	0.043	0.050	85	86	60-130	1.06	20

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Quality Control Report

Client:	Alpha Analytical Laboratories	**WorkOrder:**	2308B21
Date Prepared:	08/16/2023	**BatchID:**	276004
Date Analyzed:	08/17/2023	**Extraction Method:**	SW3510C
Instrument:	GC8	**Analytical Method:**	MAI-Organic Tin
Matrix:	Water	**Unit:**	µg/L
Project:	23H1936	**Sample ID:**	MB/LCS/LCSD-276004 2308B21-001CMS/MSD

QC Summary Report for Organotins

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Tributyltin	ND	0.011	0.060	-	-	-
Surrogate Recovery						
Tripropyltin	2.7			2.5	106	50-150

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Tributyltin	5.1	5.4	5	101	108	70-130	6.65	20
Surrogate Recovery								
Tripropyltin	2.6	2.8	2.5	105	112	70-130	6.27	20

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Tributyltin	1	4.7	4.9	5	ND	95	98	50-150	3.60	20
Surrogate Recovery										
Tripropyltin	1	2.5	2.6	2.5		101	103	50-150	1.91	20

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CHAIN-OF-CUSTODY RECORD

WorkOrder: 2308B21 **ClientCode: ALPU** **QuoteID: 232557**

☐ WaterTrax ☐ CLIP ☐ EDF ☐ EQuIS ☐ Dry-Weight ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag
☐ Detection Summary ☐ Excel

Report to:
Sheri Speaks
Alpha Analytical Laboratories
262 Rickenbacker Circle
Livermore, CA 94551
(707) 468-0401 FAX: (707) 468-5267

Email: sspeaks@alpha-labs.com; lquinn@alpha-la
cc/3rd Party:
PO:
Project: 23H1936

Bill to:
Accounts Payable
Alpha Analytical Laboratories
262 Rickenbacker Circle
Livermore, CA 94551

Requested TATs: **15 days;** **5 days;**

Date Received: **08/15/2023**
Date Logged: **08/15/2023**

					Requested Tests (See legend below)											
Lab ID	**ClientSampID**	**Matrix**	**Collection Date**	**Hold**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
2308B21-001	Buoy Project	Water	8/9/2023 14:30	☐	B	A	A	C								

Test Legend:

1	1613_FULL_W	2	608_W	3	PRDisposal Fee	4	TRIBUTYLTIN_W
5		6		7		8	
9		10		11		12	

Project Manager: Jena Alfaro **Prepared by: Adrianna Cardoza**

Comments:

NOTE: Soil samples are discarded 60 days after receipt unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

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WORK ORDER SUMMARY

Client Name: ALPHA ANALYTICAL LABORATORIES **Project:** 23H1936 **Work Order:** 2308B21

Client Contact: Sheri Speaks **QC Level:** LEVEL 2

Contact's Email: sspeaks@alpha-labs.com; lquinn@alpha-labs.com; stephen@alpha-labs.com **Comments:** **Date Logged:** 8/15/2023

☐ WaterTrax ☐ CLIP ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

LabID	ClientSampID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	U**	Head Space	Dry-Weight	Collection Date & Time	TAT	Test Due Date	Sediment Content	Hold	Sub Out
001A	Buoy Project	Water	E608.3 (OC Pesticides+PCBs w/ Florisil Clean-up)	1	1LA, Unpres	☐	☐	☐	8/9/2023 14:30	5 days	8/22/2023	Present	☐	☐
001B	Buoy Project	Water	E1613B (PCDDs & PCDFs)	1	1LA, Unpres	☐	☐	☐	8/9/2023 14:30	15 days	9/6/2023	Present	☐	☐
001C	Buoy Project	Water	Tributyltin	2	1LA, Unpres	☐	☐	☐	8/9/2023 14:30	5 days	8/22/2023	Present	☐	☐

NOTES: * STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- Organic extracts are held for 40 days before disposal; Inorganic extract are held for 30 days.

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

U = An unpreserved container was received for a method that suggests a preservation in order to extend hold time for analysis.**

2308B21

SUBCONTRACT ORDER

Alpha Analytical Laboratories, Inc.

23H1936

SENDING LABORATORY:	**RECEIVING LABORATORY:**
Alpha Analytical Laboratories, Inc.	McCampbell Analytical/Alpha Quote 232557
208 Mason St.	1534 Willow Pass Rd.
Ukiah, CA 95482	Pittsburg, CA 94565
Phone: (707)468-0401	Phone :(925) 252-9262
Fax: (707)468-5267	Fax: (925) 252-9269
Project Manager: Sheri L. Speaks	**Terms: Net 30**

Analysis	**Due**	**Expires**	**Comments**
23H1936-01 Buoy Project [Water] Sampled 08/09/23 14:30			
608 Ocean Plan SUB	08/24/23 15:00	08/16/23 14:30	
Dioxins Full List 1613	08/24/23 15:00	08/08/24 14:30	
Tributyltin SUB	08/24/23 15:00	08/16/23 14:30	

Containers Supplied:

1L Amber- Unpres. (A) 1L Amber- Unpres. (B) 1L Amber- Unpres. (C) 1L Amber- Unpres. (D)

☐ *Report to State*

System Name: ____________ **Employed by:** ____________

User ID: ____________ **Sampler:** ____________

System Number: ____________

Released By	Date	Received By	Date
[signature]	8-14-23	JW	8-14-23
JW	8-14-23	[signature]	8/15/23 980
[signature]	8/15/23 1330	[signature]	8-15-23 1330

4.5

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Sample Receipt Checklist

Client Name:	Alpha Analytical Laboratories	Date and Time Received:	8/15/2023 13:30
Project:	23H1936	Date Logged:	8/15/2023
		Received by:	Adrianna Cardoza
WorkOrder №:	2308B21 Matrix: Water	Logged by:	Adrianna Cardoza
Carrier:	Benjamin Yslas (MAI Courier)		

Chain of Custody (COC) Information

	Yes	No	NA
Chain of custody present?	☑	☐	
Chain of custody signed when relinquished and received?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Sample IDs noted by Client on COC?	☑	☐	
Date and Time of collection noted by Client on COC?	☑	☐	
Sampler's name noted on COC?	☑	☐	
COC agrees with Quote?	☑	☐	☐

Sample Receipt Information

	Yes	No	NA
Custody seals intact on shipping container/cooler?	☐	☐	☑
Custody seals intact on sample bottles?	☑	☐	☐
Shipping container/cooler in good condition?	☑	☐	
Samples in proper containers/bottles?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	

Sample Preservation and Hold Time (HT) Information

	Yes	No	NA
All samples received within holding time?	☑	☐	☐
Samples Received on Ice?	☑	☐	
	(Ice Type: WET ICE)		
Sample/Temp Blank temperature	Temp: 4.5°C		☐
ZHS conditional analyses: VOA meets zero headspace requirement (VOCs, TPHg/BTEX, RSK)?	☐	☐	☑
Sample labels checked for correct preservation?	☑	☐	
pH acceptable upon receipt (Metal: <2; Nitrate 353.2/4500NO3: <2; 522: <4; 218.7: >8)?	☐	☐	☑
<u>UCMR Samples:</u>			
pH tested and acceptable upon receipt (200.7: ≤2; 533: 6 - 8; 537.1: 6 - 8)?	☐	☐	☑
Free Chlorine tested and acceptable upon receipt (<0.1mg/L) [not applicable to 200.7]?	☐	☐	☑

Comments:

September 15, 2023

Lab No. : **SP 2314005**
Customer No. : **2020626**

Alpha Analytical Laboratories, Inc.
Attn: Leslie Quinn
208 Mason St.
Ukiah, CA 95482

Laboratory Report

Introduction: This report package contains a total of 3 pages divided into 3 sections:

Case Narrative

This Case Narrative pertains to the following samples:

Sample Description	Date Sampled	Date Received	FGL Lab No.	Matrix
Buoy Project	08/09/2023	08/16/2023	SP 2314005-001	W

Sampling and Receipt Information:

The Sample was received in acceptable condition and within temperature requirements, unless noted on the Condition Upon Receipt (CUR) form. The Sample was received, prepared and analyzed within the method specified holding times. All samples arrived room temperature. All samples were checked for pH if acid or base preservation is required (except for VOAs). For details of sample receipt information, please see the associated Chain of Custody and Condition Upon Receipt Form.

Quality Control: All samples were prepared and analyzed according to established quality control criteria. Any exceptions are noted in the Quality Control Section of this report.

Test Summary	
SM 7110 C	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)

Certification: I certify that this data package is in compliance with ELAP standards, both technically and for completeness, except for any conditions listed above and in the QC Section. Release of the data contained in this data package is authorized by the Laboratory Director or his designee, as verified by the following electronic signature. This report shall not be reproduced except in full, without the written approval of the laboratory.

KD: MKH

Approved By **Kelly A. Dunnahoo, B.S.** Digitally signed by Kelly A. Dunnahoo, B.S.
Title: Laboratory Director
Date: 2023-09-15

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CA ELAP Certification No. 2810

September 15, 2023

Alpha Analytical Laboratories, Inc.
Attn: Leslie Quinn
208 Mason St.
Ukiah, CA 95482

Description : Buoy Project
Project : 23H1936

Lab No. : SP 2314005-001
Customer No. : 2020626

Sampled On : August 9, 2023 at 14:30
Sampled By : Not Available
Received On : August 16, 2023 at 11:20
Matrix : Water

Sample Results - Radio

Constituent	Result ± Error	MDA	Units	MCL/AL	DQF	Sample Preparation			Sample Analysis			
Radio Chemistry						Date	Time	Who	Method	Date	Time	Who
Gross Alpha	-0.210 ± 0.709	1.08	pCi/L			09/14/2023	08:00	amr	SM 7110 C	09/15/2023	14:07	amr

DQF Flags Definition:

ND=Non-Detected, RL=Reporting Level

MDA = Minimum Detectable Activity (Calculated at the 95% confidence level) = Data utilized by DHS to determine matrix interference.
MCL / AL = Maximum Contamination Level / Action Level. Alpha's Action Level of 5 pCi/L is based on the Assigned Value (AV).
AV = Assigned Value(Gross Alpha Result + (0.84 x Error)). CCR Section 64442: Drinking Water Compliance Note: Do the following If Gross Alpha's (AV) exceeds 5 pCi/L run Uranium. If Gross Alpha's (AV) minus Uranium exceeds 5 pCi/L run Radium 226.

Drinking Water Compliance:
Gross Alpha (AV) minus Uranium is less than or equal to 15 pCi/L
Uranium is less than or equal to 20 pCi/L
Radium 226 + Radium 228 is less than or equal to 5 pCi/L

Note: Samples are held for 3-6 months prior to disposal.

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September 15, 2023
Alpha Analytical Laboratories, Inc.

Lab No. : SP 2314005
Customer No. : 2020626

Quality Control - Radio

Constituent	Method	Date/ID	Type	Units	Conc.	QC Data	DQO	Note
Radio								
Alpha By Co-Precip	SM7110C	09/14/2023:210314AMR	RgBlk	pCi/L		0.42794	1.08	
			LCS	pCi/L	141.0	81.3%	75-125	
			MS	pCi/L	141.0	72.8%	60-140	
		(SP 2313632-001)	MSD	pCi/L	141.0	62.4%	60-140	
			MSRPD	pCi/L		15.3%	≤30	

Definition

DQO : Data Quality Objective - This is the criteria against which the quality control data is compared.
LCS : Laboratory Control Standard/Sample - Prepared to verify that the preparation process is not affecting analyte recovery.
MS : Matrix Spikes - A random sample is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.
MSD : Matrix Spike Duplicate of MS/MSD pair - A random sample duplicate is spiked with a known amount of analyted. The recoveries are an indication of how that sample matrix affects analyte recovery.
MSRPD : MS/MSD Relative Percent Difference (RPD) - The MS relative percent difference is an indication of precision for the preparation and analysis.
ND : Non-detect - Result was below the DQO listed for the analyte.
RgBlk : Method Reagent Blank - Prepared to correct for any reagent contributions to sample result.

Page 3 of 3

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Central Valley Laboratory (2922)
9090 Union Park Way #113, Elk Grove CA 95624

San Diego Laboratory (3055)
2722 Loker Ave West, Ste A, Carlsbad CA 92010

Chain of Custody - Work Order

Reports and Invoices delivered by email in PDF format

Lab No 23H1936 Pg ______ of ______

Report to	Invoice to (if different)	Project Information
Company or Client Name:	Contact:	Project ID:
Attn: City of Fort Bragg	Email address:	Project No:
Address:	Address:	PO Number:
Phone/Fax:	Phone/Fax:	
Email Address:		

Field Sampler - Printed Name & Signature: Steve Sullivan – Sea Surveyor, Inc
S M Sullivan

Sample Identification (Example: Well Head, Kitchen Sink)	Sampling Date	Sampling Time	Container: 40ml VOA Vial	Plastic	Glass	Sleeve	Other	Preservative: HCl	HNO3	H2SO4	Other	None	Matrix: Drinking Water	Wastewater	Soil	Other	Total Number of Containers per Sample ID
8 Brown Bottles	8/9/23	14:30															8
3 small plastic bottles	↓	14:30															3
1 Medium Plastic Bottle	↓	14:30															1
Buoy Project																	

Analysis Request: Please see attached list of requested analysis
Ref # 23H3183

TAT: Standard 10 days ◯ | RUSH: 5 days ◯ | 48 hours ◯ | Other: ____days ◯ | Preapproval required

TEMP °C: Ukiah 4.7 | Livermore | Elk Grove | Petaluma | Carlsbad

Notes / DDW Source Codes
No Vials Received
OK to pour off from 12 Amber Container per Frank SF

Relinquished by	Received by	Date	Time
S M Sullivan 8/9/23	[signature]	8/9/23	15:35
F. Kemper		8-10-23	1130
via Mendo Stage	[signature]	8/10/23	1430

DDW Write On EDT Transmission? ◯ Yes ◯ No
State System Number: ____________
If "Y" please enter the Source Number(s) in the column above

CA Geotracker EDF Report? ◯ Yes ◯ No
Global ID: Sampling Company Log Code:
EDF to (Email Address):
Travel and Site Time: | Mileage: | Misc. Supplies:

WORK ORDER **Printed: 8/11/2023 9:16:42AM**

20H3189

Alpha Analytical Laboratories, Inc.

Client: **Fort Bragg, City of** **Project Manager:** **Sheri L. Speaks**
Project: **Ocean Discharge Plan** **Project Number:** **[none]**

Report To:	**Invoice To:**
Fort Bragg, City of	Fort Bragg, City of
Frank Kemper	Accounts Payable
416 N. Franklin St.	416 N. Franklin St.
Ft. Bragg, CA 95437	Ft. Bragg, CA 95437
Phone: (707) 961-2834	Phone :(707) 961-4138
Fax: (707) 961-2802	Fax: (707) 961-2802

Date Due:	09/10/20 15:00 (10 day TAT)		
Received By:	Aaron J. Kooyers	Date Receive	08/26/20 14:25
Logged In By:	Sean Foley	Date Logged	08/27/20 16:01

Samples Received at:	**2.4°C**
All containers intact:	**Yes**
Sample labels/COC agree:	**Yes**
Samples Preserved Properly:	**No**
Custody Seals Present:	**No**

Analysis	Department	Class	Due	TAT	Expires	Comments
20H3189-01 Eff - 001 [Water] Sampled 08/26/20 09:20 by Frank Kemper						
624.1 VOA Ocean Plan Group	GCMS		09/10/20 12:00	10	09/09/20 09:20	
625.1 CTR PAH SIM	GCMS SV		09/10/20 12:00	10	09/02/20 23:59	
625.1 Ocean Plan Group	GCMS SV		09/10/20 12:00	10	09/02/20 09:20	
Ag Tot ICP/MS 200.8	Metals		09/10/20 12:00	10	02/22/21 09:20	
Ammonia as N	Wet Chem		09/10/20 12:00	10	09/23/20 23:59	
As Tot ICP/MS 200.8	Metals		09/10/20 12:00	10	02/22/21 09:20	
Be Tot ICP/MS 200.8	Metals		09/10/20 12:00	10	02/22/21 09:20	
Cd Tot ICP/MS 200.8	Metals		09/10/20 12:00	10	02/22/21 09:20	
Cr Tot ICP/MS 200.8	Metals		09/10/20 12:00	10	02/22/21 09:20	
Cr3 Calc	Metals		09/10/20 12:00	10	02/22/21 09:20	
Cr6 218.6 WW	Metals	IC	09/10/20 12:00	10	09/23/20 23:59	
Cu Tot ICP/MS 200.8	Metals		09/10/20 12:00	10	02/22/21 09:20	
Cyanide Low Level 3ppb	Wet Chem		09/10/20 12:00	10	09/09/20 23:59	
Digest-Metals Preparation	Admin Metals		09/10/20 12:00	10	08/26/21 09:20	
Handling & Disposal	Administrators		09/10/20 12:00	10	08/26/21 09:20	
Hg Total CVAA 245.1 1ppb	Metals		09/10/20 12:00	10	09/23/20 09:20	
Ni Tot ICP/MS 200.8	Metals		09/10/20 12:00	10	02/22/21 09:20	
Pb Tot ICP/MS 200.8	Metals		09/10/20 12:00	10	02/22/21 09:20	
Sb Tot ICP/MS 200.8	Metals		09/10/20 12:00	10	02/22/21 09:20	
Se Tot ICP/MS 200.8	Metals		09/10/20 12:00	10	02/22/21 09:20	
Tl Tot ICP/MS 200.8	Metals		09/10/20 12:00	10	02/22/21 09:20	
Zn Tot ICP/MS 200.8	Metals		09/10/20 12:00	10	02/22/21 09:20	

WORK ORDER

20H3189

Alpha Analytical Laboratories, Inc.

Client: Fort Bragg, City of
Project: Ocean Discharge Plan

Project Manager: Sheri L. Speaks
Project Number: [none]

Analysis	Department	Class	Due	TAT	Expires	Comments
Ceres Labs						
20H3189-01 Eff - 001 [Water] Sampled 08/26/20 09:20 by Frank Kemper						
Dioxins Full List 1613	Subcontract		09/10/20 12:00	10	08/26/21 09:20	
FGL Environmental						
20H3189-01 Eff - 001 [Water] Sampled 08/26/20 09:20 by Frank Kemper						
Gross Alpha SUB	Subcontract		09/10/20 12:00	10	02/22/21 09:20	
McCampbell Analytical/Alpha Quote 232557						
20H3189-01 Eff - 001 [Water] Sampled 08/26/20 09:20 by Frank Kemper						
608 Ocean Plan SUB	Subcontract		09/10/20 12:00	10	09/02/20 23:59	
Tributyltin SUB	Subcontract		09/10/20 12:00	10	09/02/20 09:20	

Analysis groups included in this work order

624.1 VOA Ocean Plan Group

624.1 2CEVE	624.1 Acrolein	624.1 VOA Ocean Plan No

625.1 Ocean Plan Group

625.1 Benzidines	625.1 Ocean Plan No Benz

Reviewed By

Date

APPENDIX 3: ICEBERG BRINE DISCHARGE MODELING REPORT

ICEBERG BRINE DISCHARGE MODELING: FORT BRAGG PILOT PROJECT

INDEX

1. INTRODUCTION

The goal of this document is to explain the initial dilution modeling of the brine discharge from Oneka Technologies' desalination buoy within the context of its compliance to the Water Quality Control Plan for Ocean Waters of California. The proposed pilot project by the City of Fort Bragg aims to locate an Iceberg class desalination buoy in Mill Bay, off the coast of Fort Bragg, California.

Due to its higher salinity, the Iceberg's brine discharge is denser than the ambient seawater, causing the discharge to sink. The highest dilution of the brine discharge is achieved during the initial dilution process, when the turbulent brine discharge gets mixed with the receiving body. A detailed explanation of the brine discharge's dilution is provided in the following sections.

2. MODEL DESCRIPTION

Visual Plumes (VP) was used for the near field simulation of the Iceberg's brine discharge, following the recommendations given by Roberts, 2018.

VP is a widely recognized Windows-based computer application that supersedes the DOS PLUMES (Baumgartner et al., 1994) mixing zone modeling system. VP simulates single and merging submerged plumes in arbitrarily stratified ambient flow and buoyant surface discharges. Predictions include dilution, rise, diameter, and other plume variables. Among its features are graphics, time-series input files, user-specified units, a conservative tidal background-pollutant build-up capability, and a sensitivity analysis capability.

VP addresses the issue of model consistency in a unique way by including a suite of models within its model. In doing this, it promotes future modeling consistency and encourages continued improvement of plume models. VP includes the DKHW model based on UDKHDEN (Muellenhoff et al., 1985), the surface discharge model PDS (Davis, 1999), the three-dimensional UM3 model based on UM, and the NRFIELD model based on RSB.

For the Iceberg Pilot Project, the UM3 sub-model was used to model the brine's discharge. UM3 is an acronym for the three-dimensional Updated Merge (UM) model used to simulate single and multi-port submerged discharges. UM3 is coded in Delphi Pascal, the language of Visual Plumes, and is a Lagrangian model that uses the projected-area-entrainment (PAE) hypothesis (Winiarski and Frick, 1976; Frick, 1984). This established hypothesis (Rawn et al., 1960) quantifies forced entrainment, representing the rate at which mass is incorporated into the plume in the presence of current. UM3 assumes that the plume is in a steady state; in the Lagrangian formulation this implies that successive elements follow the same trajectory (Baumgartner et al., 1994). Therefore, the plume envelope remains invariant while elements moving through it change their shape and position with time. However, ambient and discharge conditions can change over time scales which are long compared to the time in which a discharged element reaches the end of the initial dilution phase, usually at maximum rise.

To make UM three-dimensional, the PAE forced entrainment hypothesis has been generalized to include an entrainment term corresponding to the third-dimension: a cross-current term. As a result, single-port plumes are simulated as truly three-dimensional entities.

3. INPUT DATA

The following parameters were adopted for the brine diffuser simulation.

3.1. DIFFUSER SET-UP

The brine diffuser consists of a 60-micron strainer cylindrical screening mesh that also serves as the seawater intake (see Figure 1). Discharge from this strainer occurs at a depth of 40 inches (3.33 feet) below sea level.

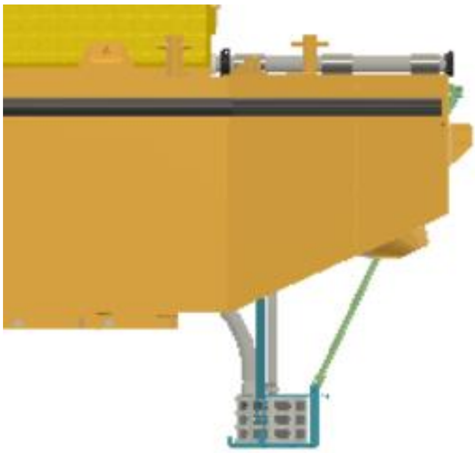

Figure 1: Seawater intake and brine discharge system with 60-micron mesh screening.

3.2. DIFFUSER LOCATION

The following location of the Iceberg pilot project was used to calculate brine dilution. The diffuser location is identified by point P in Figure 2.

POINT	X COORDINATE (ft)	Y COORDINATE (ft)	Z COORDINATE (ft)
P	6,046,707.00	2,292,710.00	-80.00

Table 1: Coordinates of point P

Note that the coordinate system used is the following:

- Horizontal datum: California State Plane, Zone 2 (NAD 83).
- Vertical datum: Water depth below the mean lower low water (MLLW).

Figure 2: Point P location in Mill Bay, off the coast of Fort Bragg, California

3.3. AMBIENT CONDITIONS

Baseline data for ambient seawater conditions shown in Table 2 were taken into consideration for dilution calculations.

AMBIENT SEAWATER CONDITIONS	
Salinity (ppt)	Temperature (ºC)
33.10	11.50

Table 2: Ambient conditions for the project.

3.4. BRINE EFFLUENT CHARACTERISTICS

For modeling purposes, the Ice Ocean outfalls I: submerged wastefield formation berg's highest salinity discharge was used. At 35% recovery, the Iceberg discharges 24,500 gallons/day (17 gallons/minute) of brine. The maximum brine discharge velocity is 0.23 feet/second. Additional brine discharge data is shown in Table 3.

BRINE DISCHARGE CONDITIONS	
Salinity (ppt)	Temperature (°C)
50.92	11.50

Table 3: Effluent conditions for the pilot project.

3.5. ENVIRONMENTAL REGULATIONS

The environmental regulation taken into consideration for this study is the Water Quality Control Plan for Ocean Waters of California (Ocean Plan), which provides the maximum increment of salinity as well as the extent of the Brine Mixing Zone (BMZ) for best designs.

The Ocean Plan states the BMZ is a region where salinity increments over natural background can be greater than 2 ppt[1] [chapter III.M.2.e.(1).(b)]. According to the Ocean Plan, increments should be minimised up to a maximum allowable distance of 328 feet.

Consequently, the initial dilution required can be calculated by the following expression:

[1] ppt is equivalent to g/l.

$$Sfinal = Sinic + \frac{(Sefl - Sinic)}{Di}$$

Where:

- Sinic = Initial salinity (33.10 ppt).
- Sefl = Brine salinity (50.92 ppt).
- Sfinal = Maximum salinity at the end of the near field (33.10 ppt + 2.00 ppt = 35.10 ppt).

Therefore, the minimum initial dilution to be achieved at the end of the near field (<328 feet) is 1:8.91.

4. METHODOLOGY FOLLOWED

The model simulates a submerged horizontal discharge into a stagnant and homogeneous environment. The simulation of calm conditions (low wind and neap tide, *i.e.* in absence of currents) is the worst-case scenario and means the dilution will be higher for the rest of the potential events.

The variables shown below are required as input data for the simulation (all of them have already been defined in previous sections):

- Depth at the discharge point.
- Distance from the surface to the discharge point.
- Discharge angle (relative to the bottom): it has considered a horizontal discharge (0°).
- Number of discharge ports (per device).
- Port diameter of the discharge: Given the existing limitations of the modeling software, the strainer diffuser mesh has been modeled as a single discharge point assuming discharge at 24,500 gallons/day and brine discharge velocity at 0.23 feet/second. Therefore, the equivalent diameter for the brine discharge is 5.51 inches (0.14 meters).
- Discharge flow.
- Effluent salinity.
- Seawater salinity.
- Effluent temperature.
- Seawater temperature.
- Horizontal distance to the end of the BMZ.

Figures 3 and 4 show the diffuser and ambient inputs to the model.

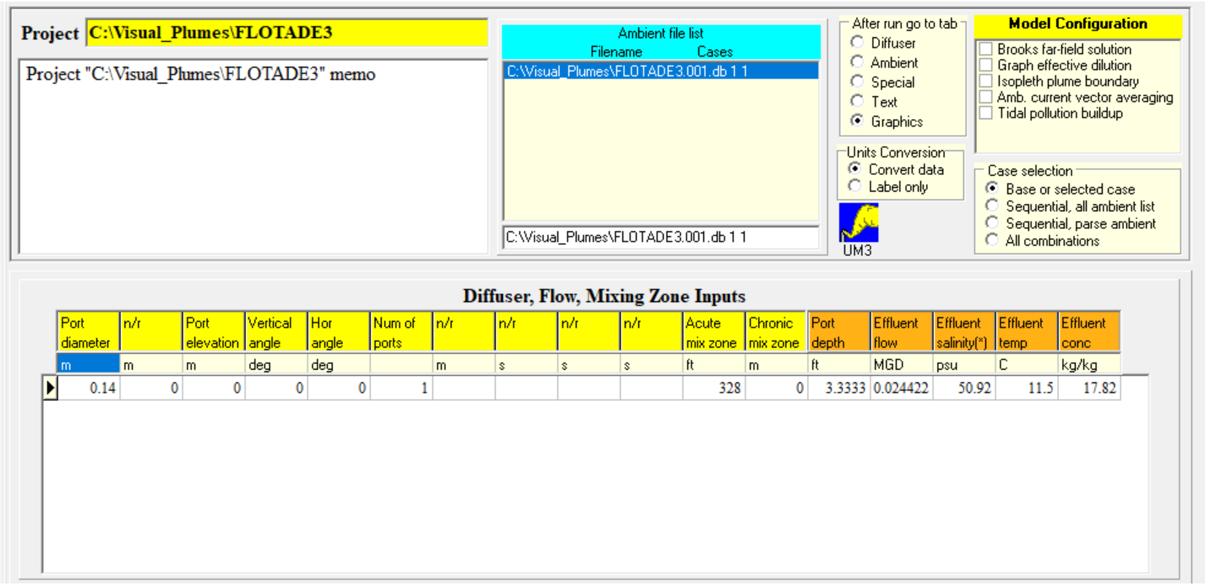

Figure 3: Diffuser inputs in Visual Plumes.

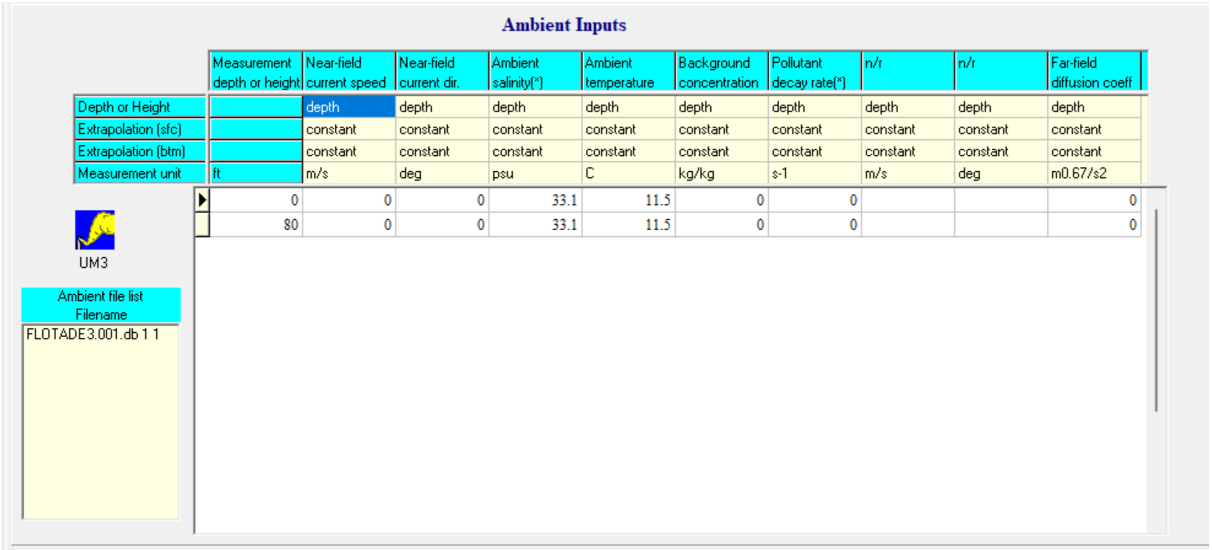

Figure 4: Seawater inputs in Visual Plumes.

5. RESULTS OF THE SIMULATION

The main results of the model are summarized below. The entire output of the model can be consulted in Appendix 1.

Results show seawater salinity lower than 2.0 ppt (including the centreline jet) at a depth of 8.697 feet and a horizontal distance of 0.798 feet from the discharge point (reaching a centreline dilution of 1:9.273).

Figure 5 shows an elevation and plan view of the brine plume. Figure 6 shows the brine discharge's dilution over distance.

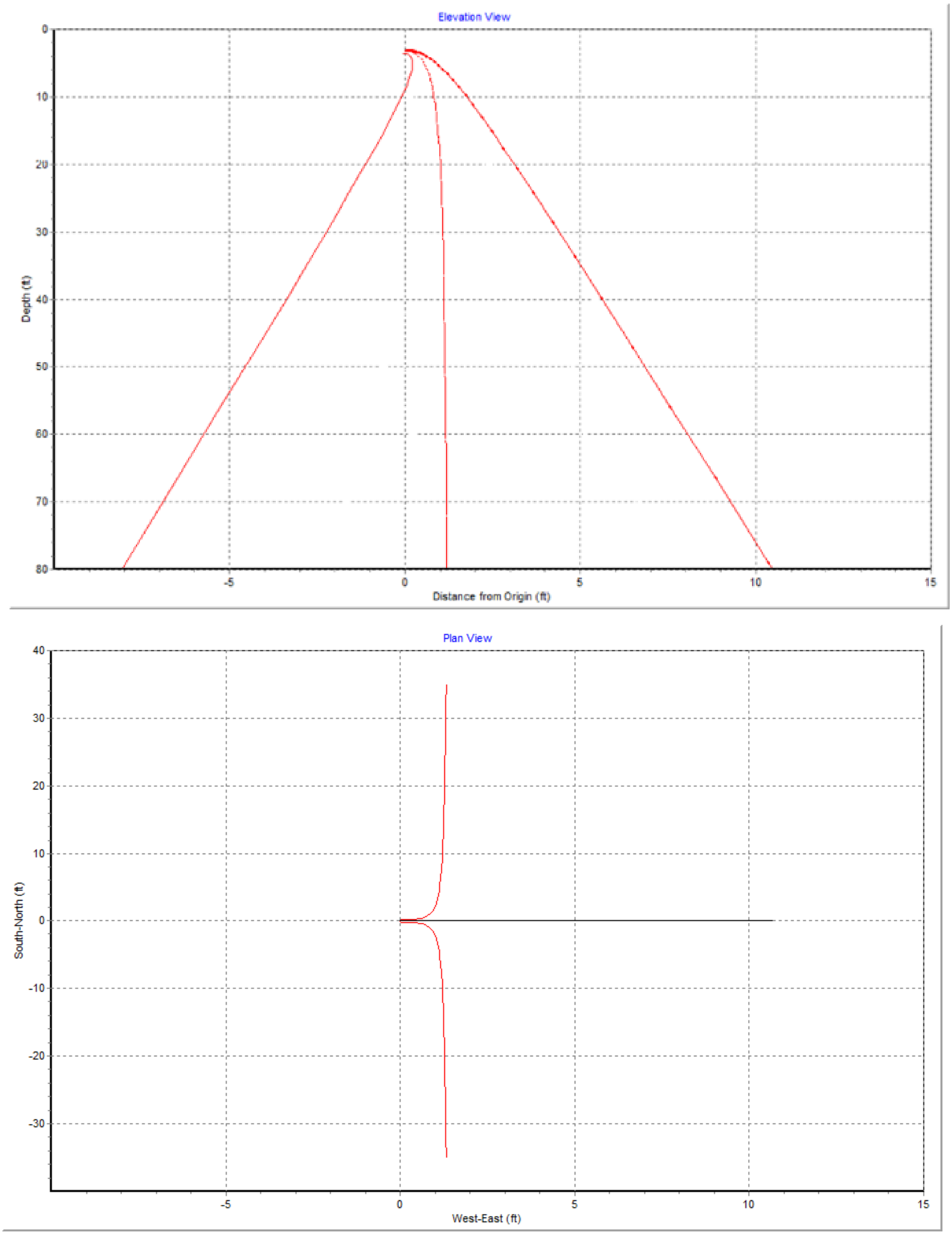

Figure 5: Elevation (Upper) and plan (Lower) view of the plume discharge.

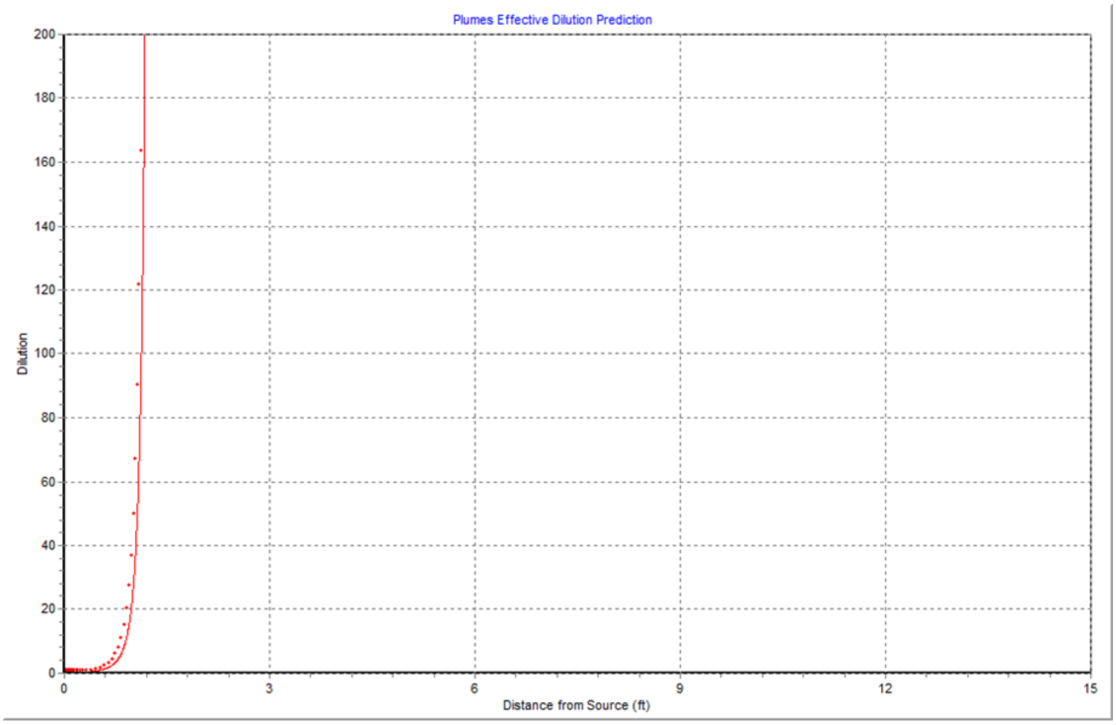

Figure 6: Dilution of the centreline of the plume from the source.

6. CONCLUSIONS

Visual Plumes was used as the model to simulate the initial dilution of the Iceberg's brine discharge. The model considered the characteristics of the Iceberg's brine diffuser as well as the characteristics of the proposed Iceberg location in Mill Bay, off the coast of Fort Bragg, California. Once modelled, the results were compared to the Water Quality Control Plan for Ocean Waters of California (Ocean Plan) to evaluate compliance. The model shows compliance to the Ocean Plan by achieving a dilution below 2.0 ppt compared to ambient salinity at 8.967 feet vertically (depth) and 0.798 feet horizontally from the brine discharge point (reaching a centreline dilution of 1:9.273).

REFERENCES

Baumgartner, D. W et al. (1994). "Dilution Models for Effluent Discharges" (3rd Ed). EPA/600/R-94/086, U.S. Environmental Protection Agency, Pacific Ecosystems Branch, Newport, Oregon.

Davis, L.R. (1999). "Fundamentals of Environmental Discharge Modeling". CRC Press, Boca Raton, FL.

Frick, W.E. (1984). "Non-empirical closure of the plume equations". Atmospheric Environment, Vol. 18, No. 4, pp. 653-662.

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Rawn, A.M et al. (1960). "Diffusers for disposal of sewage in sea water". Proceedings of the American Society of Civil Engineers, Journal of the Sanitary Engineering Division. 86: pp 65-105.

Roberts, P. J. W. (2018). "Brine Diffusers and Shear Mortality. "Prepared for Eastern Research Group.

Roberts, P.J.W. et al. (1989). "Ocean outfalls I: submerged wastefield formation." ASCE Journal of Hydraulic Engineering. 115. No. 1. pp 1-25.

Roberts, P.J.W. et al. (1989). "Ocean outfalls II: spatial evolution of submerged wastefield. ASCE Journal of Hydraulic Engineering." 115. No. 1. pp 26-48.

Roberts, P.J.W. et al. (1989). "Ocean outfalls III: effect of diffuser design on submerged wastefield." ASCE Journal of the Hydraulic Engineering. 115. No. 1. pp 49-70.

State Water Resources Control Board. (2019). "Water Quality Control Plan for Ocean Waters of California. " https://www.waterboards.ca.gov/water_issues/programs/ocean/docs/oceanplan2019.pdf

Winiarski, L.D. and Frick, W.E. (1976). "Cooling tower plume model." USEPA Ecological Research Series, EPA-600/3-76-100, USEPA, Corvallis, Oregon.

APPENDIX 1:
VISUAL PLUMES RESULTS

```
Contents of the memo box (may not be current and must be updated manually)

Project "C:\Visual_Plumes\FLOTADE3" memo



Model configuration items checked:

  Channel width (m) 100

Start case for graphs 1

Max detailed graphs 10 (limits plots that can overflow memory)

 Elevation Projection Plane (deg) 0

Shore vector (m,deg) not checked

 Bacteria model  : Mancini (1978) coliform model

 PDS sfc. model heat transfer : Medium

 Equation of State : S, T

 Similarity Profile : Default profile (k=2.0, ...)

 Diffuser port contraction coefficient 1

 Light absorption coefficient 0.16

 Farfield increment (m) 200

 UM3 aspiration coefficient 0.1

  Output file: text output tab

  Output each ?? steps 20

  Maximum dilution reported 1000

 Text output format : Standard

 Max vertical reversals : to max rise or fall


/ UM3. 30/04/2024 12:57:47
```

Case 1; ambient file C:\Visual_Plumes\FLOTADE3.001.db; Diffuser table record 1: ---------------------------------

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	Density
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.0	0.0	33.10	11.50	0.0	0.0	-	-	0.0	25.23097
24.38	0.0	0.0	33.10	11.50	0.0	0.0	-	-	0.0	25.23097

Diffuser table:

P-dia	Ver angl	H-Angle	SourceX	SourceY	Ports	MZ-dis	Isoplth	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(m)	(deg)	(deg)	(m)	(m)	()	(ft)	(concent)	(ft)	(MGD)	(psu)	(C)	(kg/kg)
0.1400	0.0	0.0	0.0	0.0	1.0000	328.00	0.0	3.3333	0.02442	50.920	11.500	17.820

Simulation:

Froude No: -0.512; Strat No: 0.0000; Spcg No: 1.53E+9; k: 6950.8; eff den (sigmaT) 39.17227; eff vel 0.0695(m/s);

Current is very small, flow regime may be transient.

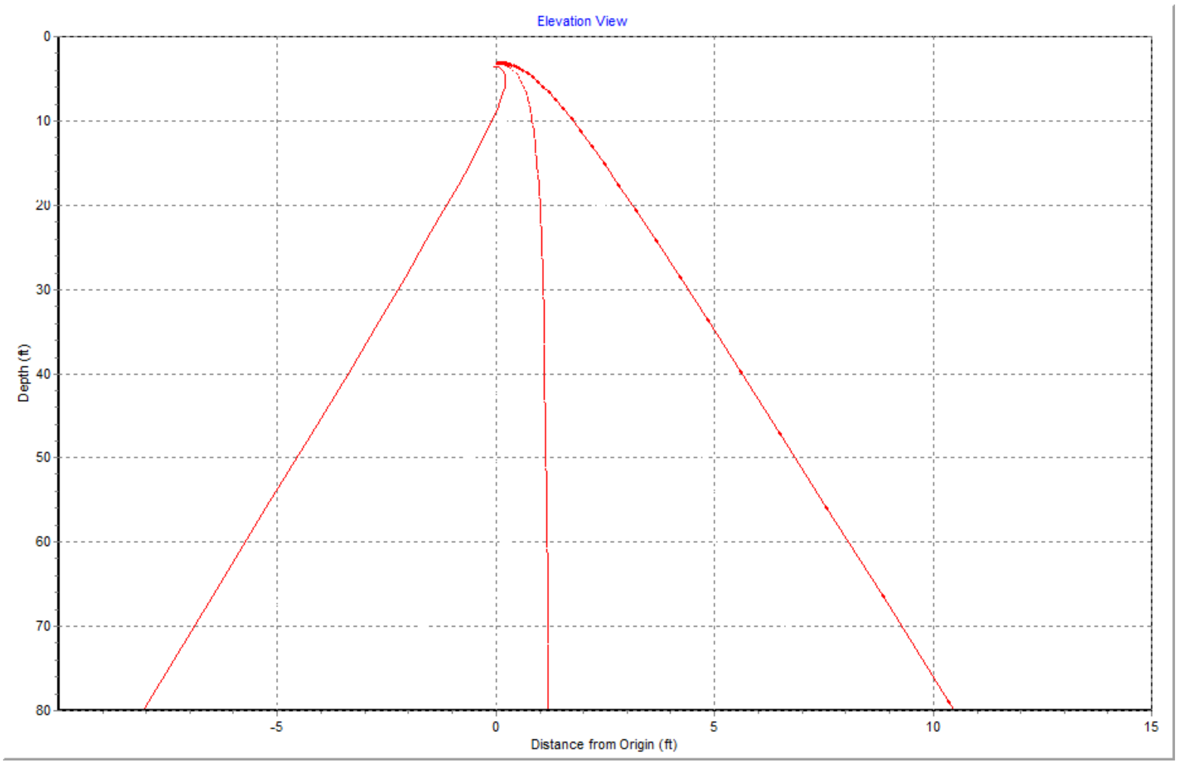
Absolute value Froude No. < 1, possible intrusion and/or plume diameter reduction

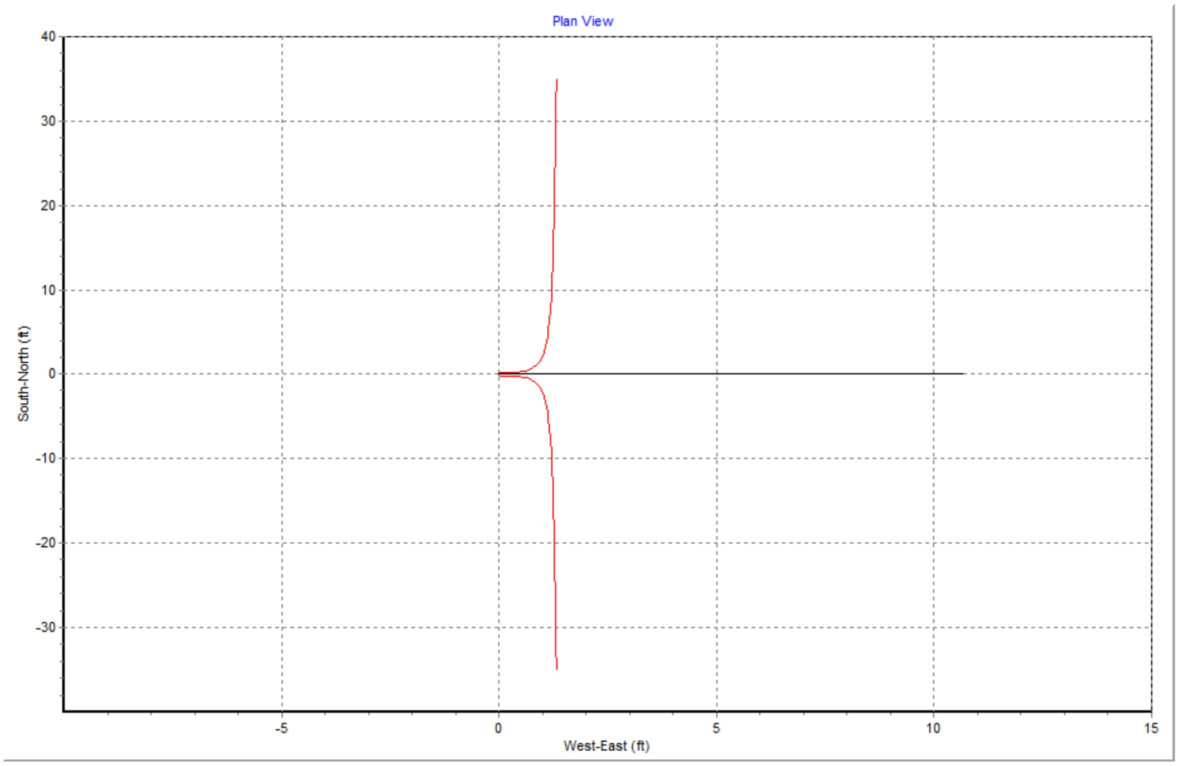
Step	Depth	Amb-cur	P-dia	Polutnt	Dilutn	CL-diln	x-posn	y-posn	Iso dia
	(ft)	(m/s)	(m)	(kg/kg)	()	()	(ft)	(ft)	(m)
0	3.333	1.000E-5	0.140	17.82	1.000	1.000	0.0	0.0	0.1400;
2	3.333	0.0	0.140	17.81	1.001	1.000	0.00129	0.0	0.1401; begin overlap;
20	3.334	0.0	0.140	17.76	1.003	1.000	0.0121	0.0	0.1401;
40	3.336	0.0	0.139	17.71	1.006	1.000	0.0244	0.0	0.1395;
60	3.339	0.0	0.138	17.65	1.010	1.000	0.0371	0.0	0.1382;

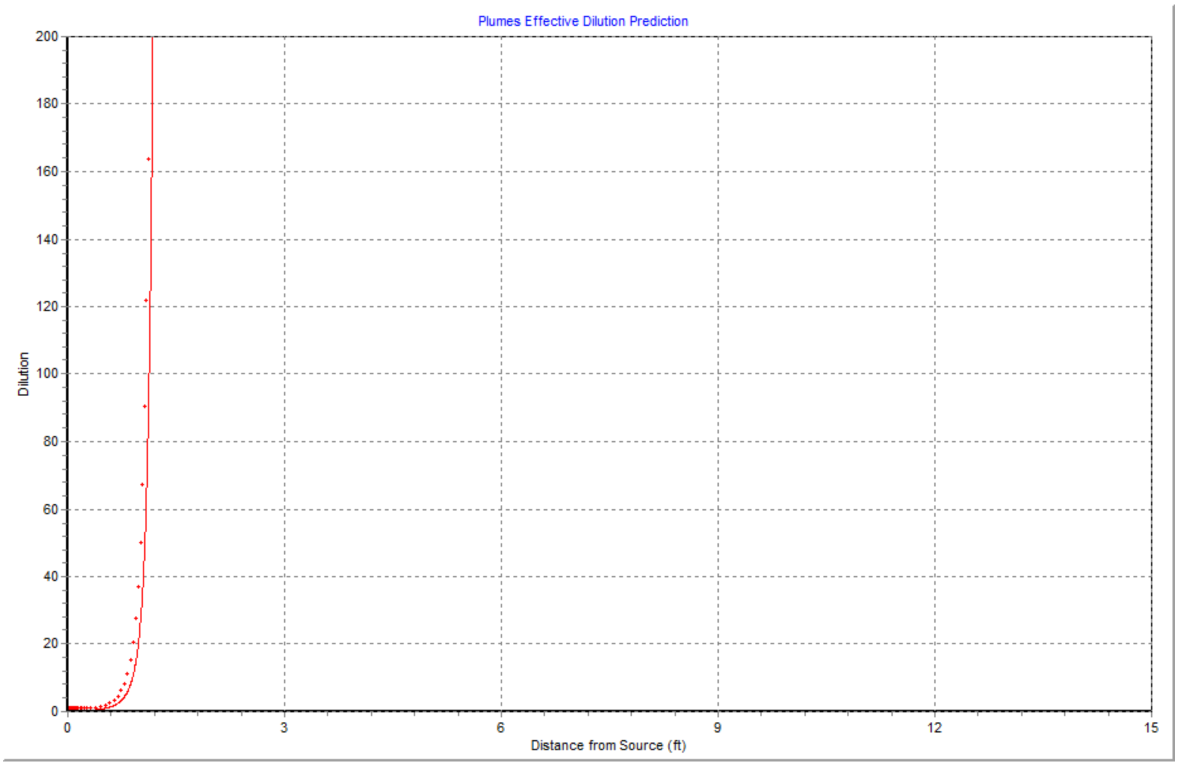
```
        80     3.344      0.0    0.136    17.58    1.014    1.000   0.0506       0.0    0.1363;

       100     3.351      0.0    0.134    17.49    1.019    1.000   0.0652       0.0    0.1338;

       120     3.361      0.0    0.131    17.35    1.027    1.000   0.0813       0.0    0.1308;

       140     3.375      0.0    0.128    17.15    1.039    1.000   0.0995       0.0    0.1275;

       160     3.395      0.0    0.124    16.81    1.060    1.000    0.121       0.0    0.1242;

       176     3.417      0.0    0.122    16.36    1.089    1.000    0.141       0.0    0.1221;
end overlap;

       180     3.424      0.0    0.122    16.22    1.098    1.000    0.146       0.0    0.1217;

       200     3.467      0.0    0.120    15.38    1.159    1.000    0.177       0.0    0.1199;

       220     3.535      0.0    0.119    14.19    1.256    1.000    0.216       0.0    0.1193;

       240     3.650      0.0    0.122    12.49    1.426    1.000    0.268       0.0    0.1216;

       260     3.862      0.0    0.131    10.06    1.771    1.000    0.339       0.0    0.1307;

       280     4.277      0.0    0.155    6.993    2.548    1.274    0.436       0.0    0.1550;

       300     4.836      0.0    0.192    4.698    3.793    1.896    0.525       0.0    0.1924;

       320     5.538      0.0    0.242    3.158    5.643    2.821    0.603       0.0    0.2416;

       340     6.425      0.0    0.305    2.124    8.392    4.196    0.674       0.0    0.3051;

       360     7.546      0.0    0.386    1.428    12.48    6.238    0.739       0.0    0.3862;

       380     8.967      0.0    0.489    0.961    18.55    9.273    0.798       0.0    0.4893;

       400     10.77      0.0    0.620    0.646    27.56    13.78    0.853       0.0    0.6203;

       420     13.05      0.0    0.787    0.435    40.97    20.48    0.904       0.0    0.7865;

       440     15.95      0.0    0.997    0.293    60.88    30.44    0.951       0.0    0.9974;

       460     19.62      0.0    1.265    0.197    90.47    45.23    0.994       0.0    1.2649;

       480     24.28      0.0    1.604    0.133    134.4    67.22    1.034       0.0    1.6042;

       500     30.18      0.0    2.035   0.0892    199.8    99.89    1.071       0.0    2.0345;
merging;
```

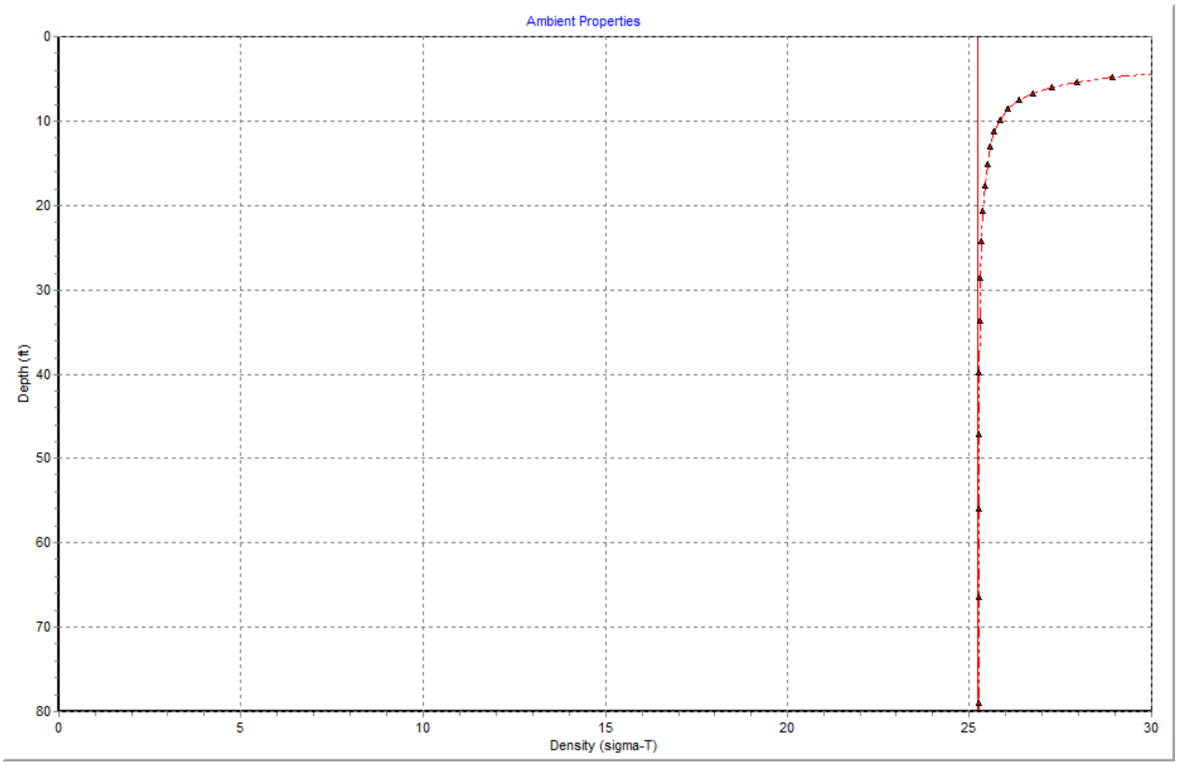
520	37.67	0.0	2.580	0.060	296.9	148.4	1.105	0.0	2.5803;
540	47.17	0.0	3.272	0.0404	441.1	220.6	1.137	0.0	3.2725;
560	59.22	0.0	4.150	0.0272	655.5	327.8	1.166	0.0	4.1503;
580	74.50	0.0	5.264	0.0183	974.1	487.0	1.193	0.0	5.2636;
587	**80.77**	**0.0**	**5.720**	**0.0159**	**1118.9**	**559.4**	**1.201**	**0.0**	**5.7201; bottom hit;**
600	93.88	0.0	6.675	0.0123	1447.4	723.7	1.217	0.0	6.6755;
620	118.5	0.0	8.466	0.00829	2150.8	1075.4	1.240	0.0	8.4661;
640	149.6	0.0	10.74	0.00558	3195.9	1598.0	1.261	0.0	10.737;
660	189.2	0.0	13.62	0.00375	4749.0	2374.5	1.281	0.0	13.617;
680	239.3	0.0	17.27	0.00253	7056.7	3528.4	1.299	0.0	17.270;
698	295.8	0.0	21.39	0.00177	10078.8	5039.4	1.314	0.0	21.388; stop dilution reached;

```
Horiz plane projections in effluent direction: radius(m):      0.0; CL(m):   0.4006

Lmz(m):   0.4006

forced entrain      1     0.0  -89.15   21.39 2.38E-4

Rate sec-1          0.0 dy-1          0.0  kt:          0.0 Amb Sal      33.1000

 ;

12:57:47. amb fills: 4
```


Elevation View
Depth (ft)
0
10
20
30
40
50
60
70
80
-5
0
5
10
15
Distance from Origin (ft)


Plan View
South-North (ft)
40
30
20
10
0
-10
-20
-30
-5
0
5
10
15
West-East (ft)


Plumes Effective Dilution Prediction
Dilution
200
180
160
140
120
100
80
60
40
20
0
0
3
6
9
12
15
Distance from Source (ft)


Ambient Properties
Depth (ft)
0
10
20
30
40
50
60
70
80
0
5
10
15
20
25
30
Density (sigma-T)

APPENDIX 4: ENTANGLEMENT MITIGATION PLAN

APPENDIX 4: ICEBERG DESALINAITON BUOY ENTANGLEMENT MITIGATION PLAN (Fort Bragg, CA USA)

The following outlines the entanglement mitigation plan for the Iceberg wave-powered desalination buoy pilot project for Fort Bragg, CA. The plan's goal is to outline the plans to mitigate entanglement of marine animals on the Iceberg mooring system and anchor lines. The Iceberg mooring system is displayed below in Figure 1. Oneka will continue to seek advisement and input from NOAA Fisheries' Office of Protected Resources (NMFS OPR) and their Marine Mammal Health and Stranding Response Program (MMHSRP), built upon these initial regional efforts of partnering with state and federal agencies, non-governmental organizations (NGOs) to continuously improve our entanglement prevention efforts.

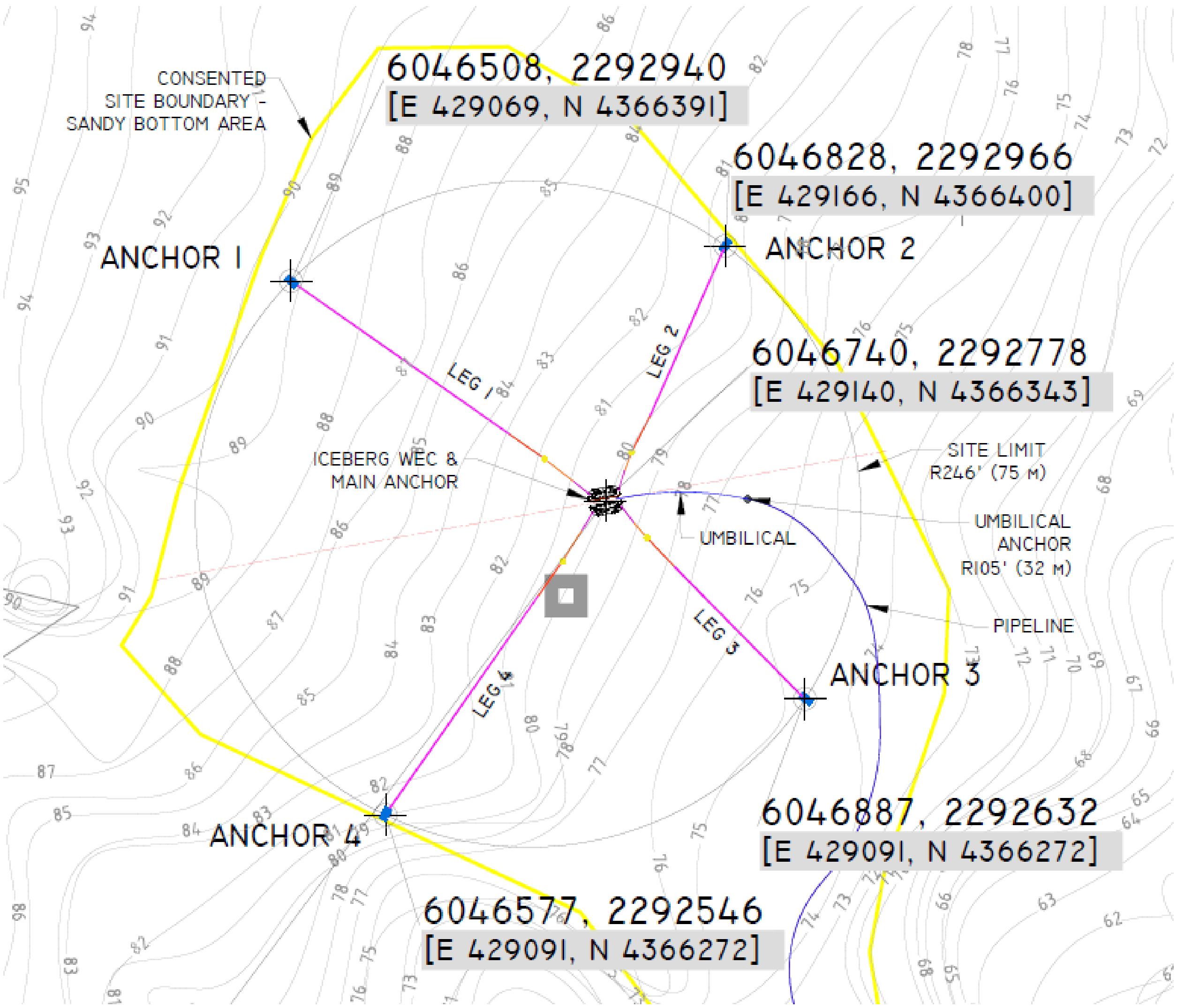


Figure 1. Iceberg Desalination Buoy mooring plan during its 12-month pilot study deployment offshore of the City of Fort Bragg, CA.

PRIMARY ENTANGLEMENT MITIGATION (DESIGN)

The mooring lines holding the Iceberg will be set under high-tension so no loops are able to form in the lines that could ensnare marine life. All additional lines needed for accessory equipment, such as backup emergency anchors, will be run through semi-rigid piping to prevent any loops developing in the water column that could ensnare marine life. The line would be able to move vertically within the piping as needed to fluctuate with the tide and waves. Exposed lines outside of the piping will occur only on the last few feet of line near the seafloor and near the surface. Only the minimal necessary length of the exposed line will be used.

SECONDARY ENTANGLEMENT MITIGATION (REGULAR MONITORING)

During each regular maintenance visit, a visual inspection of the lines from the sea surface will be made to look for evidence of nets or other marine debris getting caught on the lines that could result in secondary entanglement. A video inspection will be made quarterly of the lines using a drop camera, divers, or an ROV to ensure no materials that could cause a secondary entanglement to have become attached to the desalination buoy or its mooring system from the surface to the seafloor.

Similar Oneka desalination buoys operating since 2017 in multiple western hemisphere locations have never experienced an entanglement event. The Iceberg's position will be monitored in real-time by the maintenance team via electronic telemetry and independent satellite coordinates. Available real-time data transmitted from the buoy confirm that the units are securely moored. The GPS sensors mounted on the buoy effectively creates an electric fence and would immediately alert the monitoring system if significant or erratic movement of the buoy is occurring such as that expected if the buoy breaks free from its mooring system or is being dragged by an entangled marine mammal. Units are also equipped with a wireless camera (4G LTE) for enhanced security via periodic transmissions of the field of view. Oneka will also be evaluating acoustic monitoring devices to determine if any could detect marine mammal vocalizations/sounds near the buoys so that a visual exam could be followed upon.

ENTANGLEMENT ACTION PLAN

Following is a list of the Federal policies, guidance, and regulations used to administer the Marine Mammal Protection Act (Table 1) we have consulted to develop the following action plan in the unlikely case of marine mammal entrapment during the Iceberg Pilot Study.

Table 1. Federal policies and best practices for marine mammal entanglement response that were reviewed in preparation of this action plan.

Title	**Date**	**Document**
Large Whale Entanglement Response Best Practices	2022	PDF, 332 pages
Small Cetacean Entanglement Response Best Practices	2022	PDF, 115 pages
Pinniped Entanglement Response Best Practices	2022	PDF, 183 pages

Large Whale Entanglement

Oneka is aware of the NOAA Fisheries' Office of Protected Resources (NMFS OPR) and their Marine Mammal Health and Stranding Response Program (MMHSRP), built upon these initial regional efforts of partnering with state and federal agencies, non-governmental organizations (NGOs), researchers, the fishing industry, members of the community and many others, to establish a network of trained, experienced, well-equipped responders throughout the United States.

The principal resource of large whale entanglement response is the network of authorized responders. Human safety is paramount. The Network follows protocols and techniques that have been proven over time and can mitigate the risks posed by the response to an entangled large whale. It is for risk reduction - to humans and animals - that all large whale entanglement response efforts involving close approach are authorized, overseen, and permitted, under NMFS OPR and their MMHSRP. As such Oneka is actively engaging the Northern California NOAA offices, the Noyo Harbor Coast Guard and the Noyo Harbor Harbormaster in ongoing dialogue regarding the Pilot project, mitigation and monitoring efforts and maintaining a list of primary emergency contacts (listed below) in the unlikely event an entanglement event occurs.

Emergency Contacts

- Entanglement Hotline - 1-877-SOS-WHALe (1-877-767-9425)
- United States Coast Guard – VHF Channel #16

Procedure while awaiting response

- Stay in the boat—***never get in the water*** to attempt to help an entangled large whale.
- Note the GPS coordinates of the location of the entangled large whale, the direction and speed of travel, and whether it is solitary or with other whales.
- Call the entanglement hotline and US Coast Guard using at the Emergency Contacts listed above.
- Wait for trained, authorized personnel—do not attempt to free a large whale on your own.
- Monitor the situation—if a response is possible, authorities may ask that you stand by and watch the animal from a safe and legal distance (e.g., greater than 100 yards and not directly behind the animal).
- Document the entanglement—if possible take photos and video of the animal from a safe, and again, legal distance (high-quality camera preferred). Note behavior of the whale, approximate size, presence, color and markings on any buoys or other gear on the large whale.

Small Cetacean and Pinniped Entanglement

Entanglement in, hooking by, and ingestion of, fishing gear and marine debris is a global problem affecting hundreds of marine species. Small cetaceans (i.e., porpoises, dolphins, and toothed species of whales, excluding sperm whales), pinnipeds (seals and sea lions), fissipeds (sea otters), and sea turtles can become entangled in active and derelict fishing gear and marine debris (e.g., plastic packing bands, large rubber bands, garbage, etc.), as well as ingest fishing gear and marine debris, causing injury and death. Responding to entangled animals is often difficult or impossible due to the inaccessibility of the animal, inability to relocate the animal, inclement weather, lack of experienced and trained personnel, human safety concerns, and more.

NMFS and the MMHSRP have developed Best Practices for responding to live small cetaceans observed with life-threatening entanglements, or more rarely, that have ingested fishing gear, to ensure the health, welfare, and safety of human responders and the impacted animals. These Best Practices balance the need for standardized procedures while allowing flexibility to address specific needs of different situations for diverse species and habitats, as well as unforeseen circumstances.

Report a Stranded or Injured Marine Animal

Reporting a sick, injured, entangled, stranded, or dead animal is the best way to make sure professional responders and scientists know about it and can take appropriate action. All maintenance staff will have access to the Dolphin and Whale 911 app. If a sick, injured, stranded, or dead marine mammal or sea turtle, the maintenance staff will immediately report the observation through the app and contact the local stranding network response centers listed below.

- The Marine Mammal Center - (415) 289-7325
- NOAA Stranding Hotline, West Coast Region – (866) 767-6114

While waiting for responders, maintenance staff will:

- Maintain a safe observing distance (at least 150 ft)
- Record and update the animal's location
    - Address/landmarks on land
    - GPS position in the water
- Observe physical characteristics for approximate size, general identification (whale, dolphin, seal/sea lion, sea otter, or turtle), condition, visible wounds, ID tags or markings, clearly visible reason for distress (entanglement, injured, unknown)

APPENDIX 5: AGREEMENT BETWEEN CITY OF FORT BRAGG AND ONEKA TECHNOLOGIES

24 April 2024

To: The California Seawater Desalination Interagency Group and others of Concern

From: The City of Fort Bragg, with its principal office at 416 North Franklin Street Fort Bragg, CA 95437

Re: Letter of Record of The City of Fort Bragg Equipment Purchase Agreement.

Dear Regulatory Agency Members-

With the presentation of this signed letter, The City of Fort Bragg, confirms that it has been diligently negotiating an expects to have imminently executed by the City Council of the City of Fort Bragg, an Equipment Purchase Agreement between the City of Fort Bragg and Oneka Technologies for the purchase of an Oneka Seawater Desalination Buoy. The buoy in discussion has a nominal design production capacity of 13,200 US gallons per day (50 cubic meters per day) and will be used in a twelve-month pilot study for the city of Fort Bragg.

The Pilot Study is facilitated by a funding agreement between the State of California, Department of Water Resources, and the City of Fort Bragg: DESIGN PILOT PROJECT TITLED: ONEKA SEAWATER DESALINATION BUOY DESIGN PILOT STUDY - DEPARTMENT OF WATER RESOURCES AGREEMENT NO. 4600015131

IN WITNESS WHEREOF,

CITY OF FORT BRAGG

Authorized Signature

John Smith

Printed Name

Director Of Public Works

Title

Diana Sanchez

Witness City Clerk

City Of Fort Bragg
City of Fort Bragg – Department of Public Works
Street Address: 416 North Franklin Street, Fort Bragg, CA 95437, USA
Mailing Address: 416 North Franklin Street, Fort Bragg, CA 95437, USA
Phone: +1(707) 961-2823

APPENDIX 6: SAFETY DATA SHEETS AND OIL SPILL PREVENTION PLAN

SAFETY DATA SHEET

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Identification of the substance — **Product Name:** BioGrease ALC XT 2
Part Numbers: BGALCXT2

Use of the Substance — Industrial Grease

CAS No. — Mixture

Supplier — BioBlend Renewable Resources, LLC.
1500 Jarvis Ave., Elk Grove Village IL., 60007

Manufacturer
Address — BioBlend Renewable Resources, LLC.
1500 Jarvis Ave., Elk Grove Village IL., 60007

SDS Questions: (888) BIO-BLND, (888) 246-2653

Emergency telephone: (888) 246-2653 – M-F 8:00 AM – 4:00 PM

2. HAZARDS IDENTIFICATION

Hazard Statement: This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard, which has been updated to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Physical hazards — Not classified as a physical hazard.

Health hazards — Not Classified as a health hazard.

Environmental hazards — Not classified as an environmental hazard.

Specific hazards — May form vapors or oil mists during mechanical action or at elevated temperatures which may be irritating to the respiratory tract. Excessive inhalation of oil mist may affect respiratory system. Dermatitis after prolonged exposure. Prolonged or repeated contact with skin may cause redness, itching, irritation, eczema/chapping and oil acne.

Main symptoms — Irritant effects. Irritation of eyes and mucous membranes.

Label Elements — Label in accordance with (EC) no. 1272/2008 — No pictogram required

Other Hazards — Not classified as PBT/vPvB by current EU criteria

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS #	% Weight
Vegetable Oil	68956-68-3	[70-95%]
Proprietary Mixture	NA	[5-30%]
Total Non-Hazardous Ingredients	-	100%

Composition comments — The full text for all R-phrases is displayed in Section 16. All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. FIRST-AID MEASURES

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Remove contaminated clothes and rinse skin thoroughly with water for at least 15 minutes. In case of rashes, wounds or other skin disorders: Seek medical attention and bring along these instructions.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove any contact lenses and open eyes wide apart. Get medical attention if irritation develops or persists.
Ingestion	Drink 1 or 2 glasses of water. Get medical attention if any discomfort continues.
Most important symptoms and	
Effects	Symptoms include itching, burning, redness, and tearing of eyes.
General advice	Get medical attention if any discomfort develops.
Notes to physician	Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	Dry chemical, foam, carbon dioxide.
Extinguishing media which must not be used for safety reasons	Do not use water jet as an extinguisher, as this will spread the fire.
Unusual fire & explosion Hazards	None known
Specific hazards	Thermal decomposition may produce smoke, oxides of carbon and lower molecular weight organic compounds whose composition have not been characterized.
Special protective equipment for fire-fighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.
Fire fighting equipment/instructions	Move containers from fire area if you can do it without risk. Use water spray to cool unopened containers. Cool containers with flooding quantities of water until well after fire is out.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	When working with heated grease, mechanical ventilation may be required. Remove sources of ignition. Avoid contact with skin and eyes. For personal protection, see Section 8. In case of spills, beware of slippery floors and surfaces.
Environmental precautions	Do not allow to enter drains, sewers or watercourses. Collect and dispose of spillage as indicated in Section 13. Contact local authorities in case of spillage to drain/aquatic environment.
Methods for cleaning up	Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Small Spills: Absorb spillage with oil-absorbing material.

Large Spills: Absorb spilled substance with sand or earth.

7. HANDLING AND STORAGE

Handling	Handle and open container with care. Wear appropriate personal protective equipment. Avoid prolonged and repeated contact with grease, particularly used grease. Always remove grease with soap and water or skin cleaning agent, never use organic solvents. Use work methods which minimize production of vapors and mists. Observe good industrial hygiene practices.
Storage	Keep away from heat, sparks and open flame. Store in a cool and well-ventilated place. Store away from incompatible materials.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational exposure limits	No exposure limits noted for ingredient(s).
Exposure controls	Provide adequate ventilation. When working with heated oil, mechanical ventilation may be required. Provide access to washing facilities including soap, skin cleanser and fatty cream.
Respiratory protection	In case of inadequate ventilation or risk of inhalation of dust, use suitable respiratory equipment with particle filter (type P2). Seek advice from local supervisor.
Hand protection	Wear protective gloves. Nitrile gloves are recommended. Suitable gloves can be recommended by the glove supplier.
Eye protection	If risk of splashing, wear safety goggles or face shield.
Skin and body protection	Wear suitable protective clothing. Frequent change of gloves is advisable.
General	Use personal protective equipment as required. Personal protective equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment.
Environmental exposure Controls	Contain spills and prevent releases and observe national regulations on emissions.
Hygiene measures	Handle in accordance with good industrial hygiene and safety practices. Wash hands after handling. Launder contaminated clothing before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Grease
Physical state	Semi Solid
Form	Grease
Colour	Golden
Odour	Characteristic vegetable oil
Odour threshold	Not available
pH	Not available
Boiling point	Not available

Flash point	NA
Flammability	Not available
Flammability limits in air, upper, % by volume	Not available
Flammability limits in air, lower, % by volume	Not available
Vapour pressure	< 0.5 mm Hg at 20 °C
Relative density	0.92
Solubility (water)	Practically insoluble
Partition coefficient (n-octanol/water)	Not available
Viscosity	Not available
Vapour density	> 1 (Air = 1)
Evaporation rate	< 1 (n-Butylacetate = 1)
Melting point	Not available
Freezing point	Not available
Auto-ignition temperature	Not available
VOC	0 %

10. STABILITY AND REACTIVITY

Stability	Stable at normal conditions.
Conditions to avoid	High temperatures, Exposure to light, Contact with incompatible materials.
Materials to avoid	Strong oxidizing agents.
Hazardous decomposition Products	At thermal decomposition temperatures, carbon monoxide and carbon dioxide. Nitrogen oxides.
Hazardous polymerization	Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Acute toxicity	May form vapors or oil mists during mechanical action or at elevated temperatures which may be irritating to the respiratory tract. Excessive inhalation of oil mist may affect respiratory system. Causes skin and eye irritation. Swallowing may cause gastrointestinal irritation.
Routes of exposure	Eye contact. Inhalation. Skin contact.
Chronic toxicity	Degreasing. Prolonged or frequent contact may cause redness, itching and eczema/chaps.
Sensitization	The product contains a small amount of sensitizing substance which may provoke an allergic reaction among sensitive individuals.

Carcinogenicity	No carcinogenicity data available for this product.
Mutagenicity	No test data available for the product.
Reproductive Toxicity	No test data available for the product.
Epidemiology	No epidemiological data is available for this product.
Local effects	Irritating to eyes and skin. May cause redness and pain.

12. ECOLOGICAL INFORMATION

Ecotoxicity	Biobased greases are generally non-hazardous to the environment.
Mobility	The product is immiscible with water and will spread on the water surface.
Persistence and degradability	No data available.
Bioaccumulation	No data available.
Aquatic toxicity	No data available for this product.

13. DISPOSAL CONSIDERATIONS

Disposal instructions	Dispose in accordance with all applicable regulations.
Waste from residues / unused Products	Dispose of in accordance with local regulations.
EU wastecodes	20 01 26*

14. TRANSPORT INFORMATION

ADR	Not regulated as dangerous goods.
IATA	Not regulated as dangerous goods.
IMDG	Not regulated as dangerous goods.

15. REGULATORY INFORMATION

Other regulations	This Safety Data Sheet complies with the requirements of Regulation (EC) No 1907/2006 as amended.

16. OTHER INFORMATION

Wording of the R-phrases in sections 2 and 3	R65 Harmful: may cause lung damage if swallowed.

Country(s) or region inventory (yes/no)*	**Inventory name**	**No**
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

SAFETY DATA SHEET

Disclaimer	The information given is based on data available for the material, the components of the material, and similar materials.
Issued By	**Brock Krejchi**
Issue date	10/20/2015
Version No.	01
Revision date	8/18/2022

MARINE GRADE ANTI-SEIZE

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations
Issue date: 6/1/2020 Revision date: 4/28/2022 Supersedes: 3/3/2022 Version: 2.1

SECTION 1: Identification

1.1. Identification

Product form : Mixture

Trade name : MARINE GRADE ANTI-SEIZE

Product code : J145

1.2. Recommended use and restrictions on use

No additional information available

1.3. Supplier

Manufacturer

Whitmore Manufacturing LLC
930 Whitmore Drive
Rockwall, Texas, 75087
USA
T 1.972.771.1000
Regulatory@whitmores.com - www.jetlube.com

1.4. Emergency telephone number

Emergency number : For Chemical Emergency Call CHEMTREC 24hr/day 7days/week
Within USA and Canada: 1.800.424.9300
Outside USA and Canada: +1.703.527.3887
(collect calls accepted)

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS US classification

Not classified

2.2. GHS Label elements, including precautionary statements

GHS US labeling

No labeling applicable

2.3. Other hazards which do not result in classification

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	GHS US classification
distillates (petroleum), hydrotreated heavy paraffinic (Note L)	CAS-No.: 64742-54-7	20 - 30	Not classified

Note L : The classification as a carcinogen need not apply if it can be shown that the substance contains less than 3 % DMSO extract as measured by IP 346 ‘Determination of polycyclic aromatics in unused lubricating base oils and asphaltene free petroleum fractions — Dimethyl sulphoxide extraction refractive index method’, Institute of Petroleum, London. This note applies only to certain complex oil-derived substances in Part 3.

Full text of hazard classes and H-statements : see section 16

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing.

First-aid measures after skin contact : Wash skin with plenty of water.

First-aid measures after eye contact : Rinse eyes with water as a precaution.

First-aid measures after ingestion : Call a poison center/doctor/physician if you feel unwell.

4.2. Most important symptoms and effects (acute and delayed)

No additional information available

4.3. Immediate medical attention and special treatment, if necessary
Treat symptomatically.

SECTION 5: Fire-fighting measures
5.1. Suitable (and unsuitable) extinguishing media
Suitable extinguishing media : Water spray. Dry powder. Foam.

5.2. Specific hazards arising from the chemical
Hazardous decomposition products in case of fire : Toxic fumes may be released.

5.3. Special protective equipment and precautions for fire-fighters
Protection during firefighting : Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures
6.1. Personal precautions, protective equipment and emergency procedures
6.1.1. For non-emergency personnel
Emergency procedures : Exercise caution. Spill area may be slippery.

6.1.2. For emergency responders
Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions
Avoid release to the environment.

6.3. Methods and material for containment and cleaning up
Methods for cleaning up : Mechanically recover the product.

Other information : Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections
For further information refer to section 13.

SECTION 7: Handling and storage
7.1. Precautions for safe handling
Precautions for safe handling : Ensure good ventilation of the work station. Wear personal protective equipment.

Hygiene measures : Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities
Storage conditions : Store in a well-ventilated place. Keep cool.

SECTION 8: Exposure controls/personal protection
8.1. Control parameters

MARINE GRADE ANTI-SEIZE
No additional information available

distillates (petroleum), hydrotreated heavy paraffinic (64742-54-7)
No additional information available

8.2. Appropriate engineering controls
Appropriate engineering controls : Ensure good ventilation of the work station.

Environmental exposure controls : Avoid release to the environment.

8.3. Individual protection measures/Personal protective equipment
Hand protection:

Neoprene or nitrile rubber gloves

Type	Material	Permeation	Thickness (mm)	Penetration
Disposable gloves	Nitrile rubber (NBR), Neoprene rubber (HNBR)	2 (> 30 minutes)	0.3 mm - 0.6 mm	

Eye protection:

Wear eye protection

Skin and body protection:
Wear suitable protective clothing

Respiratory protection:
No respiratory protection needed under normal use conditions

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Solid
Appearance	: pasty.
Color	: light brown
Odor	: petroleum-like odor
Odor threshold	: No data available
pH	: No data available
Melting point	: No data available
Freezing point	: No data available
Boiling point	: No data available
Flash point	: > 224 °C Open cup
Relative evaporation rate (butyl acetate=1)	: No data available
Flammability (solid, gas)	: Not flammable.
Vapor pressure	: No data available
Relative vapor density at 20°C	: No data available
Relative density	: No data available
Solubility	: insoluble in water.
Partition coefficient n-octanol/water (Log Pow)	: No data available
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity, kinematic	: > 22 mm²/s
Viscosity, dynamic	: No data available
Explosion limits	: Not applicable
Explosive properties	: No data available
Oxidizing properties	: No data available

9.2. Other information

VOC content	: < 0.1 %

SECTION 10: Stability and reactivity

10.1. Reactivity
The product is non-reactive under normal conditions of use, storage and transport.

10.2. Chemical stability
Stable under normal conditions.

10.3. Possibility of hazardous reactions
No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid
None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials
No additional information available

10.6. Hazardous decomposition products
Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	: Not classified
Acute toxicity (dermal)	: Not classified
Acute toxicity (inhalation)	: Not classified

distillates (petroleum), hydrotreated heavy paraffinic (64742-54-7)	
LD50 oral rat	> 5000 mg/kg body weight Animal: rat, Guideline: OECD Guideline 401 (Acute Oral Toxicity), Guideline: OECD Guideline 420 (Acute Oral Toxicity - Fixed Dose Method)
LD50 dermal rabbit	> 5000 mg/kg Source: IUCLID
LC50 Inhalation - Rat	> 25 mg/l/4h

Skin corrosion/irritation : Not classified
Serious eye damage/irritation : Not classified
Respiratory or skin sensitization : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified
Reproductive toxicity : Not classified
STOT-single exposure : Not classified
STOT-repeated exposure : Not classified

distillates (petroleum), hydrotreated heavy paraffinic (64742-54-7)	
LOAEL (oral,rat,90 days)	125 mg/kg body weight Animal: rat, Animal sex: male, Guideline: OECD Guideline 408 (Repeated Dose 90-Day Oral Toxicity in Rodents)

Aspiration hazard : Not classified
Viscosity, kinematic : > 22 mm²/s

distillates (petroleum), hydrotreated heavy paraffinic (64742-54-7)	
Viscosity, kinematic	1.99 – 847 mm²/s Temp.: '40°C' Parameter: 'mm²/smm2/s '

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : The product is not considered harmful to aquatic organisms or to cause long-term adverse effects in the environment.

distillates (petroleum), hydrotreated heavy paraffinic (64742-54-7)	
LC50 - Fish [1]	> 5000 mg/l
EC50 - Crustacea [1]	> 1000 mg/l Source: IUCLID
EC50 96h - Algae [1]	> 1000 mg/l Source: IUCLID

12.2. Persistence and degradability

distillates (petroleum), hydrotreated heavy paraffinic (64742-54-7)
Not rapidly degradable

12.3. Bioaccumulative potential

distillates (petroleum), hydrotreated heavy paraffinic (64742-54-7)	
Partition coefficient n-octanol/water (Log Pow)	3.9 – 6 Source: IUCLID

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste treatment methods : Dispose of contents/container in accordance with licensed collector’s sorting instructions.

SECTION 14: Transport information

In accordance with DOT / TDG / IMDG / IATA

DOT	TDG	IMDG	IATA
14.1. UN number			
Not regulated for transport			
14.2. Proper Shipping Name			
Not applicable	Not applicable	Not applicable	Not applicable
Transport document description			
Not applicable	Not applicable	Not applicable	Not applicable
14.3. Transport hazard class(es)			
Not applicable	Not applicable	Not applicable	Not applicable
14.4. Packing group			
Not applicable	Not applicable	Not applicable	Not applicable
14.5. Environmental hazards			
Not applicable	Not applicable	Not applicable	Not applicable
No supplementary information available			

14.6. Special precautions for user

DOT

No data available

TDG

No data available

IMDG

No data available

IATA

No data available

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are present and listed as Active on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

15.2. International regulations

CANADA

distillates (petroleum), hydrotreated heavy paraffinic (64742-54-7)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

No additional information available

National regulations

distillates (petroleum), hydrotreated heavy paraffinic (64742-54-7)
Listed on INSQ (Mexican National Inventory of Chemical Substances)

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

Component	State or local regulations
talc(14807-96-6)	U.S. - Massachusetts - Right To Know List; U.S. - New Jersey - Right to Know Hazardous Substance List; U.S. - Pennsylvania - RTK (Right to Know) List
calcium sulfate(7778-18-9)	U.S. - Massachusetts - Right To Know List; U.S. - New Jersey - Right to Know Hazardous Substance List; U.S. - Pennsylvania - RTK (Right to Know) List
chalk(1317-65-3)	U.S. - Massachusetts - Right To Know List; U.S. - New Jersey - Right to Know Hazardous Substance List; U.S. - Pennsylvania - RTK (Right to Know) List
Titaniumoxide(TiO2)(13463-67-7)	U.S. - Massachusetts - Right To Know List; U.S. - New Jersey - Right to Know Hazardous Substance List; U.S. - New York City - Right to Know Hazardous Substances List; U.S. - Pennsylvania - RTK (Right to Know) List
quartz, 1%≤conc respirable crystalline silica<10%(14808-60-7)	U.S. - Massachusetts - Right To Know List; U.S. - New Jersey - Right to Know Hazardous Substance List; U.S. - Pennsylvania - RTK (Right to Know) List
silicon dioxide, amorphous(7631-86-9)	U.S. - Massachusetts - Right To Know List; U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision date : 04/28/2022

Safety Data Sheet (SDS), USA

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Clarity Synthetic EA Hydraulic Oil 46, 68, 100

Product Use: Hydraulic Oil
Product Number(s): 219011, 219012, 219013, 223063, 223064, 223065, 223071, 223072, 274324
Synonyms: Clarity Synthetic EA Hydraulic Oil 46 ISOCLEAN Certified; Clarity Synthetic EA Hydraulic Oil 68 ISOCLEAN Certified
Company Identification
Chevron Products Company
a division of Chevron U.S.A. Inc.
6001 Bollinger Canyon Rd.
San Ramon, CA 94583
United States of America
www.chevronlubricants.com

Transportation Emergency Response
CHEMTREC: (800) 424-9300 or (703) 527-3887
Health Emergency
Chevron Emergency & Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623
Product Information
email : lubemsds@chevron.com
Product Information: 1 (800) 582-3835, LUBETEK@chevron.com

SECTION 2 HAZARDS IDENTIFICATION

CLASSIFICATION:
Not classified as hazardous according to 29 CFR 1910.1200 (2012).

HAZARDS NOT OTHERWISE CLASSIFIED: Not Applicable

SECTION 3 COMPOSITION/ INFORMATION ON INGREDIENTS

This material contains no ingredients requiring disclosure under the regulatory criteria for this jurisdiction.

SECTION 4 FIRST AID MEASURES

Description of first aid measures
Eye: No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.
Skin: No specific first aid measures are required. As a precaution, remove clothing and shoes if contaminated. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.

Ingestion: No specific first aid measures are required. Do not induce vomiting. As a precaution, get medical advice.
Inhalation: No specific first aid measures are required. If exposed to excessive levels of material in the air, move the exposed person to fresh air. Get medical attention if coughing or respiratory discomfort occurs.

Most important symptoms and effects, both acute and delayed
IMMEDIATE HEALTH EFFECTS
Eye: Not expected to cause prolonged or significant eye irritation.
Skin: High-Pressure Equipment Information: Accidental high-velocity injection under the skin of materials of this type may result in serious injury. Seek medical attention at once should an accident like this occur. The initial wound at the injection site may not appear to be serious at first; but, if left untreated, could result in disfigurement or amputation of the affected part.
Contact with the skin is not expected to cause prolonged or significant irritation. Contact with the skin is not expected to cause an allergic skin response. Not expected to be harmful to internal organs if absorbed through the skin.
Ingestion: Not expected to be harmful if swallowed.
Inhalation: Not expected to be harmful if inhaled.

DELAYED OR OTHER HEALTH EFFECTS:
Reproduction and Birth Defects: This material is not expected to cause adverse reproductive effects based on animal data.

Indication of any immediate medical attention and special treatment needed
Note to Physicians: In an accident involving high-pressure equipment, this product may be injected under the skin. Such an accident may result in a small, sometimes bloodless, puncture wound. However, because of its driving force, material injected into a fingertip can be deposited into the palm of the hand. Within 24 hours, there is usually a great deal of swelling, discoloration, and intense throbbing pain. Immediate treatment at a surgical emergency center is recommended.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO_2) to extinguish flames.
Unusual Fire Hazards: Leaks/ruptures in high pressure system using materials of this type can create a fire hazard when in the vicinity of ignition sources (eg. open flame, pilot lights, sparks, or electric arcs).

PROTECTION OF FIRE FIGHTERS:
Fire Fighting Instructions: This material will burn although it is not easily ignited. See Section 7 for proper handling and storage. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.
Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in vicinity of spilled material.
Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.

Reporting: Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures: DO NOT USE IN HIGH PRESSURE SYSTEMS in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.
Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures.
Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:
Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the workplace when designing engineering controls and selecting personal protective equipment (PPE). If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, refer to PPE information below.

Factors that affect PPE include, but are not limited to: properties of the chemical, other chemicals which may contact the same PPE, physical requirements (fit & sizing, cut/puncture protection, dexterity, thermal protection, etc.), and potential allergic reactions to the PPE material. It is the responsibility of the user to read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances. Refer to appropriate CEN standards.

ENGINEERING CONTROLS:
Use in a well-ventilated area.

PERSONAL PROTECTIVE EQUIPMENT
Eye/Face Protection: Wear protective equipment to prevent eye contact. Selection of protective equipment may include safety glasses, chemical goggles, face shields, or a combination depending on the work operations conducted.
Skin Protection: Wear chemical personal protective equipment (PPE) to prevent skin contact. Selection of chemical protective clothing should be performed by an Occupational Hygienist or Safety Professional and be based upon applicable standards (ASTM F739 or EN 374). Using chemical PPE depends upon operations conducted and may include chemical gloves, boots, chemical apron, chemical suit, and complete facial protection. Refer to PPE manufacturers to obtain breakthrough time information to determine how long PPE can be used before it needs to be replaced. Unless specific glove manufacturer data indicates otherwise, the below table is based upon available industry data to assist in the glove selection process and is intended to be used as reference only.

Chemical Glove Material	Thickness (mm)	Typical Breakthrough Time (minutes)
Butyl	0.7	120

Nitrile	0.8	240
Viton Butyl	0.3	240

Respiratory Protection: No respiratory protection is normally required.

Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.

Occupational Exposure Limits: No applicable occupational exposure limits exist for this material or its components. Consult local authorities for appropriate values.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Attention: the data below are typical values and do not constitute a specification.

Color: Brown to yellow
Physical State: Liquid
Odor: Faint or Mild
Odor Threshold: No data available
pH: Not Applicable
Vapor Pressure: No data available
Vapor Density (Air = 1): No data available
Initial Boiling Point: No data available
Solubility: Insoluble
Freezing Point: Not Applicable
Melting Point: No data available
Density: 0.77 kg/l - 0.95 kg/l @ 15°C (59°F)
Viscosity: 41.40 mm2/s - 110 mm2/s @ 40°C (104°F)
Coefficient of Therm. Expansion / °F: Not Applicable
Evaporation Rate: No data available
Decomposition temperature: No data available
Octanol/Water Partition Coefficient: No data available

FLAMMABLE PROPERTIES:
Flammability (solid, gas): Not Applicable

Flashpoint: (Cleveland Open Cup) 193 °C - 221 °C (379 °F - 430 °F)
Autoignition: No data available
Flammability (Explosive) Limits (% by volume in air): Lower: Not Applicable Upper: Not Applicable

SECTION 10 STABILITY AND REACTIVITY

Reactivity: May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
Incompatibility With Other Materials: Not applicable
Hazardous Decomposition Products: None known (None expected)
Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects
Serious Eye Damage/Irritation: The material is not considered an eye irritant. The product has not been tested. The statement is based on evaluation of data for similar materials.

Skin Corrosion/Irritation: The material is not considered a skin irritant. The product has not been tested. The statement is based on evaluation of data for similar materials.

Skin Sensitization: The material is not considered a skin sensitizer. The product has not been tested. The statement is based on evaluation of data for similar materials.

Acute Dermal Toxicity: The material is not considered a dermal toxicant. The product has not been tested. The statement is based on evaluation of data for similar materials.

Acute Oral Toxicity: The material is not considered an oral toxicant. The product has not been tested. The statement is based on evaluation of data for similar materials.

Acute Inhalation Toxicity: The material is not considered an inhalation toxicant. The product has not been tested. The statement is based on evaluation of data for similar materials.
Acute Toxicity Estimate: Not Determined

Germ Cell Mutagenicity: The material is not considered a mutagen. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Carcinogenicity: The material is not considered a carcinogen. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Reproductive Toxicity: The material is not considered a reproductive toxicant. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Specific Target Organ Toxicity - Single Exposure: The material is not considered a target organ toxicant (single exposure). The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Specific Target Organ Toxicity - Repeated Exposure: The material is not considered a target organ toxicant (repeated exposure). The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Aspiration Hazard: The material is not considered an aspiration hazard.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY
This material is not expected to be harmful to aquatic organisms.
The product has not been tested. The statement has been derived from products of a similar structure and composition.

MOBILITY
No data available.

PERSISTENCE AND DEGRADABILITY
This material is expected to be readily biodegradable. The product has not been tested. The statement has been derived from products of a similar structure and composition.

POTENTIAL TO BIOACCUMULATE
Bioconcentration Factor: No data available.
Octanol/Water Partition Coefficient: No data available

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. Oil collection services are available for used oil recycling or disposal. Place contaminated materials in containers and dispose of in a manner consistent with applicable regulations. Contact your sales representative or local environmental or health authorities for approved disposal or recycling methods.

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

DOT Shipping Description: NOT REGULATED AS HAZARDOUS MATERIAL UNDER 49 CFR

IMO/IMDG Shipping Description: NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER THE IMDG CODE

ICAO/IATA Shipping Description: NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER ICAO

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code:
Not applicable

SECTION 15 REGULATORY INFORMATION

EPCRA 311/312 CATEGORIES: Not applicable

REGULATORY LISTS SEARCHED:

01-1=IARC Group 1	05=MA RTK
01-2A=IARC Group 2A	06=NJ RTK
01-2B=IARC Group 2B	07=PA RTK
02=NTP Carcinogen	08-1=TSCA 5(e)
03=EPCRA 313	08-2=TSCA 12(b)
04=CA Proposition 65	

No components of this material were found on the regulatory lists above.

CHEMICAL INVENTORIES:
All components comply with the following chemical inventory requirements: AIIC (Australia), DSL (Canada), EINECS (European Union), ENCS (Japan), IECSC (China), KECI (Korea), PICCS (Philippines), TSCA (United States).

NEW JERSEY RTK CLASSIFICATION:
Under the New Jersey Right-to-Know Act L. 1983 Chapter 315 N.J.S.A. 34:5A-1 et. seq., the product is to be identified as follows: PETROLEUM OIL (Hydraulic oil)

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 0 Flammability: 1 Reactivity: 0

HMIS RATINGS: Health: 0 Flammability: 1 Reactivity: 0
(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

REVISION STATEMENT: SECTION 08 - Eye/Face Protection information was modified.
SECTION 08 - General Considerations information was modified.
SECTION 08 - Personal Protective Equipment List information was deleted.
SECTION 08 - Personal Protective Equipment information was added.
SECTION 08 - Skin Protection information was modified.

Revision Date: September 14, 2022

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	PEL - Permissible Exposure Limit
GHS - Globally Harmonized System	CAS - Chemical Abstract Service Number
ACGIH - American Conference of Governmental Industrial Hygienists	IMO/IMDG - International Maritime Dangerous Goods Code
API - American Petroleum Institute	SDS - Safety Data Sheet
HMIS - Hazardous Materials Information System	NFPA - National Fire Protection Association (USA)
DOT - Department of Transportation (USA)	NTP - National Toxicology Program (USA)
IARC - International Agency for Research on Cancer	OSHA - Occupational Safety and Health Administration
NCEL - New Chemical Exposure Limit	EPA - Environmental Protection Agency
SCBA - Self-Contained Breathing Apparatus	

Prepared according to the 29 CFR 1910.1200 (2012) by Chevron Technical Center, 6001 Bollinger Canyon Road, San Ramon, CA 94583.

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

ICEBERG DESALINATION BUOY PILOT PROJECT

OIL SPILL PREVENTION PLAN

Prepared For	CITY OF FORT BRAGG & ONEKA TECHNOLOGIES
Prepared By	MILLER MARINE SCIENCE & CONSULTING, INC
Date	APRIL 22, 2024

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CONTENTS

PHOTO CREDITS: J. WILLIAMS, VRG

PURPOSE

The City of Fort Bragg proposes to conduct a pilot study of the Oneka Technologies Iceberg seawater desalination buoy. This oil spill prevention plan was prepared to highlight the methods and materials that will be deployed to minimize any negative effect of the pilot study's use of chemicals on California's marine environment. During all operations where hydrocarbons will be at risk of being spilled, a spill kit will be on hand to contain and clean up the spill. At a minimum, the spill kit will include:

- (10) 15 x 19" Absorbent Pads
- (2) 3" x 4" Sorbent Socks
- (1) Pair of Nitrile Gloves
- (1) Disposable Bag

For larger operations where potential hydrocarbon fluid spills may happen, the spill kit will be augmented as needed to ensure complete containment, capture, and clean-up of any spilled fluids. The spill kit will be held to respond to spills. As a preventative measure, absorbent pads such as Pig Stat-Mat (Pad), that are manufactured to absorb flammable liquids will be used each time hydrocarbon fluids are being dispensed as described below.

OIL SPILL PREVENTION PLAN

Fueling Spill Prevention

All marine crew involved with the pilot study field operations will be trained on the safe handling of the hydrocarbons used as highlighted in the following sections. When a contracted vessel is used during the project, the vessel will be required to provide an Oil Spill Prevention Plan for the subject vessel that complies with California State Oil Spill Contingency Plan (Office of Spill Prevention and Response 2019).

Training for crew involved in study field operations will include reviewing this plan with the survey team prior to any operations begin, always maintain a copy of this plan with the field crew, location and use of the spill kit (listed above), posting the names, phone numbers, and location of all relevant entities such as oil spill response regulators, emergency medical facilities, wildlife care centers, etc. The primary contacts are listed in Table 1. The entities in Table 1 will be contacted immediately when a spill occurs.

Table 1. Contact information for emergency response entities to be notified if oil spill occurs.

Entity	Contact Information
California Office of Oil Spill Prevention and Response	800-852-7550 or 916-845-8911
United States Coast Guard District 11	VHF Ch. 16 or 310-521-3801 (LA/LB) or 619-683-6470 (SD)

Oiled Wildlife Care Network (if spill expands to impact wildlife)	877-823-6926

The vessels used by the field staff during the study may vary. These may include trailered vessels, and larger docked vessels. Regardless of what is being fueled, all open flames and other heat sources will be extinguished in the area surrounding the item being fueled. No smoking, including vaping, will be allowed within a 100 ft radius of the fueling operation. Any spill on land will be reported to the fueling facility (gas station or fuel dock) immediately and field staff will provide any and all assistance with the clean-up the facility needs. The City of Fort Bragg and Oneka Technologies project managers will be immediately notified of any on-the-water spills. The Oneka Technologies project manager will communicate with those listed in Table 1 and coordinate the clean-up effort if hydrocarbons reach the water. Spills contained within the confines of the vessel will be cleaned up immediately by the field staff using the hydrocarbon spill kit.

Trailered Vessels – All trailered vessels will be fueled while on the trailer and on dry land. Absorbent pads will be placed on the ground and on the deck under the fuel fill port to capture any spills. After fueling, the area will be wiped with the mat to clean up any spills that did not land on the mat. Only EPA-approved fuel cans will be used when fueling away from a commercially operated gas station. Whenever possible, trailered vessels will be fueled at a gas station.

If the trailered vessel must be fueled while in the water, the spill kit shall be set nearby and ready for deployment if needed. A Pad will be wrapped around the fill port while an EPA-approved fuel can is used to add fuel to the fuel tank. A second pad will be held near the fuel pressure release port to catch any gas that may be expelled as the tank is filled. Absorbent socks will be set in the water below the overflow spout to catch any fuel released to the environment. If the two-cycle oil reservoir must be filled on the water, a Pad will be placed surrounding the fill hole. All Pads will be retained and disposed of at approved facilities at the earliest opportunity.

Should a temporary gas generator be required during a survey on a trailered vessel, the generator will be filled while on land using the same process as described for fueling the trailered vessel on land. If the generator must be refueled while on the water, the same precautions will be used as described for fueling the boat while in the water. The lone exception will be the placement of an absorbent pad under the generator on the deck to capture any spills that may run down the side of the generator in place of the absorbent pad near the fuel pressure release port described for the boat.

Non-Trailered Vessels – Larger, chartered vessels that remain in the water will be fueled only at commercial fuel docks. Absorbent pads will be used to surround the fuel port on the vessel to capture any spilled fuel.

Other Hydrocarbon Spill Prevention

Hydraulic Fluids – All hydraulic and greased systems, whether on the Iceberg or on a vessel, will have all hoses, fittings, and surfaces inspected either weekly (Iceberg) or prior to departure (vessel). Any loose, worn, or damaged equipment will be replaced by trained technicians. For the

Iceberg, any repairs or hydrocarbon dispensing made at sea will be done so with a spill kit at hands distance. An absorbent sock will be deployed to encircle the Iceberg and absorbent pads will be placed under all parts where hydrocarbons may leak or drip. For all vessels, other than emergency repairs, the repair will be made at a land-based facility or at the dock where vessel motion can be minimized. Absorbent pads will be used to surround the work site to catch any fluid that may spill. All absorbent pads will be properly disposed of at the nearest designated hydrocarbon disposal facility.

APPENDIX 2: CITY OF FORT BRAGG ONEKA DESALINATION BUOY PILOT ENVIRONMENTAL MONITORING PLAN

CITY OF FORT BRAGG

ONEKA DESALINATION BUOY PILOT ENVIRONMENTAL MONITORING PLAN

Prepared For	CITY OF FORT BRAGG
Prepared By	MILLER MARINE SCIENCE & CONSULTING, INC TWB ENVIRONMENTAL RESEARCH & CONSULTING
Date	MARCH 2025

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PROJECT DESCRIPTION AND PURPOSE

This document details the environmental monitoring plan for the City of Fort Bragg's (City's) Oneka Desalination Buoy Pilot Project (Pilot Project). It describes the planned monitoring, sampling, and analysis of the Iceberg's interaction with the area's marine environment. Key marine conditions to be investigated include the following:

1. Construction and decommissioning marine wildlife monitoring,
2. Operational impacts to planktonic life, and
3. Operational impacts to water quality and verification of the brine dilution modeling.

Oneka's desalination Iceberg buoy model is being deployed as a pilot study under Department of Water Resources Agreement (Grant) No. 4600015131 to determine its operational characteristics and to quantify the effect of a single Iceberg on the marine environment. These data generated in the Pilot Project could provide the foundation for a future, utility-scale Iceberg deployment where multiple units are used to augment the City's potable water supply. It is expected that a utility-scale Iceberg deployment will require a new permitting effort. The Pilot Project data will be valuable for understanding how the utility-scale deployment will interact with the environment and will assist California regulators with their project review during the permitting process. The Pilot Project Description is included as Attachment 1 to this document for reference.

1 ENVIRONMENTAL SETTING

The City is located in western Mendocino County on a stretch of the rugged Northern California coastline between the Noyo River and Pudding Creek. It is one of the, comparatively, more urban areas within the mostly rural Mendocino County. Historically, the local economy has been dominated by natural resource-based business enterprises such as timber, fishing, and tourism. The 2002 closure of the Georgia-Pacific Mill reduced the timber industry's stake in the local economy. Fishing and tourism remain significant parts of the coastal economy.

The coastal waters where the buoy for this pilot project will be moored is a mix of sandy plains interspersed among high-rugosity rocky reefs underlying a high-wave-energy environment (Figure 1). In support of the pilot study, a detailed map of the seafloor was created using side-scan sonar imaging followed by remotely-operated vehicle surveys to verify the structures identified during the sonar imaging. This resulted in identifying the mapped soft-bottom habitat displayed in tan in Figure 1. Kelp canopy mapped during three years (1989, 1999, and 2016) is also shown in Figure 1. Two of the three years represent near-maximum canopy area (1989 and 1999) and the third year is the most recent year for which a GIS shapefile is available (2016) from the California Department of Fish and Wildlife's Marine GIS unit (https://filelib.wildlife.ca.gov/Public/R7_MR/). Kelp canopy areas can be used as a proxy for the presence of hard substrate. Canopy forming kelps require hard substrate to attach to in high-energy wave areas to maintain position. Not all hard substrate, however, supports canopy-forming kelp. This can be due to turbidity, high-concentration of suspended solids that scour the substrate and eliminate canopy-forming kelp holdfasts, an abundance of herbivorous predators, and others

(Schiel and Foster 2015). Marine protected areas (MPAs) in the area were also added to the map (Figure 1) to assess the spatial proximity of the proposed project to protected areas.

Recent environmental surveys in compliance with the City's wastewater treatment plant (AMS 2023) documented a variety of marine resources such as various algal species, sea urchins (including *Strongylocentrotus purpuratus* and *S. franciscanus*), and red abalone (*Haliotis rufescens*). Foliose algal species such as *Desmarestia* and *Nereocystis* were either absent or present in very low densities consistent with the overall trend of declining algal communities along the Northern California coastline (Rodgers-Bennet and Catton 2019). The algal community decline has coincided with an increase in the sea urchin populations, which may be correlated to the algal decline, and an increase in exposed rocky habitat. During the four surveys in the area since 2007, AMS (2023) reported a gradual habitat conversion from sand to rocky substrate throughout the area. This coincides with two significant drought episodes in California.

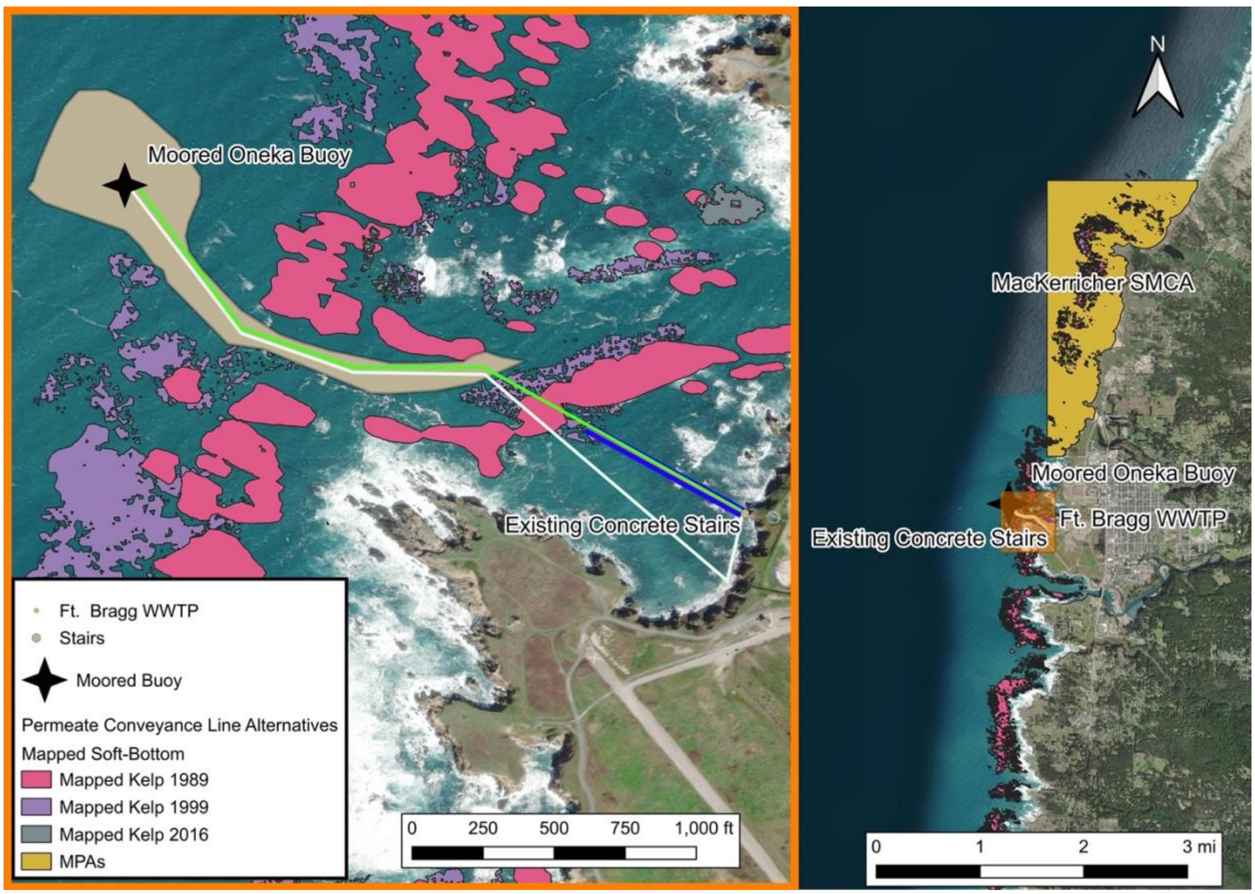

Figure 1. Map of the proposed pilot project and surrounding habitat, existing infrastructure, and location of the nearest Marine Protected Area (MPA). The mapped soft-bottom habitat is represented by the beige area in the map. Mapped kelp areas drawn from the California Department of Fish and Wildlife's Marine GIS. Green (preferred) and white (alternative) permeate conveyance lines depicted on the map. The existing wastewater treatment plant outfall is shown in blue.

A circular area measuring approximately 6.3 acres of predominantly sandy substrate (the bowl) was identified offshore of the City's wastewater treatment plant (WWTP) and deemed suitable for the placement of the Iceberg's mooring system with minimal risk to sensitive habitat. A sand channel extending from the offshore bowl inshore to near the terminus of the City's WWTP ocean outfall was identified and deemed suitable for the placement of the permeate pipeline. The permeate pipeline will have to cross hard substrate that supported canopy-forming kelp in both the 1989 and 1999 California Department of Fish and Wildlife mapping surveys. No kelp canopy was reported in this area during 2016 mapping effort or during the side-scan sonar and ROV surveys performed for this project as detailed in the Project Description. The proposed permeate pipeline alignment from the offshore bowl to the existing WWTP ocean outfall is the least impactful identified. The channel's minimum width is 71 ft; wide enough for the permeate pipeline and its anchoring system to reach the shoreline.

Using the maps provided in Figure 1, the preferred Iceberg mooring site is approximately 570 ft from the nearest canopy-forming kelp based on the 1989 mapping survey, approximately 300 ft from the nearest canopy-forming kelp based on the 1999 mapping survey, and 0.75 miles from the nearest MPA, MacKerricher State Marine Conservation Area (SMCA).

2 MARINE WILDLIFE MONITORING

The Iceberg installation and decommissioning will require construction work boats and barges. These crafts will primarily be used to deploy and retrieve the Iceberg, the mooring system and the associated large ballast weights and cables. Additional large craft work will be needed to deploy and retrieve the permeate pipeline and its ballast. No pile-driving or similar activities known to produce potentially damaging acoustic signals are planned for the construction or decommissioning. The potential impacts of the construction include harassment of marine mammals and interactions with sea turtles.

2.1 MARINE WILDLIFE IN CALIFORNIA WATERS

A total of fourteen (14) marine animals that are included under the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), the Species of Concern (SOC), or a combination of any of these three statues may be present along California's coast. The following subsections include data for each species, including the protected species status, the minimum

Table 1. Species that are expected to be observed in the project area. Species that are listed are those that are included under the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), or are considered (Species of Concern).

Taxonomic Group	Species	Common Name	ESA	MMPA	Minimum Population Estimate	Current Population Trend	Most Likely Period of Occurrence
Cetaceans - Large Whale Species	*Balaenoptera musculus*	Blue Whale	Endangered	Depleted, Strategic	1,551	Stable	Summer, Fall
	Balaenoptera physalus	Fin Whale	Endangered	Depleted, Strategic	8,127	Stable	Year-round, peaks during Summer and Fall
	Balaenoptera borealis	Sei Whale	Endangered	Depleted, Strategic	374	Data Deficient	Fall, Winter, Spring
	Balaenoptera edeni	Bryde's Whale			Data Deficient	Data Deficient	Summer, Winter
	Balaenoptera acutorostrata	Minke Whale			369	Data Deficient	Spring, Summer, Fall, with peaks during the Spring
	Eschrichtius robustus	Gray Whale			26,960	Increasing	Fall, Winter, Spring, primarily Winter
	Megaptera novaeangliae	Humpback Whale	Endangered	Under Review	2,784	Increasing	Spring, Summer, Fall, with peaks during the Fall
Cetaceans - Dolphins and Porpoises	*Delphinus spp.*	Common Dolphin					
	Delphinius delphis delphis	Short-Beaked Common Dolphin			839,325	Increase	Year-round, peaks during Summer
	Delphinius capensis capensis	Long-Beaked Common Dolphin			68,432	Potential Increase	Year-round, peaks during Fall
	Tursiops truncatus	Bottlenose Dolphin			346	Stable	Year-round
	Orcinus orca	Killer Whale			276; 77	Stable; Decreasing	Year-round; Summer

Taxonomic Group	Species	Common Name	ESA	MMPA	Minimum Population Estimate	Current Population Trend	Most Likely Period of Occurrence
	Lagenorhynchus obliquidens	Pacific White-Sided Dolphins			21,195	Data Deficient	Cold-water months
	Grampus griseus	Risso's Dolphin			4.817	Data Deficient	Cold-water months
	Pseudorca crassidens	False Killer Whale			No relevant stock	No relevant stock	Rare, but March and April 2018
Pinnipeds	*Zalophus californianus*	California Sea Lion			233,515	SST dependent	Year-round, peaks in Summer
	Phoca vitulina richardii	Harbor Seal			27,348	Decreasing	Year-round
	Mirounga angustirostris	Northern Elephant Seal			81,368	Increasing	Year-round, peaks in Winter, Spring, and Summer
	Enhydra lutris nereis	Southern Sea Otter	Endangered	Depleted, Strategic	3,272	Increasing	Year-round, peaks in Winter and Spring
	Arctocephalus townsendi	Guadalupe Fur Seal	Threatened	Depleted, Strategic	15,830	Increasing	Rare, but April 2018
	Callorhinus ursinus	Northern Fur Seal			7,524	Increasing, but El Niño Dependent	Year-round
Sea Turtles	*Caretta caretta*	Loggerhead Turtle	Threatened		1,212	Increasing	Year-round but rare
	Chelonia mydas	Green Turtle	Endangered		20,062	Increasing	
	Dermochelys coriacea	Leatherback Turtle	Endangered		308	Decreasing	Year-round

population estimate, the current population trend, and the most likely periods of occurrence for the species and stocks relevant to the project region.

2.1.1 Cetaceans - Large Whale Species

2.1.1.1 BLUE WHALE

There are two populations of Blue Whales (*Balaenoptera musculus musculus*) in the North Pacific Ocean (Carretta et al. 2019). The population relevant to the project region is the Eastern North Pacific Stock, which ranges from the Gulf of Alaska to the bottom of the Exclusive Economic Zone (EEZ) on the U.S. West Coast (Carretta et al. 2019).

Protection Status – Blue Whales are considered "Endangered" by the ESA, and "Depleted" and "Strategic" under the MMPA (Carretta et al. 2019).

Minimum Population Estimate – The current minimum population estimate for this species was calculated from the lower 20th percentile of the mark-recapture estimate (log-normal distribution) for a total of 1,551 whales (Carretta et al. 2019).

Current Population Trend – Using mark-recapture estimates to calculate the current population trend of this species indicates no population increase since the 1990s. It has been suggested that this population reached 97% of its carrying capacity in 2013 (Carretta et al. 2019).

Most Likely Periods of Occurrence – Blue Whales are most likely to occur along the U.S. West Coast in the summer and fall for feeding, but individuals have been found feeding north and south of this region as well (Carretta et al. 2019).

2.1.1.2 FIN WHALE

There are insufficient data to determine precise stocks for Fin Whales (*Balaenoptera physalus physalus*) in the Northern Hemisphere. However, from a conservation standpoint, Fin Whales that are present off the coasts of California, Oregon, and Washington are relevant to the present project area (Carretta et al. 2019).

Protection Status – Fin Whales are considered "Endangered" under the ESA and "Depleted" and "Strategic" under the MMPA (Carretta et al. 2019).

Minimum Population Estimate – The current minimum population estimate for this species was calculated as the lower 20th percentile of the posterior distribution of the 2014 abundance estimate for a total of 8,127 whales (Carretta et al. 2019).

Current Population Trend – Fin Whale abundance increased between 1991 and 2008 by an average of 7.5% each year. From 2008 to 2014, the population appeared to stabilize (Carretta et al. 2019).

Most Likely Periods of Occurrence – Fin Whales occur year-round in the Gulf of Alaska, the Gulf of California, California (specifically the Southern California Bight), Oregon, and Washington. Using data derived from CalCOFI surveys between 2004 and 2008, Fin Whales were spotted in California waters across all seasons, with peak abundances observed during the summer and fall (Douglas et al. 2014).

2.1.1.3 SEI WHALE

There is one population of Sei Whales (*Balaenoptera borealis borealis*) in the North Pacific Ocean. The stock that is relevant to the project site is the Eastern North Pacific Stock (Carretta et al. 2019). However, this species tends to use offshore waters and are not associated with coastal features (Carretta et al. 2019).

Protection Status – Sei Whales are considered “Endangered” under the ESA and “Depleted” and “Strategic” under the MMPA (Carretta et al. 2019).

Minimum Population Estimate – The current minimum population estimate for this species was calculated as the lower 20th percentile of the log-normal distribution of abundances that were estimated between 2008 and 2014 via vessel line transect surveys for a total of 374 whales (Carretta et al. 2019).

Current Population Trend – There are no data to determine Sei Whale abundance trends (Carretta et al. 2019).

Most Likely Periods of Occurrence – Sei Whales are likely to occur in coastal California waters in all seasons apart from summer (Barlow 1994).

2.1.1.4 BRYDE’S WHALE

There are a total of seven stocks of Bryde’s Whales (*Balaenoptera edeni*) that span the North Pacific Ocean, South Pacific Ocean, and Peruvian coasts. The Eastern Tropical Pacific stock is relevant to this project and spans east of 150°W and includes the Gulf of California and waters off the California Coast (Carretta et al. 2019)

Protection Status – Bryde’s Whales are not currently listed as at risk under the ESA (endangered or threatened) or under the MMPA (depleted or strategic) (Carretta et al. 2019).

Minimum Population Estimate – There is no current estimate of minimum population, because the only estimate for this species was in 1993 (Carretta et al. 2019).

Current Population Trend – There are no data to determine Bryde’s Whale abundance trends (Carretta et al. 2019).

Most Likely Periods of Occurrence – A project using passive acoustic telemetry found that Bryde’s Whales are present in the Southern California Bight between summer and early winter seasons (Kerosky et al. 2012).

2.1.1.5 MINKE WHALE

There are three stocks of Minke Whales (*Balaenoptera acutorostrata scammoni*) in the North Pacific Ocean; the stock that spans the waters of California, Oregon, and Washington is relevant to the project region (Carretta et al. 2019).

Protection Status – Minke Whales are not currently listed as at risk under the ESA (endangered or threatened) or under the MMPA (depleted or strategic) (Carretta et al. 2019).

Minimum Population Estimate – The current minimum population estimate was calculated as the lower 20th percentile of the log-normal distribution of abundances that were estimated between 2008 and 2014 via ship surveys during the summer and fall seasons for a total of 369 whales (Carretta et al. 2019).

Current Population Trend – There are no data to determine Minke Whale abundance trends (Carretta et al. 2019).

Most Likely Periods of Occurrence – Minke Whales occur year-round off the coast of California (Carretta et al. 2019). Using data derived from CalCOFI surveys between 2004 and 2008, Minke Whales were spotted in California waters during the spring, summer, and fall seasons, with peak abundances observed during the spring (Douglas et al. 2014).

2.1.1.6 GRAY WHALE

There are two stocks of Gray Whales (*Eschrichtius robustus*) in the Pacific Ocean; the stock relevant to this project site is the Eastern North Pacific Stock, which includes the coastal waters of Alaska down to the southern region of the Gulf of California (Carretta et al. 2019).

Protection Status – Gray Whales are not currently considered at risk under the ESA (endangered or threatened) or under the MMPA (depleted or strategic) (Carretta et al. 2019).

Minimum Population Estimate – The current minimum population estimate was calculated from the 2015/2016 abundance estimate multiplied by the coefficient of variation for a total of 26,960 whales (Carretta et al. 2019).

Current Population Trend – The population has been increasing over the years, potentially due to an increase in feeding conditions in the arctic as ice begins to melt (Carretta et al. 2019).

Most Likely Periods of Occurrence – Grey Whales occur in the southern region of the North American coast during the fall and in the northern region of the North American coast during the spring seasons. Most individuals pass the California coast in the middle of January to the middle of February (Swartz et al. 2006).

2.1.1.7 HUMPBACK WHALE

The stock structure of Humpback Whales (*Megaptera novaeangliae*) is currently being evaluated by the National Marine Fisheries Service. Historically, several populations of Humpback Whales were identified in the North Pacific Ocean based on breeding areas. The population that is relevant to the project site is the California, Oregon, Washington stock (Carretta et al. 2019).

Protection Status – Humpback Whales are currently considered “Endangered” under the ESA and is under review for the MMPA (Carretta et al. 2019).

Minimum Population Estimate – The current minimum population estimate was calculated as the lower 20th percentile of the log-normal distribution from mark-recapture estimates for a total of 2,784 whales (Carretta et al. 2019).

Current Population Trend – There has been a long-term increase in the population of Humpback Whales (8% per year), but the population did not increase linearly each year (some years showed decreasing population trends) (Carretta et al. 2019).

Most Likely Periods of Occurrence – Using data derived from CalCOFI cruises between 2004 and 2008, Humpback Whales were spotted in California waters during the spring, summer, and fall seasons, with peak abundances observed during the fall (Douglas et al. 2014).

2.1.2 Cetaceans - Dolphins and Porpoises

2.1.2.1 COMMON DOLPHIN

There are two species that comprise the Common Dolphin group – the Short-Beaked Common Dolphin (*Delphinus delphis delphis*) and the Long-Beaked Common Dolphin (*Delphinus capensis capensis*). The Short-Beaked Common Dolphin is widely distributed across the coast of California, and the stock relevant to the project region includes the waters of California, Oregon, and Washington (Carretta et al. 2019). The Long-Beaked Common Dolphin distribution overlaps with the Short-Beaked Common Dolphin Distribution, and the population relevant to the Southern California region is the California Stock (Carretta et al. 2019).

Protection Status – Short-Beaked Common Dolphins and Long-Beaked Common Dolphins are not considered at risk under the ESA (endangered or threatened) or under the MMPA (depleted or strategic) (Carretta et al. 2019).

Minimum Population Estimate – The current minimum population estimate for Short-Beaked Common Dolphins is calculated from the log-normal 20th percentile from abundance estimates between 2008 and 2014 for a total of 839,325 dolphins (Carretta et al. 2019). The current minimum population estimate for Long-Beaked Common Dolphins is calculated from the log-normal 20th percentile from abundance estimates between 2008 and 2014 for a total of 68,432 whales (Carretta et al. 2019).

Current Population Trend – There has been an increase in Short-Beaked Common Dolphin population abundances during warm-water periods and likely is the result of the northward movement of this stock from Mexico (Carretta et al. 2019). There have been no formal statistical analyses for the population trend for Long-Beaked Common Dolphins, but vessel-based line-transect surveys have recorded higher abundance estimates in recent years (Carretta et al. 2019).

Most Likely Periods of Occurrence – Short-Beaked Common Dolphins are abundantly distributed along the Californian coast and their periods of occurrence change seasonally and inter-annually (Carretta et al. 2019). Long-Beaked Common Dolphins are more commonly found inshore along the west coast of Baja California and their periods of occurrence change seasonally and inter-annually. Using data derived from CalCOFI cruises between 2004 and 2008, Short-Beaked Common Dolphins and Long-Beaked Common Dolphins were spotted in California waters throughout all seasons, with peak abundances for Short-Beaked Common Dolphins in the summer and Long-Beaked Common Dolphins in the fall (Douglas et al. 2014).

2.1.2.2 COMMON BOTTLENOSE DOLPHIN

Common Bottlenose Dolphins (*Tursiops truncatus*) have a circumglobal distribution in tropical and warm-temperate waters. The population relevant to the project is the California Coastal stock (Carretta et al. 2019).

Protection Status – Common Bottlenose Dolphins are not considered at risk under the ESA (endangered or threatened) or under the MMPA (depleted or strategic) (Carretta et al. 2019).

Minimum Population Estimate – The current minimum population estimate for Common Bottlenose Dolphins was collected from the minimum number of individually identified animals that were documented during surveys between 2009 and 2011 for a total of 346 dolphins (Carretta et al. 2019).

Current Population Trend – The Common Bottlenose Dolphin population appears to be stable, based on data from mark-recapture abundances in 1987 to 1989, 1996 to 1998, and 2004 to 2005 (Carretta et al. 2019). The number of individually identifiable Common Bottlenose Dolphins surveyed in 2009 to 2011 indicates that the population may be growing (Carretta et al. 2019).

Most Likely Periods of Occurrence – Common Bottlenose Dolphins have been known to occur year-round in California and Baja California since 1983 when ocean temperatures began to increase (Carretta et al. 2019).

2.1.2.3 KILLER WHALE (ORCA)

There are eight Killer Whale (*Orcinus orca*) stocks that are recognized within the U.S. EEZ. The stock relevant to this project is the Eastern North Pacific Offshore stock and the Eastern North Pacific Southern Resident stock (Carretta et al. 2019).

Protection Status – Killer Whales in the Eastern North Pacific stock are not considered at risk under the ESA (endangered or threatened) or under the MMPA (depleted or strategic) (Carretta et al. 2019). However, Killer Whales in the Eastern North Pacific Southern Resident stock were listed as “Endangered” under the ESA in 2005 and are “Strategic” under the MMPA (Carretta et al. 2019). This stock was considered “Depleted” under the MMPA prior to its addition to the ESA in 2005 (Carretta et al. 2019).

Minimum Population Estimate – The current minimum population estimate for Killer Whales in the Eastern North Pacific Offshore stock were calculated from the lower 20th percentile of the estimate reported by Ford et al. (2014) for a total of 276 whales (Carretta et al. 2019). The current minimum population estimate for the Eastern North Pacific Southern Resident stock was calculated by counting individually identifiable animals for a total of 77 whales (Carretta et al. 2019).

Current Population Trend – The Eastern North Pacific Offshore Killer Whale stock is considered stable by Ford et al. (2014). This assessment was based on high annual survival rates (0.98) and annual recruitment rates (0.02) (Carretta et al. 2019, Ford et al. 2014). The Eastern North Pacific Southern Resident stock has declined since 1995, but was thought to have increased between 1974 and the 1990’s by 1.8% per year (Carretta et al. 2019).

Most Likely Periods of Occurrence – Killer Whales can occur along the coasts of California year-round (Forney and Barlow 1998), but the Eastern North Pacific Southern Resident stock is most sighted during the summer in the inland waters of Washington and southern British Columbia (Carretta et al. 2019).

2.1.2.4 PACIFIC WHITE-SIDED DOLPHIN

Protection Status – Pacific White-Sided Dolphins (*Lagenorhynchus obliquidens*) are not currently listed as at risk under the ESA (endangered or threatened) or under the MMPA (depleted or strategic) (Carretta et al. 2019).

Minimum Population Estimate – The current minimum population estimate for Pacific White-Sided Dolphins was calculated as the log-normal 20th percentile of the average abundance estimates from 2008 to 2014, for a total of 21,195 dolphins (Carretta et al. 2019).

Current Population Trend – No long-term population trends for Pacific White-Sided Dolphins have been identified, as the distribution and abundances of this species are variable across seasons and years (Carretta et al. 2019).

Most Likely Periods of Occurrence – Pacific White-Sided Dolphins are primarily off California during periods of cold water (winter months; Carretta et al. 2019).

2.1.2.5 RISSO'S DOLPHIN

Protection Status – Risso's Dolphins (*Grampus griseus*) are not currently listed as at risk under the ESA (endangered or threatened) or under the MMPA (depleted or strategic) (Carretta et al. 2019).

Minimum Population Estimate – The current minimum population estimate for Risso's Dolphins was calculated as the log-normal 20th percentile of geometric mean abundance estimates between 2008 and 2014, for a total of 4,817 dolphins (Carretta et al. 2019).

Current Population Trend – No long-term population trends for Risso's Dolphins have been identified, as the distribution and abundances of this species are variable across seasons and years (Carretta et al. 2019).

Most Likely Periods of Occurrence – Risso's Dolphins are found primarily off California during periods of cold water (winter months) (Carretta et al. 2019).

2.1.2.6 FALSE KILLER WHALE

There are several different False Killer Whale (*Pseudorca crassidens*) stocks that are found world-wide in tropical waters (Carretta et al. 2019). However, no stocks are relevant to the project and do not typically occur along southern California.

2.1.3 Pinnipeds

2.1.3.1 CALIFORNIA SEA LION

There are five distinct populations of California Sea Lions (*Zalophus californianus*) that span the United States and Mexico. However, since there is no joint management between countries, the stock relevant to the project area is the U.S. stock (Carretta et al. 2019).

Protection Status – California Sea Lions are not currently listed as at risk under the ESA (endangered or threatened) or under the MMPA (depleted or strategic), as the stock estimate is nearly 40% above the maximum net productivity level (Carretta et al. 2019).

Minimum Population Estimate – According to the most recent Pacific Region Marine Mammal Stock Assessment, the minimum population size in 2014 is 233,515 animals (Laake et al. 2018; Carretta et al. 2019), which appears to be reaching the estimated carrying capacity of this species. The minimum population size represents the lower 95% confidence interval for the 2014 population size estimate (Carretta et al. 2019).

Current Population Trend – Using data from 1975 to 2014, population trends were derived using annual pup counts, annual survivorship estimates using mark-recapture methods, and estimates of human-caused injuries, mortalities and bycatch. Results indicate annual pup survival was higher for females (0.600) compared to males (0.574, Carretta et al. 2019; DeLong et al. 2017). Maximum annual survival rates for animals 5 years of age are 0.952 for females and 0.931 for males, and the survival of pups and yearlings decreased by 50% for each one degree increase in sea surface temperature (Carretta et al. 2019; DeLong et al. 2017). Decreases in sea surface temperature resulted in an increase in pup and yearling survival estimates (Carretta et al. 2019; DeLong et al. 2017).

Most Likely Periods of Occurrence – California Sea Lions can occur along the California coast year-round and show high occurrences south of Point Conception during the breeding season between May and July (Antonelis and Fiscus 1980).

2.1.3.2 HARBOR SEAL

Harbor Seals (*Phoca vitulina richardii*) occur throughout the North Atlantic and North Pacific Oceans. In the North Pacific Ocean, the population relevant to the project site is the California stock (Carretta et al. 2019).

Protection Status – California Harbor Seals are not currently listed as at risk under the ESA (endangered or threatened) or under the MMPA (depleted or strategic) (Carretta et al. 2019).

Minimum Population Estimate – The current minimum population estimate was calculated from the estimated number of seals hauled out of the water in 2012 and multiplied by the correction factor for a total of 27,348 seals (Carretta et al. 2019).

Current Population Trend – Since 2004, counts of Harbor Seals in California decreased (Carretta et al. 2019).

Most Likely Periods of Occurrence – Harbor Seals occur off the coasts of California year-round (Bartholomew 1965).

2.1.3.3 NORTHERN ELEPHANT SEAL

Northern Elephant Seals (*Mirounga angustirostris*) have breeding and birthing grounds that span California and Baja California. The stock relevant to the project is the California Breeding stock (Carretta et al. 2019).

Protection Status – Northern Elephant Seals are not currently listed as at risk under the ESA (endangered or threatened) or under the MMPA (depleted or strategic) (Carretta et al. 2019).

Minimum Population Estimate – The current minimum population estimate was calculated by doubling the observed pup count in 2010 for a total of 81,368 seals (Carretta et al. 2019).

Current Population Trend – The population has grown annually by 3.8% since 1998 (Lowry et al. 2014).

Most Likely Periods of Occurrence – Between December and March, Northern Elephant seals breed and give birth primarily on offshore islands in California and Baja California. Adults molt on land between March and August and return to their feeding areas in the Gulf of Alaska between seasons (Carretta et al. 2019).

2.1.3.4 SOUTHERN SEA OTTER

Southern Sea Otters (*Enhydra lutris nereis)* occur off the coast of California as far north as San Mateo County and as far south as San Diego County.

Protection Status – Southern Sea Otters are considered "Endangered" under the ESA and as "Strategic" and "Depleted" under the MMPA (FWS 2017).

Minimum Population Estimate – The current minimum population estimate for Southern Sea Otters was calculated from the latest three-year running average of combined counts from the mainland range and San Nicolas Island for a total of 3,272 otters (FWS 2017).

Current Population Trend – The Southern Sea Otter population has grown 3.2% per year over the past five years (FWS 2017).

Most Likely Periods of Occurrence – Southern Sea Otter abundances are highest in the central portion of their range, between Seaside, CA (north) and Cayucos, CA (south) along the Big Sur coast of California. Southern Sea Otters are consistently present in kelp-dominated areas and are seasonally present in sandy, soft-bottom habitats (winter to early spring). Mating and pupping occur year-round, but peak between October through January, and March through April (FWS 2017).

2.1.3.5 GUADALUPE FUR SEAL

Protection Status – Guadalupe Fur Seals (*Arctocephalus townsendi*) are considered "Threatened" under the ESA and "Depleted" and "Strategic" under the MMPA (Carretta et al. 2019).

Minimum Population Estimate – All Guadalupe Fur seals cannot be counted, as different age classes and sexes use the shore at different times of the year. Direct counts from Isla Guadalupe and Isla San Benito in 2010 indicate a minimum overall population size of 15,830 seals (Carretta et al. 2019; Garcia-Capitanchi, 2011).

Current Population Trend – Guadalupe Fur Seal population abundances appear to be increasing 10.3% per year (Carretta et al. 2019).

Most Likely Periods of Occurrence – Guadalupe Fur Seals do not typically inhabit waters near the coast of California, and most sightings of this species are due to stranding events (Carretta et al. 2019).

2.1.3.6 NORTHERN FUR SEAL

Protection Status – Northern Fur Seals (*Callorhinus ursinus*) are not currently listed as at risk under the ESA (endangered or threatened) or under the MMPA (depleted or strategic) (Carretta et al. 2019).

Minimum Population Estimate – The current minimum population estimate for Northern Fur Seals was calculated as the sum of the minimum number of animals at San Miguel Island and the Farallon Islands in 2013 (after accounting for pups and their mothers), for a total of 7,524 seals (Carretta et al. 2019).

Current Population Trend – The Northern Fur Seal population has increased since 1968, but periodically decreases due to El Niño events (Carretta et al. 2019).

Most Likely Periods of Occurrence – Northern Fur Seals may be present year-round, due to different requirements during the reproductive season. Males may appear on shore between June and August, and some individuals may stay as late as November. Females, on the other hand, typically are found ashore between June and November (Carretta et al. 2019).

2.1.4 Sea Turtles

2.1.4.1 LOGGERHEAD TURTLE

There are nine Loggerhead Turtle (*Caretta caretta*) Distinct Population Segments (DPS) that have been identified globally (Conant et al. 2009). The population that is relevant to the project region is the North Pacific Ocean DPS (Conant et al. 2009).

Protection Status – Loggerhead Turtles are considered “Threatened” under the ESA (Conant et al. 2009).

Minimum Population Estimate – The current minimum population estimate was calculated from unpublished data from the Sea Turtle Association of Japan and from Kmezaki et al. (2002). Data in this estimate reflect the number of females at nesting beaches in Japan, as all Loggerhead Turtle nesting for this population occurs in Japan. The most recent available data from 2007 indicates nearly 1,212 turtles (Conant et al. 2009).

Current Population Trend – In the time series data from the sources listed above, it appears that the Loggerhead Turtle population in the North Pacific Ocean decreased between 1990 and 1996/1996 but increased between 1999/2000 and 2004/2005. The population decreased between 2004 and 2005 but appears to be increasing between 2004/2005 and 2007 (Conant et al. 2009).

Most Likely Periods of Occurrence – Loggerhead Turtles can occur within tropical and temperate waters in the Pacific Ocean, but the only documented nesting area for the North Pacific Ocean population of this species is in Japan (Conant et al. 2009).

2.1.4.2 GREEN TURTLE

There are eleven Green Turtle (*Chelonia mydas*) Distinct Population Segments (DPS) that have been identified globally (Seminoff et al. 2015). The population that is relevant to the project is the East Pacific DPS which extends from the California/Oregon border (northern-most region at 42˚N) along the coast to central Chile (southern-most region at 40˚S). This population includes waters within 143˚W to 96˚W.

Protection Status – Green Turtle populations along the Pacific Coast of Mexico and in Florida are classified as “Endangered” under the ESA, and all other populations are classified as “Threatened” (Seminoff et al. 2015).

Minimum Population Estimate – The current population estimate for Green Turtles in the East Pacific DPS was calculated from abundance estimates at nesting sites as the total number of females counted divided by the number of years of monitoring and multiplied by the remigration interval. The estimated total nester abundance is 20,062 turtles (Seminoff et al. 2015).

Current Population Trend – The nesting site located in Colola, MX was the only site that had sufficient data to estimate the current population trend (fifteen years of recent nesting data; annual nesting level of > 10 females). Results from this site indicate that the population increased prior to 2015 and is expected to continue increasing over time (Seminoff et al. 2015).

Most Likely Periods of Occurrence – Green Turtles are most likely to occur at known nesting sites during the nesting season. Most nesting sites occur along the coasts of Mexico, Costa Rica, Columbia, and Ecuador with no known nesting sites in California.

2.1.4.3 LEATHERBACK TURTLE

Leatherback Turtles (*Dermochelys coriacea*) have a global distribution that includes regions in the Pacific Ocean that span from British Columbia and the Gulf of Alaska (north) to the coast of Chile and New Zealand (south) (NMFS 2013).

Protection Status – Leatherback Turtles are considered “Endangered” under the ESA (NMFS 2013).

Minimum Population Estimate – The current population estimate for Leatherback Turtles in the eastern Pacific Ocean was derived for several different nesting regions. Approximately 188 female Leatherback Turtles were nesting in 2003-2004 in Costa Rica, and 120 nests were found using aerial surveys along Mexico in 2003-2004 (NMFS 2013).

Current Population Trend – There has been a decline in the population for Leatherback Turtles in the eastern Pacific Ocean since the 1980s (NMFS 2013).

Most Likely Periods of Occurrence – In the Pacific Ocean, Leatherback Turtles nest year-round at nesting beaches in Indonesia, Papua New Guinea and the Solomon Islands and use California waters for foraging. There are both summer and winter nesting Leatherback Turtles, so occurrence off the coast of California may be year-round (NMFS 2013).

2.2 Marine Species Monitoring and Mitigation Plan and BMP Implementation Plan

2.2.1 Marine Wildlife Monitors

A Marine Wildlife Monitor (MWM) will be present during all construction and decommissioning activities. The actual number of MWM(s) present will depend on the equipment used and the spatial area occupied by the working craft. The MWM(s) will have a set of binoculars, a cell phone, a VHF radio set to a pre-determined channel for the project, and a logbook in their possession while they perform their specific duties. If a monitoring vessel is needed during the project, the vessel operator can serve as the MWM as this individual will be surveying the surroundings constantly to ensure safe navigation.

2.2.1.1 MARINE WILDLIFE MONITOR QUALIFICATIONS

Each MWM shall be an experienced marine biologist, with a minimum of a bachelor’s degree in science, who has experience in marine mammal identification and behaviors and have knowledge of marine mammal physiology, behavior, and life-history. These qualifications will assist in being able to determine if observed marine mammals are exhibiting behavioral reactions to the proposed actions. Each Biological Monitor shall have no other construction-related tasks while conducting monitoring.

2.3 Marine Wildlife Monitoring Guidelines

Minimizing Impacts to Marine Wildlife – The MWM will have the authority to alter vessel operations when marine mammals or reptiles are observed. A 100-m exclusion zone will be observed during construction. If marine wildlife enters the exclusion zone, the MWM will have the authority to stop all work as quickly as can be achieved safely. Construction will only occur when the full exclusion zone can be observed without impairment by nightfall, fog, rain, or other conditions limiting safe observation of the entire safety zone. The conditions effecting observations of the safety zone will be periodically reevaluated during each monitoring day.

When an animal is observed entering or about to enter the exclusion zone, the MWM will issue a stop work order to the construction foreman. All construction will temporarily stop as quickly as can be safely[1] achieved. The animal will be observed continuously. Once the animal has been observed safely outside the exclusion zone or has not been observed for at least 15 minutes, construction will resume.

MWM Station On Board – The MWM(s) will be positioned where a clear view of the surrounding waters can be safely achieved. If stationed on a construction craft, the MWM will be allowed access to the highest point safely achieved on the craft with an unobstructed view of the project area. If the MWM cannot be safely stationed on the construction craft, a dedicated vessel will be used. The vessel will be positioned to see at least 75% of the exclusion zone at any given time. If not possible, additional monitoring vessels and MWMs will be deployed to ensure sufficient coverage to monitor the entire exclusion zone.

Data Collection and Reporting for Marine Wildlife Monitors – The MWM will record all encounters with marine mammals and sea turtles. Relevant information such as the species, group size, age (juvenile or adult, if can be determined), size (if can be determined), and sex (if can be determined) of individuals will be recorded. Other information that will be recorded includes the behavior of the animals, the distance the group of animals was from the vessel, and the outcome of such encounters.

Marine Mammal and Reptile Collision Response and Reporting –If a collision with a marine mammal or a sea turtle occurs at any time, the MWM will document the conditions under which the accident occurred, including:

1) the exact location at the time of collision
2) the date and time of the collision
3) any environmental conditions such as wind speed and direction, swell height, visibility in meters or kilometers, and the presence of rain or fog present at the time of the collision
4) the species of marine wildlife that was involved in the collision, and
5) the name of the vessel and the vessel operator at the time the collision occurred.

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[1] Safe applies to minimizing the potential to harm staff, damage equipment, or negatively impact the environment.

The project's Marine Mammal Entanglement Plan (included in the Project Description) will be used to guide the reporting of any injured, stranded, or entangled animal.

Recording and Reporting Procedures – At the completion of each phase (construction and decommissioning), a Marine Wildlife Monitoring Report (Report) will be prepared and submitted to all permitting agencies. The Report will include copies of the MWM logbooks and will address the effectiveness of the current monitoring protocols and procedures, as well as a report on all marine mammal and sea turtle sightings. Such sightings will include species names and counts. If, over the course of the survey, the MWM notices a behavioral change in any wildlife species that may be attributed to the survey's actions, such information will be included in the Report. Any alterations to the survey in response to MWM observations of altered marine mammal behavior will also be included in the Final Report.

3 MARINE WATER QUALITY MONITORING

3.1 Continuous Brine Discharge Monitoring

The brine discharge is expected to rapidly dilute within a one foot (horizontally) and nine feet (vertically) from the discharge point. To effectively monitor and validate the modeled dilution, a string of temperature and conductivity data-logging sensors, from which salinity is derived, will be deployed from and near the Iceberg (Table 2). The sensors will be spaced at increasing intervals from the Iceberg to the seafloor to match the discharge dilution modeling. From the Iceberg, data-logging sensors will be placed on a vertical mooring line spaced at 1, 3, 9, and 12 ft depth from the Rotoflush intake/discharge screen. This spacing encapsulates, and exceeds, the model-predicted depth (nine ft vertically) of the brine plume before it dilutes to no more than 2 ppt over ambient salinity. A second mooring with four data-logging sensors will be placed approximately one foot (horizontally) away from the Rotoflush screen. The sensors will again be placed at the 1, 3, 9, and 12 ft depths in reference to the Rotoflush screen and not the sea surface. This second string of data-logging sensors will capture the outer boundary of the brine mixing zone (BMZ) predicted by the discharge modeling, or one foot (horizontally) away from the discharge point (Rotoflush screen). The loggers will be serviced as needed, but no less than quarterly, to download the accumulated data, clean the logger and its housing of any biofouling, and redeploy. Monitoring will continue for the duration of the pilot study while the Iceberg is deployed.

3.2 Monthly Water Quality Monitoring

Each month, water quality profiles from the sea surface to the sea floor will be collected using a calibrated, multiparameter sonde. Water temperature, pH, salinity, and dissolved oxygen will be measured throughout the water column at each of five stations at 1-ft depth intervals between the surface and the sea floor (Table 2). One station will be located as close to the Iceberg's Rotoflush screen as can be safely achieved and an additional four stations will each be located 100 ft away from each corner of the Iceberg in a cross-formation to monitor upcoast, downcoast, offshore, and inshore of the Iceberg (Figure 2). The four stations located 100 ft away will serve as spatial reference stations capturing water quality in each possible direction of the ocean currents that could transport the brine plume. Monthly monitoring will continue for the duration of the pilot study while the Iceberg is deployed.

3.3 Water Chemistry Monitoring

Each quarter during the Iceberg's deployment and once before the deployment, seawater samples will be collected using a discrete-depth sampler (e.g., Van Dorn bottle) as close to the Iceberg discharge point as possible and at Station WQ2, a reference station (Table 2). These samples will be transported to Alpha Analytical Laboratories for chemical analysis. This is the same analytical laboratory the City has used for testing in compliance with the WWTP's NPDES permit. The water samples will be tested for the same set of Ocean Plan Table 1 Priority Pollutants as were analyzed in the Project Description.

3.4 Marine Water Quality Monitoring Reporting

A brief synopsis of the data collected each month will be shared with the regulatory group via email. These data should be considered draft and subject to change as the project progresses. A final report compiling all accumulated data and its analysis after a rigorous QA/QC review will be prepared and submitted to the funding and permitting agencies within 6 months of the Iceberg's decommissioning at the end of the pilot study's year-long deployment.

4 PLANKTON ENTRAINMENT ASSESSMENT

One of the key concerns raised regarding seawater desalination is the potential impact to marine plankton. The Iceberg is designed to minimize entrainment to the extent possible by using an ultra-fine mesh (60 µm) screen over the intake. The mesh size and a corresponding intake velocity of less than 0.5 feet per second are expected to exclude all but the smallest plankton, e.g., phytoplankton. This expectation will be assessed with the following plankton sampling plan. The application of the results from this study will be germane to future Iceberg permitting efforts if this investigation can empirically demonstrate that the Iceberg's intake system results in significantly reduced entrainment in comparison to an unscreened open intake.

4.1 Plankton Sampling Plan

Plankton in the immediate vicinity and at a reasonable distance away from the Iceberg will be sampled quarterly. For the pilot study, a quarterly sampling frequency was selected in recognition of the often-dangerous conditions that exist on the water offshore of Fort Bragg. A quarterly frequency should allow sufficient scheduling latitude to safely conduct the field sampling during daylight and nighttime hours during the same 24-hr period.

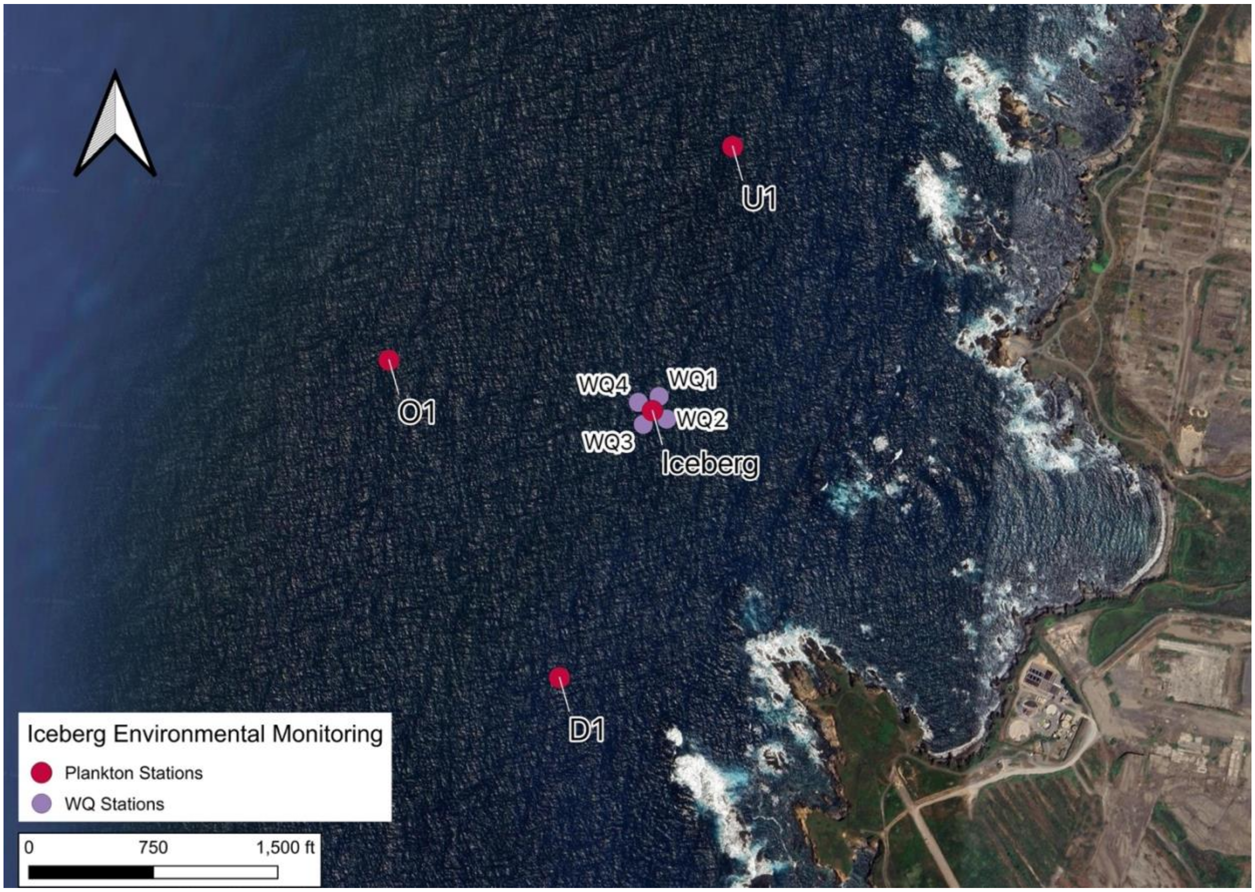

Figure 2. The water quality and plankton sampling stations. The Iceberg is indicated as both its relative position and its presence as both a water quality and plankton station as close to the Iceberg buoy as possible. The continuous salinity monitoring stations are not shown.

Table 2. Parameters monitored, survey type (frequency and equipment type), Station Identification, Sampling Depth (ft), and Narrative Description of the Station's Location.

Parameter Monitored	Survey Type	Station ID	Depth (ft)	Location Description
Salinity	Continuous Data Logger	Dis-1	1	Vertical string of salinity data loggers hanging from Iceberg as close to Rotoflush intake/discharge screen as possible. Depth is in reference to Rotoflush screen not sea surface.
		Dis-3	3	
		Dis-9	9	
		Dis-12	12	
		BMZ-1	1	Vertical string of salinity data loggers hanging from a buoy moored approximately 1-ft away from the Iceberg's Rotoflush screen. Depth is in reference to Rotoflush screen not sea surface.
		BMZ-3	3	
		BMZ-9	9	
		BMZ-12	12	
Temp, Sal, pH, DO	Monthly Multiprobe	WQ-Iceberg	1-ft increments from Surface to Seafloor	Approximately 100-ft away from each corner of the Iceberg
		WQ1		
		WQ2		
		WQ3		
		WQ4		
OP Table 1 PP	Quarterly Van Dorn	Dis-3 and WQ2	3-5 ft	As close to the Iceberg Rotoflush screen and at Station WQ2 (Ref)
Plankton	Quarterly Pumped	Iceberg	Approx 5 ft	At the Iceberg with pump intake as close to the Rotoflush screen as can be safely achieved.
		U1	Approx 5 ft	1,600 ft upcoast of the Iceberg
		O1	Approx 5 ft	1,600 ft offshore of the Iceberg
		D1	Approx 5 ft	1,600 ft downcoast of the Iceberg

4.1.1 Sampling Stations

Four stations including the Iceberg (Table 2 and Figure 2) will be sampled during each quarterly event. The Iceberg will be the entrainment point while each of the three remaining stations will sample the ambient plankton communities in the area. The ambient plankton sampling stations are located approximately 1,600 ft upcoast, offshore, and downcoast from the Iceberg to sample plankton that may be passively transported to the Iceberg by prevailing currents. The coordinates of all four sampling sites (Iceberg and ambient) will be determined during the first survey after the Iceberg has been commissioned. On the first survey, the Iceberg station will be recorded based on the final position of the Iceberg after it is moored. Each of the ambient station coordinates will be recorded after maneuvering the sampling vessel to a position that matches the narrative description of the station, e.g., 1,600 ft upcoast of the Iceberg plankton sampling station. The coordinates for each sampling station occupied during the first survey will be recorded. Each subsequent survey will reoccupy the same coordinates assuming it is safe to do so.

The prevailing currents can change their alongshore direction while the dominant inshore-offshore flow is inshore. Therefore, ambient plankton stations are positioned at the three points where plankton can be transported towards the Iceberg and be safely sampled. Inshore of the Iceberg is considered a less likely source for ocean currents to carry plankton to the Iceberg and, due to its shallower depths and rocky substrate, is considered a more dangerous sampling location.

No ocean current monitoring is proposed for this study. None of the ocean current models presently available for the region have spatial resolution relevant to the study or coverage of the cove where the Iceberg will be placed (Figure 3). To derive at least a proxy estimate of ocean currents, the Regional Ocean Modeling System (ROMS) estimated ocean currents published by the California Ocean Observing Systems Data Portal (https://data.caloos.org/?new_sesssion=true#map) will be recorded and used. Each day of sampling, the ROMS estimates nearest the cove will be averaged to derive the proxy ocean current for the sampling period to be used in any further analyses.

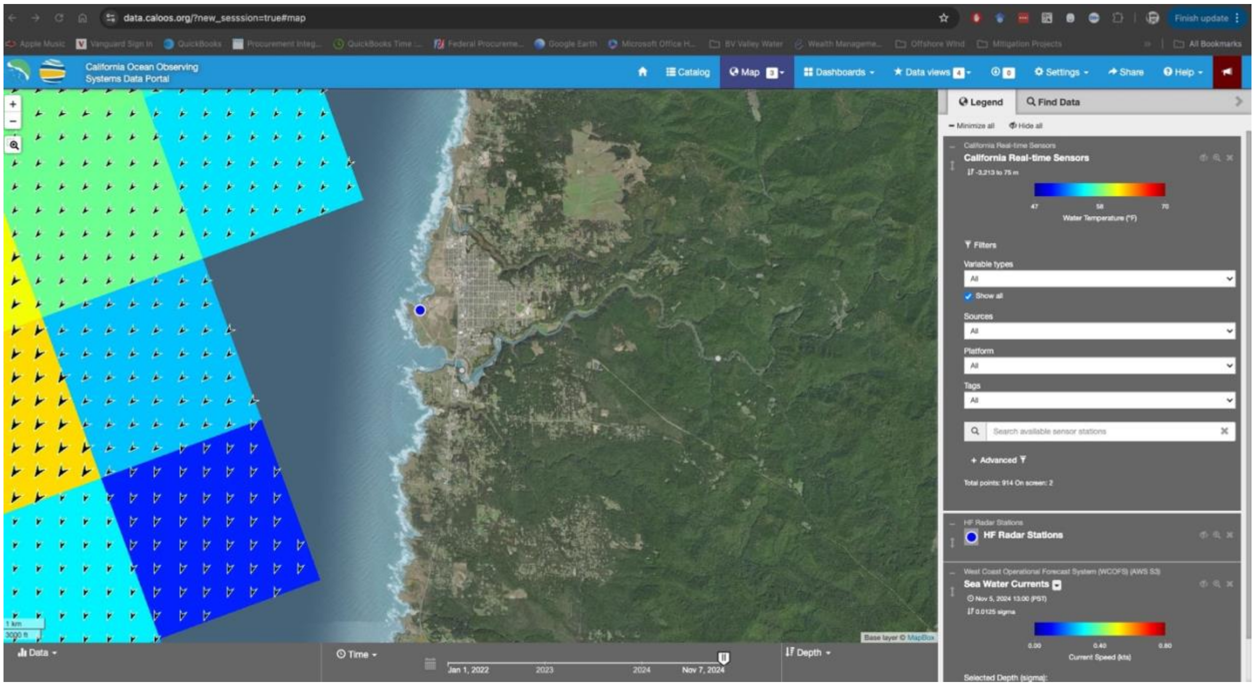

Figure 3. Screen shot of the ROMS output indicating the available cells with estimated ocean currents (represented by the individual arrow heads) in proximity to the Mill Bay location for the Iceberg deployment (blue dot).

4.1.2 Sampling Methods

Sampling from behind the operating Iceberg's intake screen would require disassembly and reassembly of the system. Furthermore, the Iceberg's seawater intake is near the sea surface, extending less than 6 ft below the water's surface. These two factors were considered in the sampling plan design.

The proposed plankton sampling will focus on the upper, approximately, 5 ft of the water column near the surface. This will mimic the depth of the Iceberg intake. To avoid the disassembly/reassembly concerns, the intake will be replicated using a pumped sampling system with the intake hose fitted with a 60-µm mesh screen. A similar sampling program was completed by MMSC for TWB Environmental Research and Consulting, Inc. for Poseidon Resources (Appendix A in TWB 2022). A gas-powered water pump will be used to pump seawater through an intake set at a fixed depth of approximately 5 ft and discharge the seawater through a 50-µm mesh plankton net on the opposite side of the boat from the intake (Figure 4). This will capture all plankton that has passed through both intakes regardless of intake screen mesh. Organisms smaller than 50 µm will mostly pass through the plankton net although some are expected to be retained. Intake size and pump flow rate will be set to create an intake velocity of approximately 0.22 ft/sec, or the same as the Iceberg's calculated intake velocity.

The intake velocity will be calculated based on the intake size and pumping rate. The pumping rate will preferably be determined at full throttle on the pump. If the pump needs to operate at less than full throttle to achieve a pumping rate suitable to create the approximately 0.22 ft/sec through screen velocity, the throttle position associated with this pumping rate will be permanently marked on the pump. The derivation of all these parameters will be made when the final pump and hoses are selected. While not available at this point, the calculations and parameters will be included in the final report.

At the Iceberg, two sampling configurations will be used in recognition of the ultra-fine mesh screening. The screened intake will incorporate a 60-µm mesh Rotoflush screen identical to the one used on the Iceberg to replicate the Iceberg's ultra-fine mesh intake screen. The second sample will be an "open intake" where the Rotoflush screen is removed and replaced with a large funnel that has a 6-mm mesh netting stretched over it as an intake pump protection screen[2]. Six-millimeter mesh is large enough to allow all but some gelatinous zooplankton through the intake while excluding most juvenile and adult fish and other larger debris that could impact the sample and the sampling pump.

Collecting near-simultaneous samples through the screened (Rotoflush) and unscreened intakes will allow quantification of the ultra-fine mesh screen's exclusion efficiency. The paired sampling design, screened and unscreened, will be used at each of the four sampling stations. This will both increase the sampling size and statistical power as well eliminating any unknown site effects that could influence the screened versus unscreened comparison. These data will support a robust assessment of the screening efficiency of the Rotoflush that can be applied to future deployment efforts.

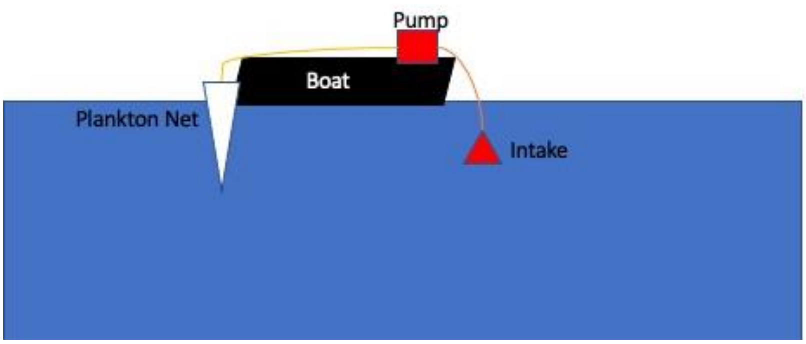

Figure 4. Left: Cartoon representation of pump sampling arrangement indicating the approximate location of the intake point, pump on the boat, and plankton net away from the intake to avoid disturbing the intake's zone of influence. Right: Example of unscreened intake funnel, green sampling hose, and the gas-powered sampling pump.

The California Ocean Plan requires plankton sampling to use a net mesh of no greater than 335 µm. A 50-µm mesh 0.5-m (or larger), single-ring plankton net will be used to better quantify the Iceberg's entrainment. This fine mesh plankton net will be used at all stations for consistency with the Iceberg entrainment station.

[2] A screen to exclude large debris that may damage the pump but not exclude any plankton.

To account for diel periodicity in the entrainable plankton, sampling will occur during the daylight and nighttime hours. Daylight sampling will occur at least 2 hrs before (after) sunset (sunrise). Night sampling will occur at least 2 hrs after (before) sunset (sunrise). Sampling will preferably occur centered on sunset but some sampling events may be centered on sunrise if weather conditions require. The decision on sunset vs. sunrise sampling will be made for each sampling event based on the weather forecast at the time.

To maximize the data collected during each sampling event the following sampling program is proposed. Four samples per diel period will be collected at each station, Iceberg and ambient. This will include two samples per diel period, each, of the screened and unscreened intake sampling at the entrainment station. This will result in 32 total samples annually at each station, 16 screened and 16 unscreened. The pumped volume will be calculated based on the pump's flow rate and the pumping time. A target of 30 m^3 pumped per sample will be used at all stations.

With each sample, a 0.5 L water sample will be collected from the pump discharge stream and analyzed in the field using a calibrated sonde to collect water temperature, salinity, turbidity, pH, dissolved oxygen, and chlorophyll-a concentration. The value of this sample is to assess changes in these parameters potentially due to the use of the screened intake, especially on chlorophyll-a concentrations. Differences in chlorophyll-a concentrations could represent a differing concentration of phytoplankton in the water that has passed through the intake. Phytoplankton are expected to pass through the 50-µm mesh plankton net. The additional parameters will highlight any oceanographic differences between the samples and sampling stations that may influence the plankton community susceptible to the sampling effort.

4.1.3 Sample Processing

All samples will be fixed in pre-labeled, plastic 0.5 L jars in the field using a 5% buffered formalin seawater solution. The plastic jars with fixed samples will be sealed with parafilm and the lids taped closed with electrical tape in preparation for shipping to MMSC's lab. The sealed jars will be shipped, via ground shipping, with a documented chain of custody after all quarterly sampling is complete. Once received, MMSC will catalog all samples and complete the shipping chain of custody.

Samples will be transferred to 99% isopropyl alcohol after at least 72 hrs in the formalin solution. Following California EPA standards, the formalin will be treated appropriately in Scigen NEUTRALEX® Formalin Neutralizer. Once transferred, each sample will be decanted into a graduated cylinder and allowed to settle. The volume, termed the volumetric biomass, will be read and recorded once the plankton sample has settled to the bottom. The significantly lower density of isopropyl alcohol (0.79 g/ml) versus seawater (1.02 g/ml) accelerates settling. The time to settlement can vary seasonally based on the plankton species present. Therefore, the uniform settlement time will be determined each season based on when the first unscreened sample is collected for the quarter near the Iceberg to settle. The volumetric biomass will be read off the graduated cylinder and recorded. This measurement will indicate the cumulative volume of plankton caught in the sample. Volumetric biomass is a standard plankton measure used in programs such as the California Cooperative Oceanic Fisheries Investigations (CalCOFI) to assess total biological productivity or biological biomass regardless of taxon-specific composition.

This metric has supported some landmark research assessing community changes such as Roemmich and McGowan (1995).

After the volumetric biomass is collected, each sample will be sorted using a stereomicroscope to remove all fish larvae, fish eggs, megalops-stage crab larvae, and squid paralarvae. All fish and crab larvae will be identified to the lowest, practicable taxonomic level and counted. Fish larvae will also be measured using image analysis software and micrographs. Fish eggs will not be identified but will be counted. Fish eggs are largely unidentifiable and are included in this assessment to evaluate the intake mesh exclusion efficiency. The standard practice for calculating the Empirical Transport Model-Area of Production Forgone (ETM-APF) analysis required in the California Ocean Plan includes adding the estimated pelagic egg stage length to the estimated age of the larvae without attempting to identify the eggs. Squid paralarvae will also be counted. California spiny lobster larvae (any stage) are highly unlikely at this location but will be sorted for identification and enumeration if observed.

4.1.4 Data Analysis and Reporting

The resulting data will be compiled into a project-specific database. All plankton data will be standardized to the water volume filtered. The data will be cataloged, and an entrainment estimate calculated for the screened and unscreened intake for each quarter. The entrainment estimate will represent the mean plankton concentration multiplied by the pilot study's targeted daily intake volume of 13,200 gal/day. These estimates will be calculated for the total plankton volumetric biomass and by each subcategory, e.g., total fish eggs, total fish larvae, by fish larvae taxon, etc.

Detailed analyses will focus on assessing the intake screen exclusion efficiency based on both the plankton volumetric biomass and the community composition of identified and enumerated entrained larvae. The size distribution of identified and entrained larvae will be compared with those collected in the ambient plankton community sampling. Additional analyses will assess seasonality in the entrained plankton in addition to any detectable effect of water quality at each sampling station.

The core assessment is expected to examine the volumetric biomass/m^3 of water sampled. This measure will be uniformly collected and will best represent all forms of marine life caught in the 50-µm mesh net. All of the more refined metrics such as taxonomic composition and abundance suffer from the practicable taxonomic limitations and sorting efficiencies. If the hypothesis is correct that the ultra-fine mesh Rotoflush screen excludes a significant fraction of the plankton, especially the larger organisms, a clear difference in volumetric biomass/m^3 is expected between the screened and unscreened intake samples.

Collecting water quality data on water after it has passed through a screen is a new approach to plankton monitoring. Its goal in this effort is to provide some insight into the phytoplankton fraction that may pass through the screen to determine if any effect of the Rotoflush on phytoplankton concentrations can be derived. Phytoplankton are presumed to pass through the 50-µm mesh plankton net. The measured chlorophyll-a concentrations will serve as a proxy for phytoplankton in this analysis. The additional water quality parameters collected will provide ancillary data should a marked difference marine life parameters between the sampling sites be detected. Plankton are highly sensitive to variations in water, especially density. Seawater density can be derived from temperature, salinity, and depth.

Plankton data rarely meets parametric statistic assumptions. Therefore, where applicable, non-parametric statistics will be used to compare the screened and unscreened intake samples. Analyses will be completed for the complete data set of screened versus unscreened intake samples without regard to sampling location. The analyses will be progressively refined to determine if any site effects are present in the data that could be applicable to a future, utility-scale deployment.

After each quarter, the resulting data will be reviewed to determine if additional analyses, such as the ETM/APF, can be applied. The lack of project-specific ocean current data will inhibit a detailed EMT/APF. If sufficient plankton information is recorded in the screened net samples to support an ETM/APF, the estimated ocean current information recorded from ROMS will be used to calculate the applicable model parameters. An ETM/APF will only be calculated if sufficient information is available in the screened samples as they are the experimental treatment in this analysis while the unscreened is the control. The unscreened sample is expected to contain sufficient fish larvae and crabs to calculate an ETM/APF, but this data is of no importance without a corresponding screened intake sample ETM/APF result.

After each quarter, a brief, draft summary will be submitted to the regulatory agencies. These data should be considered draft and subject to change as more data becomes available and analyses potentially evolve. All information and methods will be documented in a final report to be submitted to the funding and permitting agencies within 6 months of the Iceberg's decommissioning at the end of the pilot study's year-long deployment.

5 QUALITY ASSURANCE PROJECT PLAN

Data quality is a cornerstone of science in support of regulatory decision making. Therefore, a Quality Assurance Project Plan (QAPP) is developed and will be used to ensure the final data products meet the highest scientific standards and the goals to support the regulatory decisions that will follow.

5.1 QAPP Purpose

The Environmental Monitoring Plan element's purposes are detailed above. The QAPP is to ensure the workplans described in the preceding pages are followed. Should the need arise to adjust the plans after implementation, the necessary adjustments will be documented and reported to the regulatory agencies during the monthly sampling summaries.

5.2 QAPP Execution

To ensure all phases of both studies are achieved to the highest quality possible, a Miller Marine Science & Consulting, Inc. scientist (MMSC) will be on site in the field to train local staff in the City of Fort Bragg during the data logger deployment and retrieval as well as the first monthly water quality survey and the first plankton sampling event. All field data will be transmitted to

MMSC after the survey is complete. This will include all digital files and legible scans of any paper data sheets. The MMSC sorting laboratory will process the plankton samples.

In the field, a checklist of operational events related to each sampling effort will be maintained. Prior to the first survey, principal field staff local to the City of Fort Bragg will be trained in the execution of the workplan described above. If staff turnover occurs where trained staff are no longer available, MMSC staff will be dispatched to join the survey. A Scientific Collecting Permit issued by the California Department of Fish and Wildlife for the project's plankton sampling will always be with the sampling party. The lead scientist on each plankton sampling event will be listed on the Scientific Collecting Permit.

Operational efforts will include:

- Water Quality Monitoring
    - A calibrated multiparameter sonde will be available during all water quality surveys
        - The sonde will be calibrated per manufacturer's specifications prior to the survey using commercially available standards for each parameter
        - The sonde is needed to collect baseline information at the deployment and retrieval of the data-logging sensors to calibrate the sensors, if needed
    - Either a second set of data-logging sensors or a computer with downloading shuttle and all needed cleaning supplies will be taken out each time the data-logging sensors are serviced. Clean, downloaded, and relaunched data-logging sensors will be redeployed each time.
    - The Van Dorn bottle will be cleaned with Alconox detergent prior to the survey and rinsed with site water at each site before collecting a water sample
        - Sample bottles from the analytical laboratory will be on hand in the field to transfer the sample directly from the Van Dorn to the sample bottle with no intermediary
        - Samplers will wear rubber gloves for sampling at each site. A new pair of clean gloves will be used at each site.
- Plankton Sampling
    - All materials are present before sampling begins.
        - Plankton net frame, plankton net of mesh no larger than 50 µm free of any tears or holes, codends of mesh no larger than 50 µm free of any tears or holes for each net, labeled sample jars, buffered formalin, list of stations with coordinates, GPS, datasheets, washdown hose or bucket to rinse the net from the outside, gas-powered pump with sufficient gas to complete the sampling, sampling hose, Rotoflush with all equipment to attach it to the hose, unscreened intake funnel with 6-mm mesh netting stretched over the opening, calibrated multiparameter sonde to measure chlorophyll-a in water discharged into the plankton net to measure phytoplankton proxy collected during each sampling event.

- Sampling is conducted in accordance with the workplan.
- Post-sampling sample handling is done to eliminate the potential introduction of plankton, including rinsing the net from the outside to condense the plankton in the codend.
- Post-sampling preservation is completed for each sample with an appropriate volume of formalin added to achieve a 4-5%-formalin solution.

- Plankton Laboratory Processing
    - Only trained sorters and taxonomists will process the samples
        - New sorters will have their first five samples resorted
            - Each sorter must remove at least 90% of the target organisms in each of the five samples to be considered trained
            - Failure on one sample will result in another five samples sorted by the trainee being resorted by a trained sorter
                - If pass on the second set of five samples then sorter is considered trained
                - If not passing, then sorter is removed from the sorting lab
            - Failure on more than one sample eliminates the sorter from continuing in the sorting lab
- Data Management and Analysis
    - All data will be transcribed into a digital database.
        - Data entry will be checked by someone other than the original data entry staffer for accuracy. Errors will be corrected immediately and documented.
        - Laboratory data manager will conduct a final review of all data. Taxonomic questions will be followed up with the taxonomist performing the identification.
        - MMSC project management will review the data submitted by the laboratory data manager and any questions will be addressed with the laboratory manager.
    - Data digitally recorded by the instruments will be reviewed for errors in the system
        - Calibration failures, data logging failures, sensor/probe malfunctions
    - Analyses
        - All analyses will be reviewed by a TWB Environmental Research and Consulting, Inc. scientist to ensure no calculation errors are made.
    - Reporting

- The report will be reviewed internally by MMSC, then by TWB, with a draft final submitted for review to the City of Fort Bragg and Oneka. A final report incorporating comments and edits by the City and Oneka will be provided to the City for submittal to the regulatory agencies, or submitted on the City's behalf by MMSC.

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ATTACHMENT 1: PROJECT DESCRIPTION

Refer To IS/MND Appendix 1

APPENDIX 3: LOW THREAT PERMIT ATTACHMENT B-1: BEST MANAGEMENT PRACTICES (BMP) AND POLLUTION PREVENTION (PP) PLAN

twb Environmental Research and Consulting

Attachment B-1

Best Management Practices (BMP) and Pollution Prevention (PP) Plan

Contents

Introduction

This Best Management Practices and Pollution Prevention Plan (BMP/PP Plan) is being provided as Attachment B-1 to the Notice of Intent (NOI) for the City of Fort Bragg's (City's) 12-month pilot test of the Oneka wave-powered seawater desalination buoy. The purpose of the BMP/PP Plan is to identify and implement site-specific BMPs and pollution prevention measures to reduce or prevent the discharge of wastes and pollutants to the Pacific Ocean of the North Coast Region. Sufficient detail is being provided in this Attachment to allow the Executive Officer to assess whether or not all reasonable measures will be implemented to assure that the discharge poses a low threat to water quality.

A. Characterization of Discharges

The Oneka buoy creates desalinated water through a reverse osmosis (RO) process driven solely by wave energy (i.e., no grid power). The RO process is accomplished by pressurizing seawater to drive it through a membrane creating two liquid streams: 1) freshwater (permeate) and 2) concentrated seawater (brine). The Oneka RO process does not require the use of any chemicals (e.g., antiscalants, coagulants, preservatives, chlorine, RO membrane cleaning solutions). In addition to the two liquid streams, solid waste (of natural origin) will be created during routine maintenance of the buoy's submerged surfaces when biofouling organisms are manually removed. Details about the discharge streams are provided in Table 1.

Table 1. Characterization of the discharge streams.

Discharge Stream	Discharge Location	Constituent	Discharge Rate
Permeate	Existing WWTP outfall	Freshwater	0.013 MGD
Brine	Approximately 0.5 miles offshore adjacent to buoy along the 90-ft isobath	Salinity (ppt)	0.0528 MGD
Biofouling	Offshore adjacent to buoy	Natural organic debris	Approx 4 ft^3 per quarter

B. Site Map

The pilot project will be conducted approximately 0.5 miles offshore of the City's wastewater treatment plant (WWTP). The site map illustrating all of the project components is provided in Figure 1.

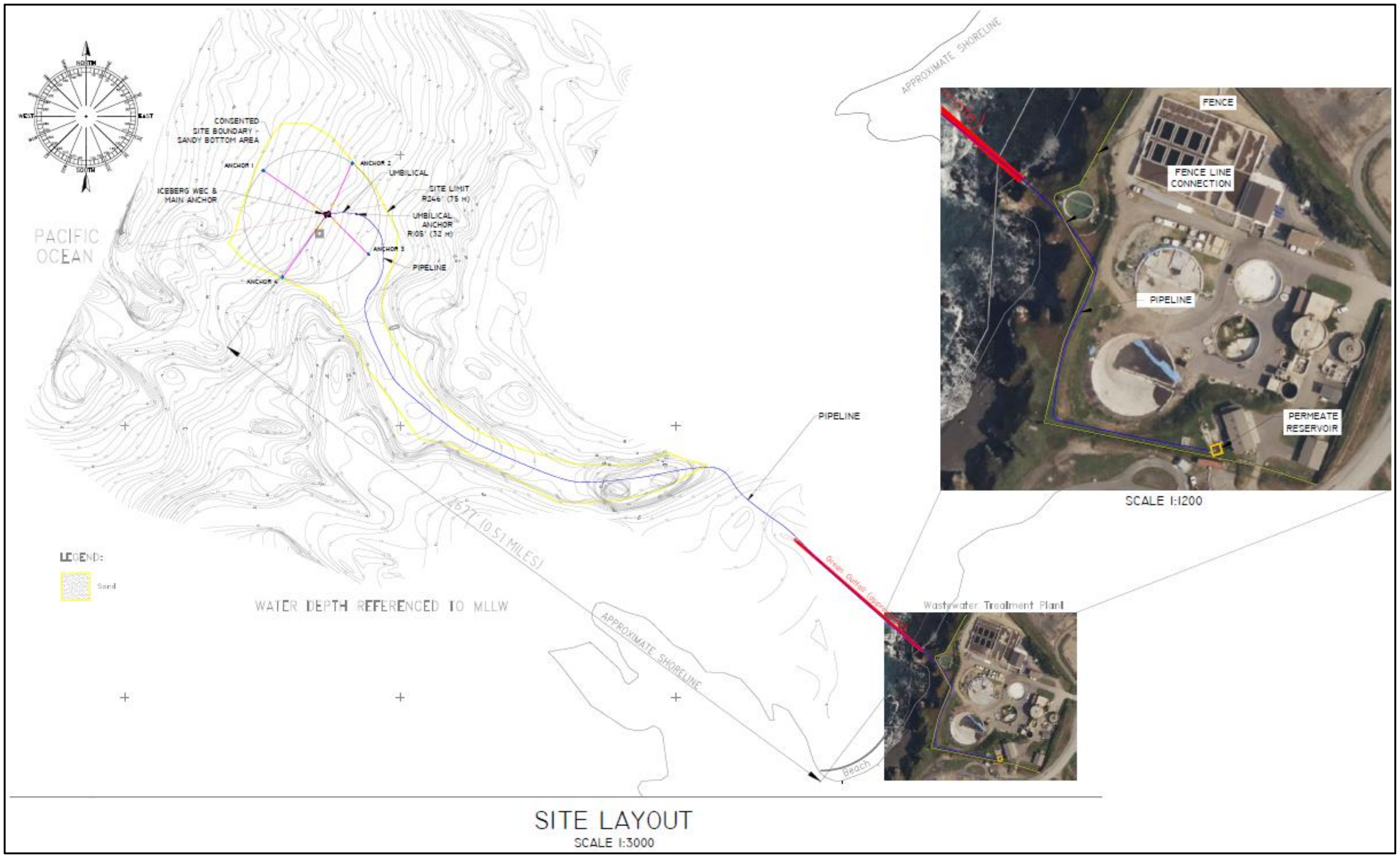

Figure 1. Site layout for the pilot project depicting the Iceberg's location, mooring system layout, permeate pipeline to shore, existing City of Fort Bragg WWTP existing ocean outfall, and WWTP with the proposed terminus of the permeate pipeline.

C. Identification of BMPs

1. Preventative BMPs

   Preventive BMPs are measures to reduce or eliminate the generation of pollutants and waste and undesirable nuisance conditions. Preventative BMPs are parsed into those for construction/installation and those for operation of the buoy over the 12-month pilot project.

   Construction/Installation

   The buoy, the permeate pipeline, and the anchoring systems for both will be installed by an experienced marine contracting firm. The construction/installation effort will take place over approximately 3 weeks and will involve multiple marine vessels: a barge, a tugboat, and a diving support vessel (DSV). The marine vessels represent a spill risk of fuels, oils, and other working fluids. Construction/installation efforts will also cause a temporary, localized increase in turbidity due to buoy and pipeline anchoring activities.

   The preventative measures that will be implemented to prevent/reduce these potential construction/installation-related impacts include the following:

   - The marine contracting firm will implement best management practices to prevent spills to the Pacific Ocean. BMPs include use of secondary containment for fuels, oils, and hydraulic fluid. In addition, the marine contracting firm has developed a Spill Prevention and Response Plan (SPRP; Appendix 1) as noted below in the Response BMP section.
   - The marine contracting firm will utilize diver support for the pipeline deployment to ensure that turbidity is kept to a minimum and that the pipe is within the designated alignment to minimize potential damage to local ocean flora and fauna. Diver support will include realtime communications with vessel-based personnel. Direct, realtime communication will aid in preventing/reducing the suspension of benthic sediment.

   Operation

   During the 12-month operational period, permeate will be delivered to shore where it will be eventually routed to the existing ocean outfall for co-discharge with treated wastewater effluent (unless it can be used for approved non-potable purposes such as watering landscape vegetation at the WWTP). During the operation period of this pilot project, brine will be discharged directly from the buoy offshore. As characterized above, brine is simply concentrated seawater; it does not contain any additional chemicals.

A biodegradable oil is used in the capstan motor that maintains main line tension for the buoy. Though the biodegradable oil poses a risk of spill, it is biodegradable.

Solid waste (of natural origin) will be generated when biofouling is manually removed from the submerged surfaces of the buoy. Divers will be deployed quarterly to inspect and clean submerged surfaces as needed. Divers will manually scrape the submerged surfaces and any liberated debris will be passively released into the water column.

The preventative measures that will be implemented to prevent/reduce these operational-related impacts include the following:

- Seawater desalination systems produce permeate and brine at a rate that is determined by the recovery rate of the system. To the extent that requisite performance data can be collected at different recovery rates, the project team will prioritize operation at lower recovery rates in order to reduce the salinity of the brine discharged.
- Brine will be discharged near the water surface, far offshore, and in an active wave area – all of which ensure adequate mixing as it falls with density gradient.
- The biodegradable oil used on the buoy system minimizes environmental risk. In addition a spill kit is installed on the buoy.
- The SPRP will prevent/reduce the potential risk of introducing lubricants or other chemicals to the receiving water.
- The buoy hull will be coated with a non-toxic epoxy paint to prevent/reduce the amount of biofouling that will be liberated from the project components. Assessing the condition of coatings will be part of the regular offshore inspections to ensure proper protection of submerged components.

2. <u>Discharge Unlikely to Create Nuisance Conditions</u>

The discharge of effluent will be conducted in a manner that will prevent the creation of nuisance conditions. The only potential nuisance condition would be the creation of high-salinity area(s) within the water column; however, modeling under stagnant ocean conditions (conservative approach) indicates that the brine will mix with the receiving waters and dilute within 1 foot (horizontally) and 9 feet (vertically) to no more than 2.0 ppt over ambient. Brine will not reach the seafloor or sensitive midwater habitats. No chemicals are used in the buoy's desalination process, therefore, none will be discharged. Salinity will be monitored from a string of salinity meters at various depths below the buoy to verify the modeling results. The brine is simply concentrated seawater with no other added chemicals; therefore, no other nuisance conditions are expected to develop.

3. Control BMPs
   Control BMPs are designed to control or manage pollutants or waste after they are generated, but before they are discharged to the receiving water. No control BMPs are applicable given the nature of this pilot project. Seawater desalination systems produce permeate and brine at a rate that is determined by the recovery rate of the system. The pilot project is designed to be an opportunity to evaluate the performance of the system under various recovery rates. Low recovery rates create a lower salinity, higher volume brine (and lower permeate volume); higher recovery rates create a higher salinity, lower volume brine (and higher permeate volume). To the extent that requisite performance data can be collected at different recovery rates, the project team will prioritize operation at lower recovery rates in order to reduce the salinity of the brine discharged.

   Unless permeate can be used for approved non-potable purposes (e.g., watering landscape vegetation at the WWTP), the full permeate flow will be routed via piping to the existing WWTP. The permeate will therefore be mixed with WWTP effluent and be discharged through the existing outfall diffuser. No project activities are anticipated to create erosion or soil stability issues.

4. Treatment BMPs
   Brine is discharged directly from the offshore buoy; there are no treatment BMPs prior to discharge. Similarly, there are no treatment BMPs for permeate since there are no pollutants that require removal; it is freshwater.

5. Response BMPs
   Appendix 1 provides the SPRP

D. BMP Measures for Low Threat Discharge Control

1. Discharge-Specific BMPs
   a. Treated Drinking Water Discharges – the permeate created during this pilot project will not be placed into the potable water distribution system and therefore will not be chlorinated. As such, the permeate will not require separate dechlorination prior to co-discharge with WWTP effluent.
   b. Chlorinated Water Discharges – see above response.
   c. Distribution and Storage Tank Drainage Discharges – Not applicable to this pilot project
   d. Dewatering and Other Sediment-Bearing Discharges – Not applicable to this pilot project
2. Sediment, Salt, Minerals, and Erosion Control

a. Sediment, Salt, and Mineral Control – this pilot project will produce two liquid streams: 1) freshwater (permeate) and 2) concentrated seawater (brine) and one solid waste stream: biofouling removed from submerged buoy components. The permeate will be piped directly to the WWTP and will therefore not be exposed to any sources of sediment particles, salts and minerals that would need to be removed. Similarly, the brine stream will be discharged directly from the buoy to the Pacific Ocean and will therefore not be exposed to any sources of sediment particles, salts and minerals that would need to be removed. The solid waste stream is of natural origin and, when liberated by scraping, will be passively released into the water column.
b. Erosion Controls – the discharges from this pilot project will all be to the Pacific Ocean. The only potential discharge that could create erosion (in the form of resuspension of ambient benthic sediment) is the brine discharge. However, since brine is passively discharged and modeling under stagnant ocean conditions (conservative approach) indicates that the brine will mix with the receiving waters and dilute within 1 foot (horizontally) and 9 feet (vertically) to no more than 2.0 ppt over ambient, there will be essentially no inherent gravity current impacting the seafloor that could create resuspension of sediment.

3. Dechlorination – Not applicable to this pilot project
4. Management of Discharge Categories Where Petroleum Hydrocarbons and Associated Pollutants May be Present – As noted above hydraulic oil is used as a working fluid in the RO process on board the buoy; however, it is not part of the liquid discharge streams described herein.
5. Management of Additives – none of the discharge streams described herein include any additives. No chemicals are added at any point during the desalination process.
6. Additional BMPs – Not applicable to this pilot project

E. Quality Assurance/Quality Control Protocol

A project-specific Quality Assurance Project Plan (QAPP) has been developed to assure that BMPs, monitoring, and reporting are effective, valid, and in compliance with the General Order. The QAPP is provided as Appendix 2.

F. Equipment and Supplies

The City and its pilot project partners ensure that all equipment and sampling meters are inspected, maintained, and calibrated per manufacturer instructions and specifications. Information about equipment calibration methods and frequency are provided in Appendix 2.

G. Training

The City will contract with Oneka for the O&M of the buoy given that it is specialty equipment for which trained personnel do not currently exist outside of Oneka. Oneka will follow the QAPP to ensure safe and reliable operation as well as collection of good quality data.

Appendix 1
Spill Prevention and Response Plan

Purpose

The City of Fort Bragg proposes to conduct a pilot study of the Oneka Technologies Iceberg seawater desalination buoy. This oil spill prevention plan was prepared to highlight the methods and materials that will be deployed to minimize any negative effect of the pilot study's use of chemicals on California's marine environment. During all operations where hydrocarbons will be at risk of being spilled, a spill kit will be on hand to contain and clean up the spill. At a minimum, the spill kit will include:

1. 15 x 19" Absorbent Pads
2. 3" x 4" Sorbent Socks
3. Pair of Nitrile Gloves
4. Disposable Bag

For larger operations where potential hydrocarbon fluid spills may happen, the spill kit will be augmented as needed to ensure complete containment, capture, and clean-up of any spilled fluids. The spill kit will be held to respond to spills. As a preventative measure, absorbent pads such as Pig Stat-Mat (Pad), that are manufactured to absorb flammable liquids will be used each time hydrocarbon fluids are being dispensed as described below.

Oil Spill Prevention Plan

Fueling Spill Prevention

All marine crew involved with the pilot study field operations will be trained on the safe handling of the hydrocarbons used as highlighted in the following sections. When a contracted vessel is used during the project, the vessel will be required to provide an Oil Spill Prevention Plan for the subject vessel that complies with California State Oil Spill Contingency Plan (Office of Spill Prevention and Response 2019).

Training for crew involved in study field operations will include reviewing this plan with the survey team prior to any operations begin, always maintain a copy of this plan with the field crew, location and use of the spill kit (listed above), posting the names, phone numbers, and location of all relevant entities such as oil spill response regulators, emergency medical facilities, wildlife care centers, etc. The primary contacts are listed in Table 1. The entities in Table 1 will be contacted immediately when a spill occurs.

Table 1. Contact information for emergency response entities to be notified if oil spill occurs.

Entity	Contact Inormation
California Office of Oil Spill Prevention and Response	800-852-7550 or 916-845-8911

United States Coast Guard District 11	VHF Ch. 16 or 310-521-3801 (LA/LB) or 619-683-6470 (SD)
Oiled Wildlife Care Network (if spill expands to impact wildlife)	877-823-6926

The vessels used by the field staff during the study may vary. These may include trailered vessels, and larger docked vessels. Regardless of what is being fueled, all open flames and other heat sources will be extinguished in the area surrounding the item being fueled. No smoking, including vaping, will be allowed within a 100 ft radius of the fueling operation. Any spill on land will be reported to the fueling facility (gas station or fuel dock) immediately and field staff will provide any and all assistance with the clean-up the facility needs. The City of Fort Bragg and Oneka Technologies project managers will be immediately notified of any on-the-water spills. The Oneka Technologies project manager will communicate with those listed in Table 1 and coordinate the clean-up effort if hydrocarbons reach the water. Spills contained within the confines of the vessel will be cleaned up immediately by the field staff using the hydrocarbon spill kit.

Trailered Vessels – All trailered vessels will be fueled while on the trailer and on dry land. Absorbent pads will be placed on the ground and on the deck under the fuel fill port to capture any spills. After fueling, the area will be wiped with the mat to clean up any spills that did not land on the mat. Only EPA-approved fuel cans will be used when fueling away from a commercially operated gas station. Whenever possible, trailered vessels will be fueled at a gas station. If the trailered vessel must be fueled while in the water, the spill kit shall be set nearby and ready for deployment if needed. A Pad will be wrapped around the fill port while an EPA-approved fuel can is used to add fuel to the fuel tank. A second pad will be held near the fuel pressure release port to catch any gas that may be expelled as the tank is filled. Absorbent socks will be set in the water below the overflow spout to catch any fuel released to the environment. If the two-cycle oil reservoir must be filled on the water, a Pad will be placed surrounding the fill hole. All Pads will be retained and disposed of at approved facilities at the earliest opportunity.

Should a temporary gas generator be required during a survey on a trailered vessel, the generator will be filled while on land using the same process as described for fueling the trailered vessel on land. If the generator must be refueled while on the water, the same precautions will be used as described for fueling the boat while in the water. The lone exception will be the placement of an absorbent pad under the generator on the deck to capture any spills that may run down the side of the generator in place of the absorbent pad near the fuel pressure release port described for the boat.

Non-Trailered Vessels – Larger, chartered vessels that remain in the water will be fueled only at commercial fuel docks. Absorbent pads will be used to surround the fuel port on the vessel to capture any spilled fuel.

Other Hydrocarbon Spill Prevention

Hydraulic Fluids – All hydraulic and greased systems, whether on the Iceberg or on a vessel, will have all hoses, fittings, and surfaces inspected either weekly (Iceberg) or prior to departure (vessel). Any loose, worn, or damaged equipment will be replaced by trained technicians. For the Iceberg, any repairs or hydrocarbon dispensing made at sea will be done so with a spill kit at hands distance. An absorbent sock will be deployed to encircle the Iceberg and absorbent pads will be placed under all parts where hydrocarbons may leak or drip. For all vessels, other than emergency repairs, the repair will be made at a land-based facility or at the dock where vessel motion can be minimized. Absorbent pads will be used to surround the work site to catch any fluid that may spill. All absorbent pads will be properly disposed of at the nearest designated hydrocarbon disposal facility.

Appendix 2
Quality Assurance Project Plan (QAPP)

Quality Assurance Project Plan for Desalination Buoy Discharge Monitoring

Wave-powered Desalination Buoy Pilot Project
Fort Bragg, California

September 2024

Prepared by:

Oneka Technologies
27 Parker Street
Dartmouth, NS
B2Y 2T5

Oneka Technologies: ____________________________ **Date:**

City of Fort Bragg: ____________________________ **Date**

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LIST OF APPENDICES

1.0 PROJECT MANAGEMENT

This Quality Assurance (QA) Project Plan has been prepared for the monitoring of discharges from a floating desalination buoy pilot project being undertaken by the City of Fort Bragg, California. This section of the QA Project Plan describes how the project will be managed, organized and implemented.

1.1 Title and Approval Page

See Title Page.

1.2 Table of Contents

See Pages i.

1.3 Distribution List

The following is a list of organizations and persons who will receive copies of the approved QA Project Plan and any subsequent revisions:

- City of Fort Bragg
- Oneka Technologies

1.4 Project Organization

The responsible party for this discharge monitoring program is the City of Fort Bragg. Oneka Technologies will be contracted to conduct the monitoring program, and subcontractors will execute portions of the program. The roles and responsibilities of those involved in the implementation of the discharge monitoring program are described below.

- The Oneka Project Manager will be responsible for planning and executing all activities described in this QA Project Plan.
- Oneka operations personnel and selected contractors will execute the monitoring program using qualified personnel.
- An Environmental Laboratory Accreditation Program (ELAP) accredited laboratory will perform chemical analyses of water samples.

1.5 Background and Problem Definition

This section provides background information on the desalination buoy pilot project, and defines the specific issues being examined by the monitoring project described in this QA Project Plan.

1.5.1 Purpose and Objectives of the Pilot Project

The pilot project funded in part via a grant from the California Department of Water Resources to test the operational efficacy of an Oneka Technologies Iceberg wave-powered desalination buoy.

The City of Fort Bragg has endured significant potable water supply concerns in recent years and is seeking an alternative, drought-proof water supply. The pilot test is to examine the operation and environmental effect of the Iceberg, a new-to-California seawater desalination technology. The technology has been successfully deployed in other US states and coastal nations but not in California.

The Iceberg will be moored offshore the City of Fort Bragg's wastewater treatment plant in Millbay. It will withdraw seawater at low-velocity (<0.5 ft/sec) and low volume (<22,000 gal/day) using only wave-energy to pressurize the water through a reverse osmosis system. Desalinated permeate will be pumped to shore using the wave-energy generated pressure. Seawater will be withdrawn from the source water near the sea surface through a 60-micron mesh screen and brine will be discharged through the same screen. The brine will dilute as it falls through the water column and reach less than 2 ppt above ambient within 50 ft of the discharge.

1.5.2 About Oneka Technologies

Oneka Technologies is a Canadian company working in the water technology sector, with a mission to make the oceans a sustainable and affordable source of freshwater. Using only the renewable energy created by ocean waves, Oneka turns seawater into fresh water, allowing coastal communities and industries facing water scarcity to mitigate and adapt to climate change. Founded in Sherbrooke, Quebec in 2015, the company has more than 70 employees and operations in Canada, the United States and Chile.

Oneka Technologies' wave powered desalination units convert seawater into freshwater through reverse osmosis, using only the mechanical energy of ocean waves; no electricity is generated or consumed in the process.

1.5.3 Discharges Associated with the Pilot Project

No chemicals are added at any point during the desalination process. During this pilot project, only brine and unused permeates will be discharged. The brine will be discharged from the buoy itself. Unused permeate will be pumped to the wastewater treatment plant via untreated HDPE pipe. Once inside the treatment plant fence line, the permeate will be piped to the existing WWTP discharge with valving to allow for permeate to be drawn for testing and non-potable uses by the City.

The brine will be discharged from the buoy moored approximately 0.5 miles offshore of the wastewater treatment plant along the 90-ft isobath. The brine is modeled to dilute to less than 2.0 ppt over ambient salinity within 1 ft (horizontally) and less than 9 ft (vertically) from the discharge. The discharge will be passive without adding energy to enhance mixing. The passive, rapidly diluting brine discharge will have minimal, if any, impact on all forms of marine life. The unused permeate will be commingled with the existing wastewater treatment plant discharge through the existing ocean outfall. No chemicals will be added to the water during the process.

Quarterly, biofouling will be manually removed from the submerged surfaces of the buoy. Any liberated debris will be passively released into the water column.

Figure 1 illustrates the details and dimensions of the "Iceberg" desalination buoy.

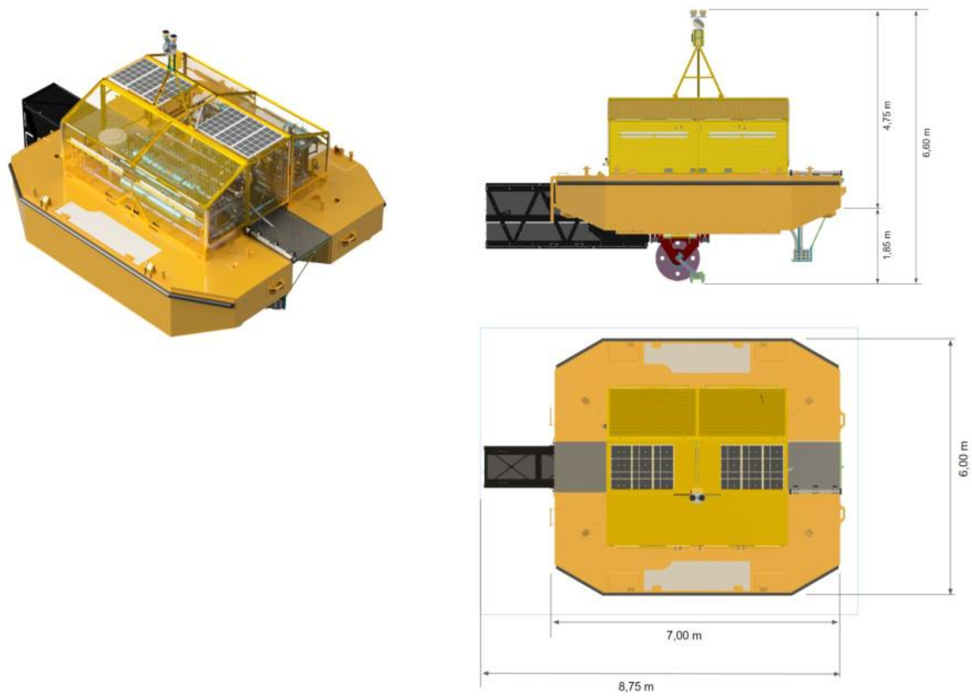

Figure 1: "Iceberg" Desalination buoy dimensions

Functioning: The motion of the waves actuates the buoy's pumping mechanism which draws in sea water and pressurizes it into the buoy's piping system. The water then passes through filters and desalination membranes to remove suspended material and salt, resulting in desalinated drinking water. Brine water from the filtration process is sent back in the ocean (about 30-45,000 ppm salinity) and mixed through passive wave and ocean current action. No chemical products are used nor are any hazardous materials used in the desalination process. Desalinated water generated during the project will be discharged back to the ocean.

Safety: The mooring system consists of the main mooring line and a secondary mooring system comprising 4 embedment anchors. The main anchor and mooring line transfers energy from the motion of the waves to the buoy's pumping mechanism. The secondary mooring system prevents free floating of the buoy if the main mooring line is disconnected.

The buoy has reflective bands, radar reflectors, the company logo, contact phone number, warning writing, and navigation lighting. The light makes the buoys secure at night while the passive radar reflector enables boats to see the buoy day and night with their instruments.

Electronic telemetry and independent satellite coordinates are sent to Oneka servers every minute to make sure the buoys are securely attached and performing well. Units are equipped with a wireless camera (4G LTE) for enhanced security. As part of the data collection program, and installed under a separate permit, a small wave data recorder (16 inches in diameter) will be installed nearby to report real-time wave height and other meteorological data.

1.6 Activities to be Monitored

The pilot project will produce the following discharges:

- 2 liquid streams:
  - freshwater (permeate), and
  - concentrated seawater (brine)
- 1 solid waste stream:
  - biofouling removed from submerged buoy components.

The discharge monitoring project will:

1. Document application of discharge-related Best Management Practices, and
2. Collect data and document both environmental conditions in the vicinity of the pilot project

The BMPs that will be employed through the project are described in Attachment B-1 to the Notice of Intent for Low Threat Discharges. Details of the field monitoring and sampling programs are provided in **Sections 2.1 and 2.2**.

1.7 Data Quality Objectives and Criteria

The surface water monitoring program is designed to monitor changes in salinity levels in the vicinity of the desalination buoy to assess potential changes due to buoy operation. Monitoring will take place throughout the 12-month pilot project. The results of the monitoring will help the project proponents and regulators to evaluate the potential for significant environmental effects resulting from future desalination buoy projects.

Baseline water quality data were collected by Miller Marine Science and brine dispersion modelling has been conducted by Increa. Results from this project will be compared to those from these studies and well as California objectives for brine discharge from desalination facilities.

1.8 Measurement Performance Criteria/Acceptance Criteria

To support project decisions, data generated must be of known and acceptable quality. To define acceptable data quality for this project, data quality indicators (DQIs) were identified for each analytical parameter, and decisions were made regarding how each DQI would be assessed. The DQIs include:

- precision

- accuracy/bias (as related to %recovery and contamination)
- representativeness
- comparability
- completeness, and
- sensitivity

The general approach to assessing each DQI is described below. Some DQIs will be assessed quantitatively, while others will be assessed qualitatively.

When water samples are collected and submitted to an analytical laboratory, only Environmental Laboratory Accreditation Program (ELAP) accredited laboratories will be used, and their quality programs (types & frequencies of QC samples and QC acceptance limits) will be reviewed and have been determined to be adequate to meet the data quality needs of the project. As such, the laboratory's QC has been accepted as the project's measurement performance criteria for the analytical component, while project-specific criteria have been defined to assess the field sampling component. All field and sampling data will be subject to the QA/QC procedures described in **Section 2.5**.

1.9 Field Sampling and Measurement Personnel Training

No additional training will be required. All field personnel will be qualified personnel who will work under the direction of the Oneka Project Manager.

1.10 Documents and Records

As the party contracted to conduct the pilot project, it is the responsibility of the Oneka Technologies Project Manager to prepare and maintain amended versions of the QA Project Plan and to distribute the amended QA Project Plan to the parties listed in **Section 1.3**.

In the field, records will be documented in several ways, including field logbooks, photographs, pre-printed forms, portable electronic device documents and internet-based documents. Oneka Technologies will maintain electronic and/or paper files of all documentation generated by the sampling program.

For each monitoring or sampling event, the following information will be recorded for each day:

- Team members and their responsibilities,
- Time of arrival/entry on site and time of site departure,
- Name of vessel and captain,
- Other personnel on site,
- Any deviations from the QAPP.

For each sampling event, the following information will be recorded at each sample collection/measurement location:

- Sample location,
- Sampler's names,
- Date and time of sample collection,
- Type (media or matrix) being monitored or sampled,
- Type of sampling equipment used,
- Type of monitoring instruments used, including equipment model and serial number
- Field measurement instrument readings,
- Field observations (weather conditions, noticeable odors, color),
- Sample preservation.

For water sample collection, only laboratory supplied sampling containers will be used and all samples will be labelled according to laboratory requirements. Chain-of-custody forms will be provided by the laboratory and used to document collection and shipment of samples for off-site laboratory analysis. All sample shipments will be accompanied by a chain-of-custody form. The forms will be completed and sent with each shipment of samples to the laboratory.

1.11 Laboratory Documentation and Records

The analytical laboratory will keep records of all analyses performed, as well as associated QC information, including laboratory blanks, matrix spikes, laboratory control samples, and laboratory duplicates.

1.12 Reporting

Oneka Technologies is responsible for the preparation of quarterly reports and a final report on monitoring and sampling conducted through the pilot project. The quarterly report should include, at a minimum:

- Methodologies employed in the monitoring and sampling activities, including any modifications to the plans,
- Table summarizing the results (including both laboratory data and field measurements),
- Final laboratory certificates of analysis (including QC sample results),
- Discussion of any problems noted with the data, either from laboratory or field measurements,
- Discussion of any data points showing exceedances of criteria,
- Recommendations/changes for the next sampling event.

The final report should include, at a minimum:

- Description of the project,
- Table summarizing the results (of all project, including both laboratory data and field measurements),

- Final laboratory certificates of analysis for the fourth quarter (including QC sample results),
- Discussion of the field and laboratory activities, as well as any deviations or modifications to the plans,
- Trends observed as a result of the monitoring efforts,
- Evaluation of the data in meeting the project objectives.

The quarterly reports are to be submitted approximately sixty days after the completion of each sampling event. The annual reports are to be submitted in lieu of the last quarterly report for each year and are inclusive of the entire year's activities.

2.0 DATA ACQUISITION/GENERATION

This section of the QA Project Plan describes how monitoring and sample collection will be conducted. Field Documentation of deviations from this QA Project Plan is the responsibility of the Oneka Technologies Project Manager. Deviations noted during field activities will be documented in the Quarterly Reports. All field instruments will be calibrated (according to the manufacturer's instructions) at the beginning of each sampling event and periodically checked for deviations or anomalies. Field instrument calibration and sample measurement data will be recorded in the field logbook. See **Section 2.4** for more details.

2.1 Field Measurements

2.1.1 Continuous Brine Discharge Monitoring

The brine discharge is expected to rapidly dilute within a few feet of the discharge point. To effectively monitor and validate the modeled dilution, a string of temperature and conductivity sensors (e.g., Seametrics CT2X conductivity smart sensor and data logger) will be deployed from the desal buoy. The sensors will be spaced at increasing intervals from the Iceberg to the seafloor with the first sensor located as close to the discharge as possible. Subsequent loggers will be positioned at depths from the discharge point of 1 ft, 3 ft, 5 ft, 10 ft, and near the bottom. The logging rate will be set at 4x/min. The loggers will be serviced monthly to download the accumulated data, clean the logger and its housing of any biofouling, and redeploy. Monitoring will continue for the duration of the pilot study while the Iceberg is deployed.

2.1.2 Monthly Water Quality Monitoring

Each month, water quality profiles from the sea surface to the sea floor will be collected using a calibrated sonde. Water temperature, pH, salinity, and dissolved oxygen will be collected at each of five stations at 1-ft depth intervals between the surface and the sea floor. One station will be located adjacent to the Iceberg and an additional four stations will each be located 100 ft away from the Iceberg in a cross-formation to monitor upcoast, downcoast, offshore, and inshore of the

Iceberg. Monthly monitoring will continue for the duration of the pilot study while the Iceberg is deployed.

2.1.3 Water Chemistry Monitoring

After the first three months of deployment, seawater samples will be collected using a discrete-depth sampler (e.g., Van Dorn bottle) as close to the discharge point as possible and at approximately 5 ft deep from the discharge point. These samples will be transported to an ELAP certified laboratory for chemical analysis. This is the same analytical laboratory the City of Fort Bragg uses for monitoring compliance of the WWTP. The previous analysis described in the Project Description will be repeated for each of the samples collected as proposed above.

2.2 Laboratory Analyses Methods (Off-Site)

All samples will be analyzed at an ELAP accredited analytical laboratory. Analyses will be performed following EPA-approved methods.

Field Blanks - Field blanks will be collected to evaluate whether contaminants have been introduced into the samples during the sample collection due to exposure from ambient conditions or from the sample containers themselves. Field blank samples will be obtained by pouring deionized water into a sample container at the sampling location.

Field duplicate samples will be collected to evaluate the precision of sample collection through analysis. Field duplicates will be collected at designated sample locations by alternately filling two distinct sample containers for each analysis. Field duplicate samples will be preserved, packaged, and sealed in the same manner described for the surface water samples. A separate sample number and station number will be assigned to each duplicate. The samples will be submitted as "blind" (i.e., not identified as field duplicates) samples to the laboratory for analysis.

One field blank and one duplicate sample will be collected for every 10 samples or a frequency of 10%.

2.3 Instrument/Equipment Testing, Inspection, and Maintenance

Sampling equipment under the care of Oneka Technologies will be maintained according to the manufacturer's instructions. Maintenance logs will be maintained in the Fort Bragg field office. The log will document any maintenance and service of the equipment and each log entry will include the following information:

- Name of person maintaining the instrument/equipment,
- Date and description of the maintenance procedure,
- Date and description of any instrument/equipment problem(s),
- Date and description of action to correct problem(s),
- List of follow-up activities after maintenance (i.e., system checks), and

- Date of when the next maintenance will be needed.

2.4 Instrument/Equipment Calibration and Frequency

All equipment will be calibrated according to manufacturers' instructions. For salinity monitoring, Seametrics CT2X conductivity meters/data loggers will be used. The water quality meter has not yet been selected.

All Seametrics CT2X conductivity smart sensors and data loggers are factory calibrated. All Seametrics CT2X sensors will be re-calibrated according to manufacturers instruction using the two-point calibration protocol described in the sensor's user manual.

2.5 Data Collection and Management Plan

The security and integrity of the data collected through this project is of the highest priority. **Table A-1** in **Appendix A** provides descriptions of how the data will be acquired, transferred, used and maintained.

3.0 ASSESSMENT AND OVERSIGHT

During the course of the project, it is important to assess the project's activities to ensure that the QA Project Plan is being implemented to ensure that project goals and compliance requirements are met. For the current project, the ongoing assessments will include:

<u>Field Oversight</u>

- Readiness review of the field team prior to starting field efforts,
- Recording of all field activities, and
- Review of field sampling and measurement activities methodologies and documentation at the end of each event.

<u>Laboratory Oversight</u>

- Evaluation of results generated by the analytical laboratory following the sampling event by a Qualified Person within Oneka and/or Miller Marine Science.

The Project Manager will be responsible for planning and implementing oversight and review activities for all tasks identified in **Section 2.0**.

APPENDIX A

Table A-1: Data Collection and Management

Quality Assurance Project Plan
Desalination Buoy Discharge Monitoring

TABLE A-1: DATA COLLECTION AND MANAGEMENT PROCESSES

Phase	Activity	Conductivity monitoring at the desal buoy	Monthly water quality monitoring	Water quality sampling and laboratory analysis
Data Collection	**Type of Data Collected**	Salinity data a various depths beneath the desal buoy as per CEQA EMP	Field measurement of temperature, pH, dissolved oxygen and salinity at various depths and at 5 stations: 1 adjacent to buoy and 4 stations located 100ft away from buoy	Seawater samples will be collected as close to the discharge point as possible and at approximately 5 ft deep from the discharge point.
	Related Discharge	Brine discharge	Brine discharge	Brine discharge
	Purpose of Data	To fascilitate assessment of brine plume dispersion and comparison with existing modelling results	To fascilitate assessment of potential water quality effects	To fascilitate assessment of potential water quality effects
	Collection Schedule	Data will be collected continuously throughout the pilot project	Data will be collected monthly on the 15th of each month, varied as required based on sea conditions	Conducted once, after first 3 months of operation and concurrently with monthly water monitoring
	Data Acquisition Method	Via an array of datalogging salinity probes	Via handheld sensor	Via discrete-depth sampler (e.g., Van Dorn bottle)
	Operational verification	Sensors will initially be deployed and retreived within 5 days (weather dependant) and the data collected and reviewed to ensure that the device is operating normally.	Calibration according to manufacturer's instructions quarterly Assessment of readings during field monitoring	Not applicable - sample collection
Data Retrieval, Analysis, and Security	**Data and Samples: Transfer and Processing**	Retreived manually by field staff in accordance with documented procedure (e.g., via a USB adaptor to field computer)	Stored in sensor unit and copied by field staff to field computer immediately following completion of monitoring at each station	Samples transferred to laboratory supplied containers at time of sampling and labelled. Chain of custody completed and shipped with samples to accredited laboratory.
	QA/QC Review of Data	The Oneka Project Manager is responsible for the review and validation of all data collected through the course of the project. Collected data will be reviewed on a monthly basis by a qualified person using statistical analysis (e.g., distribution ranges, standard deviations, manual review of 10% of data, comparisons with expected value ranges) in a reasonable timeframe after the data is downloaded. This process aims to identify issues such as sensor malfunction or transcription errors, identify root causes, and expediently design and implement remedial actions.	The Oneka Project Manager is responsible for the review and validation of all data collected through the course of the project. Collected data will be reviewed on a monthly basis by a qualified person using statistical analysis (e.g., distribution ranges, standard deviations, manual review of at least 50% of data, comparisons with expected value ranges) in a reasonable timeframe after the data is downloaded. This process aims to identify issues such as sensor malfunction or transcription errors, identify root causes, and expediently design and implement remedial actions.	Chemical analysis of all water samples collected during the project will be analyzed by an ELAP certified laboratory, using the laboratory's QA/QC procedures. Analytical results will be provided to Miller Marine Science for analysis and reporting.
	Data Analysis	Analysis of salinity data will be conducted by a qualified person at Oneka Technologies, and data will be provided to Miller Marine Science for further analysis and reporting.	Analysis of salinity data will be conducted by a qualified person at Oneka Technologies, and data will be provided to Miller Marine Science for further analysis and reporting.	Samples will be analyzed by Alpha Analytical Laboratories for chemical analysis. This is the same analytical laboratory the City has used for testing in compliance with the WWTP's NPDES permit. Analytical results will be provided to Miller Marine Science for analysis and reporting.
	Data Management	All data will immediately be backed up to a cloud server directly from field computer. Backup copies of all data will be maintained on a computer at Fort Bragg field office and at Oneka headquarters.	All data will immediately be backed up to a cloud server directly from field computer. Backup copies of all data will be maintained on a computer at Fort Bragg field office and at Oneka headquarters.	The analytical laboratory will convey all results to Oneka electronically. Copies will be held by the laboratory, by Oneka (cloud server), and by the Oneka qualified person (data analyst), as well as by Miller Marine Science Consulting.
	Data Security	All data stored will be retained in a secure system with a backup copy retained for a period of at least 2 years.	All data stored will be retained in a secure system with a backup copy retained for a period of at least 2 years.	All data stored will be retained in a secure system with a backup copy retained for a period of at least 2 years.