3.9 Hydrology and Water Quality

This Section evaluates the potential impacts to hydrology and water quality resulting from construction and operation of the Project against significance thresholds derived from applicable local, state, or federal policies, or from Appendix G of the CEQA Guidelines.

3.9.1 Study Area

For the Terrestrial Development and the Humboldt Bay Water Intake project components, the Study Area includes the Area of Potential Effect as shown in Figure 2-2 – Area of Potential Effect, as well as the adjacent waters of Humboldt Bay. For the Ocean Discharge project component, the Study Area includes area of plume dilution resulting from the use of diffusers on the existing Redwood Marine Terminal II (RMT II) ocean outfall, as shown in Figure 13 and Figure 14 of Appendix E – Numeric Modeling Report (Dilution Study, GHD 2021a).

3.9.2 Setting

The setting for the Terrestrial Development and Humboldt Bay Water Intakes includes vacant and underutilized industrial lands on the Samoa Peninsula, as shown in Figure 2-2. The natural topography of the area has been altered by regular and extensive anthropogenic disturbance. The terrestrial Project Site does not include any streams, springs, or other water bodies. One-parameter willow series wetlands are present on the Project Site but outside the ground disturbance footprint. Coastal and estuarine wetlands were delineated within the Study Area of the Humboldt Bay Water Intake element (SHN 2020b).

Humboldt Bay is located to the east of the Project Site and is also considered in this impact analysis for this section. Additionally, the proposed water intakes (sea chests) are located in Humboldt Bay. Tidal characteristics for Samoa are presented in Table 3.9-1 – Tidal Data for Samoa (Humboldt Bay). The greater diurnal range (the difference between MHHW and MLLW) near Samoa is moderate (7.37 feet).

Table 3.9-1 Tidal Data for Samoa (Humboldt Bay)

Tidal Datum	Tide Level (ft)
Highest Astronomical Tide (HAT)	9.32
Mean Higher High Water (MHHW)	7.37
Mean Sea Level (MSL)	3.99
Mean Lower Low Water (MLLW)	0.00
Lowest Astronomical Tide (LAT)	-2.41

The setting for the Ocean Discharge includes the existing RMT II ocean outfall, which extends 1.55 miles offshore into the Pacific Ocean. The multiport diffuser has 72 ports on either side of the pipe (total of 144 ports), each port is 2.4-inch diameter at a spacing of 12 feet between ports. Currently, there are eight diffuser port pairs open (16 open ports). The closed diffuser ports are secured with toggle bolt blinds. The outfall pipe consists of four pipe sections. All pipe sections are connected with different joint configurations and flanges. Each joint includes zinc anodes wet welded to mixed flange materials to prevent electrolysis.

The near surface waters off the U.S. West Coast originate in large part from the eastward-flowing North Pacific Current (the northern limb of the North Pacific Gyre), which advects (transports) biota and debris towards the West Coast and serves as a source of the water properties of the California Current System (CCS). In contrast to the CCS of the upper water column, the California Undercurrent is a poleward-flowing subsurface oceanographic feature of the region. Overall biological productivity in the CCS in the locale of Humboldt Bay is generally attributed to seasonal upwelling of nutrient-rich deep waters to the continental shelf, as in other eastern boundary systems. The wind regime is characterized primarily by northwesterly winds from May to September and both southerly and northerly winds at other times of year. A summary of the descriptive statistics of pertinent analytes to this investigation are summarized in Table 3.9-2 – Marine Water Quality at Entrance Bay of Humboldt Bay. Marine currents are variable annually and interannually.

Available data on near-shore background ammonia is limited. Grab sampling was conducted just outside the mouth Humboldt Bay in 1980 during the upwelling (April through September) and runoff seasons (October through March). The 1980 measurements found 0.0 microgram per liter (ug/L) and 2.41 ug/L during the upwelling and runoff seasons, respectively (Barnhart et al. 1992). Barnhart et al. (1992) concluded that while "nearshore waters are the main source of nitrate-nitrogen during summer, they tend to be low in ammonium and may act as a sink along with plant product inside the bay." Given these two datapoints are from a single grab sample more than thirty years ago, they are likely not representative of current conditions or the variability of background ammonia concentration in receiving waters (nearshore Pacific Ocean) throughout the year.

Swanson (2015) monitored ammonia throughout Humboldt Bay via grab samples but did not monitor outside Humboldt Bay. Swanson's two monitoring stations at the South Bay Entrance and the Bay Entrance are the most representative available data for off-shore conditions from his research. During the upwelling season, grab samples of ammonia concentrations in outer Humboldt Bay (nearest the mouth of Humboldt Bay) have been monitored in 1980, 1981, 2006, and 2009 through 2015. Results were lowest in 1980 (1.9 micromolars [uM]) and highest during the most recent monitoring (3.9 uM). During the runoff season, ammonia concentrations in the outer bay ranged from a low of 0.0 uM in 1980 to a high of 6.0 uM in 2006. During the most recent grab samples collected by Swanson during the 2009 through 2015 period, ammonia concentrations were documented at 3.0 uM (Swanson 2015). Based on this limited dataset, background ammonia concentrations are both variable annually and interannually and increasing through time. See Section 3.9.5 – Methodology for information about other known datasets that were considered that may include ammonia monitoring.

Table 3.9-2 Marine Water Quality at Entrance Bay of Humboldt Bay

Analyte	Median	80^{th} Percentile	20^{th} Percentile
PO_4 (ug/L)	45	60	-
NO_3 (ug/L)	150	225	-
NH_4 (ug/L)	42	64	-
S (psu)	33.5	-	32.3
T (°C)	11	13	-

ug/L = micrograms/liter psu = practical salinity unit

The RMT II ocean outfall is utilized by two existing dischargers on the Samoa Peninsula. The National Pollution Discharge Elimination System (NPDES) permit, as administered by the North Coast Regional Water Quality Control Board (NCRWQCB), for DG Fairhaven Power, LLC (Order No. R1-2018-0013) authorizes a discharge of 0.350 million gallons per day (MGD). The NPDES permit for Peninsula Community Services District and Samoa Pacific Group Town of Samoa Wastewater Treatment Facility (Order No. R1-2020-0005) authorizes a permitting discharge of 0.756 MGD. The RMT II ocean outfall has a total capacity of approximately 40 MGD.

Compensatory off-site restoration associated with pile removal would occur along the Kramer Dock shoreline, located in Fields Landing, California. Pile removal would occur in the tidal environment of Humboldt Bay.

3.9.3 Regulatory Framework

Federal

Clean Water Act

The federal Clean Water Act (CWA) enacted by Congress in 1972 and amended several times since, is the primary federal law regulating water quality in the United States and forms the basis for several state and local laws throughout the country. The CWA established the basic structure for regulating discharges of pollutants into the waters of the United States. The CWA gave the EPA the authority to implement federal pollution control programs, such as setting water quality standards for contaminants in surface water, establishing wastewater and effluent discharge limits for various industry categories, and imposing requirements for controlling nonpoint source pollution. At the federal level, the CWA is administered by the EPA and USACE.

Section 303(d) of the Federal Clean Water Act requires state governments to present the EPA with a list of “impaired water bodies,” defined as those water bodies that do not meet water quality standards, even after point sources of pollution have been equipped with the minimum required levels of pollution control technology.

The Humboldt Bay is included in the EPA’s 303(d) list of impaired waters under Section 303(d) of the CWA because the State of California has determined that the water quality standards are not met due to excessive contaminants for dioxins and polychlorinated biphenyl (PCBs) and are thus subject to the development of Total Maximum Daily Load (TMDL) waste allocations pursuant to requirements in the CWA. A TMDL for dioxins and PCBs has not yet been developed.

Sections 404 and 401 of the CWA require permitting and state certification for construction and/or other work conducted in “waters of the United States.” Such work includes levee work, dredging, filling, grading, or any other temporary or permanent modification of wetlands, streams, or other water bodies. The Terrestrial Development would not impact waters of the United States or State; however, the Humboldt Bay Water Intake component would require in-water work under the jurisdiction of the NCRWQCB and the USACE. A permit under Section 10 of the CWA would not be required for the Terrestrial Development but would be required for the Humboldt Bay Water Intakes.

National Flood Insurance Program

FEMA administers the National Flood Insurance Program (NFIP) to provide subsidized flood insurance to communities that comply with FEMA regulations limiting development in floodplains. FEMA also issues Flood Insurance Rate Maps identifying which land areas are subject to flooding. The maps provide flood information and identify flood hazard zones in each community. The design standard for flood protection is established by FEMA, with the minimum level of flood protection for new development determined to be the 1-in-100 annual exceedance probability (i.e. the 100-year flood event).

National Pollutant Discharge Elimination System

The National Pollutant Discharge Elimination System (NPDES) permit program was established in the CWA to regulate industrial and municipal discharges to surface waters of the United States. NPDES permit regulations have been established for broad categories of discharges including point source municipal waste discharges and nonpoint source stormwater runoff.

A NPDES permit is required when proposing to or discharging into any surface water of the state. NPDES stormwater discharges in California are regulated through federal NPDES permits, administered by the RWQCB. The Project would be required to obtain a NPDES permit to authorize discharge into the Pacific Ocean via the existing RMT II outfall.

Federal Antidegradation Policy

The federal antidegradation policy is set forth in 40 CFR §131.12. State Water Resources Control Board (SWRCB) Order No. 68-16 incorporates the federal antidegradation policy into the state policy for water quality control and ensures consistency with federal CWA requirements. This federal regulation establishes a three-part test for determining when increases in pollutant loadings or other adverse changes in surface water quality may be permitted:

- Existing instream water use and level of water quality necessary to protect the existing uses shall be maintained and protected.
- Where the quality of the waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the state finds after full satisfaction of the intergovernmental coordination and public participation provisions of the state's continuing

planning process that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation or lower water quality, the state shall assure water quality adequate to protect existing uses fully. Further, the state shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable BMPs for nonpoint source control.

– Where high quality waters constitute an outstanding National resource, such as waters of National and State Parks and wildlife refuges and waters of exceptional recreational or ecological significance, water quality shall be maintained and protected.

The federal anti-degradation policy serves as a catch-all water quality standard to be applied where other water quality standards are not specific enough for a particular waterbody or where other water quality standards do not address a particular pollutant.

State

Coastal Act

The California Coastal Act (California Public Resources Code sections 30000 et seq) was enacted by the State Legislature in 1976 to provide long-term protection of California's 1,100 mile coastline for the benefit of current and future generations. Coastal Act policies constitute the standards used by the California Coastal Commission (Commission) in its coastal development permit decisions and for the review of local coastal programs (LCPs) prepared by local governments and submitted to the Commission for approval. The Humboldt Bay Area Plan of the Humboldt County Local Coastal Program (Humboldt LCP) will dictate development on the terrestrial portion of the Project, while the Coastal Act will govern for the effluent discharge and Humboldt Bay intakes. Policies referenced in the HBAP are directly cited from the Coastal Act and are discussed in the Local section below. The Coastal Act is also used by the Commission to review federal activities that affect the coastal zone. Among other things, the policies require:

– Protection and expansion of public access to the shoreline;
– Protection, enhancement, and restoration of environmentally sensitive habitats;
– Protection of productive agricultural lands, commercial fisheries, and archaeological resources; and
– Protection of the scenic beauty of coastal landscapes and seascapes.

The Project is located within the Coastal Zone, within the state's jurisdiction. All new development proposed on tide and submerged lands, and other public trust lands must receive a permit from the Commission (PRC 30519(b), and 30416(d)).

Porter Cologne Water Quality Control Act

The Porter Cologne Water Quality Control Act is the primary statute covering the quality of waters in California. Under the Act, the SWRCB has the ultimate authority over state water rights and water quality policy. The nine RWQCBs regulate water quality under this Act through the regulatory standards and objectives set forth in Water Quality Control Plans (also referred to as Basin Plans) prepared for each region.

The five-member SWRCB allocates water rights, adjudicates water right disputes, develops state-wide water protection plans, establishes water quality standards, and guides the nine RWQCBs located in the major watersheds of the state. The joint authority of water allocation and water quality protection enables the SWRCB to provide comprehensive protection for California's waters. The SWRCB is responsible for implementing the CWA, issues NPDES permits to cities and counties through RWQCBs, and implements and enforces the NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) (Order No. 2009-0009, as amended by Order No. 2010-0014). The Order applies to construction sites that include one or more acre of soil disturbance. Construction activities include clearing, grading, grubbing, excavation, stockpiling, and reconstruction of existing facilities involving removal or replacement.

Regional Water Quality Control Board

Regional Water Boards adopt and implement Water Quality Control Plans (Basin Plans) which recognize the unique characteristics of each region with regard to natural water quality, actual and potential beneficial uses, and water quality problems. The current 2018 Basin Plan prepared by the NCRWQCB provides a definitive program of actions designed to preserve and enhance water quality and to protect beneficial uses of water in the North Coast Region.

The NCRWQCBs' planning process also includes water quality planning programs (adoption, review, and amendment of state-wide and basin water quality control plans and policies), including development and adoption of TMDLs and implementation plans; regulatory programs (permitting and control of discharges to water through "NPDES" and WDR permits, discharge to land – "Chapter 15," and stormwater and storage tanks programs); monitoring and quality assurance programs; nonpoint source management programs, including the "Watershed Management Initiative;" and funding assistance programs, including grants and loans.

Water Quality Control Plan for Ocean Waters off California (Ocean Plan)

The Ocean Plan, as amended in 2019, is one of five statewide water quality control plans established by the State Water Resources Control Board to preserve and enhance California's territorial ocean waters for the use and enjoyment of the public. This is achieved by controlling the discharge of waste into the ocean and seawater intake. Discharge of waste can include stormwater runoff, municipally treated sewage outflow, and other discharges by industry under regional and state board permits. These plans, which are the State Water Board's master water quality planning documents, designate beneficial uses, water quality goals, and include programs to achieve these objectives.

Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan)

The California Thermal Plan provides temperature standards for territorial seas off California. The Ocean Plan requires implementation of the Water Quality Objectives contained in the Thermal Plan as follows: "*The maximum temperature of thermal waste discharges shall not exceed the natural temperature of receiving waters by more than 20°F*." This will be included in the new draft NPDES permit as well.

The full WQO's for new discharges to coastal waters is as follows:

(1) Elevated temperature wastes shall be discharged to the open ocean away from the shoreline to achieve dispersion through the vertical water column.
(2) Elevated temperature wastes shall be discharged a sufficient distance from areas of special biological significance to assure the maintenance of natural temperature in these areas.
(3) The maximum temperature of thermal waste discharges shall not exceed the natural temperature of receiving waters by more than 20°F.
(4) The discharge of elevated temperature wastes shall not result in increases in the natural water temperature exceeding 4°F at (a) the shoreline, (b) the surface of any ocean substrate, or (c) the ocean surface beyond 1,000 feet from the discharge system. The surface temperature limitation shall be maintained at least 50 percent of the duration of any complete tidal cycle.
(5) *Additional limitations shall be imposed when necessary to assure protection of beneficial uses*.

NCRWQCB NPDES Permit

Projects that discharge stormwater runoff to Waters of the U.S. from land disturbances greater than one acre require a General Construction Stormwater Discharge Permit from the RWQCB, as required under NPDES Order No. 2009-0009, as amended by Order No. 2010-0014. To obtain a permit, a discharger files a Notice of Intent to be included under the State's NPDES permit. General conditions of the permit require that dischargers must eliminate non-stormwater discharges to stormwater systems, develop and implement a Stormwater Pollution Prevention Plan (SWPPP), and perform inspections of stormwater pollution prevention measures.

Local

Humboldt Bay Area Plan – Local Coastal Program

3.14 – Industrial Coastal Marine Environment

In addition to any other policies established pursuant to this division, the policies of the state with respect to water quality as it relates to the coastal marine environment are that:

a. *Wastewater discharges shall be treated to protect present and future beneficial uses, and, where feasible, to restore past beneficial uses of the receiving waters. Highest priority shall be given to improving or eliminating discharges that adversely affect any of the following:*

   (1) Wetlands, estuaries, and other biologically sensitive sites.

   (2) Areas important for water contact sports.

   (3) Areas that produce shellfish for human consumption.

   (4) Ocean areas subject to massive waste discharge.

Ocean chemistry and mixing processes, marine life conditions, other present or proposed outfalls in the vicinity, and relevant aspects of area-wide waste treatment management plans and programs, but not of convenience to the discharger, shall for the purposes of this section, be considered in determining the effects of such discharges. Toxic and hard- to-treat substances should be pretreated at the source if such substances would be incompatible with effective and economical treatment in municipal treatment plants.

d. *Independent baseline studies of the existing marine system should be conducted in the area that could be affected by a new or expanded industrial facility using seawater in advance of the carrying out of the development.*

3.14 Industrial – Protection Against Spillage

Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur.

a. *Industrial uses shall include mitigation and design features for compatibility with adjacent land uses; in particular, screening and/or landscaping to buffer adjacent residential and recreational uses.*

New industrial development adjacent to areas planned for public recreation, natural resources, or residential use on the North Spit shall include mitigation measures, including at a minimum, setbacks, landscaping, and design controls to minimize significant conflicts with adjacent land uses.

3.17 Hazards – Development Policies: Tsunamis

New development below the level of the 100 year tsunami run-up elevation described in Tsunami Predictions for the West Coast of the Continental United States (Technical Report H-78-26 by the Corps of Engineers) shall be limited to public access, boating, public recreation facilities, agriculture, wildlife management, habitat restoration, and ocean intakes, outfalls, and pipelines, and dredge spoils disposal.

3.9.4 Evaluation Criteria and Thresholds of Significance

Evaluation Criteria	Significance Thresholds	Sources
Would the Project violate any water quality standards or waste discharge requirements, or otherwise substantially degrade surface or groundwater quality?	Non-compliance with the NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities Alteration of the course of a stream, river, or waterway in a manner that creates erosion or siltation Creation of increased quantity of runoff such that capacity of storm drains would be exceeded	CEQA Guidelines Appendix G, Checklist Item X (a) (e) General Construction Permit (Order No. 2009-0009, as amended by Order No. 2010-0014 & 2012-006)
Would the Project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin?	Creation of a deficit in aquifer volume or lowering of groundwater levels Creation of a substantial amount of new impervious surfaces that would interfere with groundwater recharge	CEQA Guidelines Appendix G, Checklist Item X (b) (e)
Would the Project substantially alter the existing drainage pattern of the site or area in a manner which would result in substantial erosion or siltation on- or off-site?	Uncontrolled runoff from construction site	CEQA Guidelines Appendix G, Checklist Item X (c)(i) Humboldt County Grading, Excavation, and Erosion and Sediment Control Ordinance
Would the Project substantially alter the existing drainage pattern of the site or area in a manner which would substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	Creation of a substantial amount of new impervious surfaces that would result in an increase in runoff from or within the Project Area	CEQA Guidelines Appendix G, Checklist Item X (c)(ii) FEMA flood protection standards
Would the Project substantially alter the existing drainage pattern of the site or area in a manner which would 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?	Installation of stormwater retention basins that do not comply with County standards, are not sustainable, and would increase erosion or sedimentation.	CEQA Guidelines Appendix G, Checklist Item X (c)(iii) Humboldt County Low Impact Development Stormwater Manual
Would the Project substantially alter the existing drainage pattern of the site or area in a manner which would impede or redirect flood flows?	Project actions would result in on-site or off-site flooding.	CEQA Guidelines Appendix G, Checklist Item X (c)(iv)

Evaluation Criteria	Significance Thresholds	Sources
In flood hazard, tsunami, or seiche zones, risk release of pollutants due to Project inundation?	Placement of facilities in a 100-year flood hazard area Non-compliance with the Humboldt County Flood Damage Prevention Ordinance	CEQA Guidelines Appendix G, Checklist Item X (d), and Item VIII (b) Humboldt County Flood Damage Prevention Ordinance
Conflict with or obstruct implementation of a water quality plan or sustainable groundwater management plan?	Conflict with Basin Plan or groundwater management planning.	CEQA Guidelines Appendix G, Checklist Item X (a) (e) Humboldt Bay Clean Water Act 303(d) listing for dioxin and polychlorinated biphenyls (PCBs)

3.9.5 Methodology

Impact analysis related to hydrology and water quality is based on the following technical evaluations developed for the Project:

- Numeric Modeling Report (Dilution Study, Appendix E)
- Preliminary Hydrologic and Stormwater Analysis (Appendix H)
- Probabilistic Site-Specific Tsunami Hazard Analysis (Appendix I)

In addition, the FEMA 100-year flood overlay was obtained from the Humboldt County WebGIS online database (Humboldt County 2021).

Impact analysis for compensatory off-site restoration involving Spartina removal relied on the existing Final Programmatic Environment Impact Report for the Humboldt Bay Regional Spartina Eradication Plan (H.T. Harvey & Associates and GHD 2013), hereafter referred to as the 2013 Spartina PEIR.

The numeric modeling dataset for ambient water quality in this study was collected approximately 3.5 miles south-southeast of the RMT II multiport diffuser. Swanson (2015) collated data from measurements at Entrance Bay of Humboldt Bay from October 2012 to February 2015 that was comprised of:

- Bi-weekly to quarterly measurements from January 2014 to February 2015 by Swanson (2015).
- Bi-weekly measurements from October 2012 to February 2015 by Wiyot Tribe Natural Resources Department (2015).

Data applied to numeric modeling was the best time series data available to estimate appropriate water quality objectives and is representative of proximal nearshore water quality in the Study Area (Appendix E). The following data sources to characterize ambient water quality at the proposed facility's diffuser were also considered, but not utilized:

- The Trinidad glider by the Central and Northern California Ocean Observing System (CENCOOS) (refer to (https://www.cencoos.org/trinidad-glider/) makes continuous measurements of temperature, salinity, chlorophyll fluorescence and acoustic backscatter from the surface to 500 m depth and from ~10 to ~400 km offshore. However, nutrients are not measured, and the glider track is too far offshore to characterize nearshore water quality for the numeric modeling effort.
- As part of the California Cooperative Oceanic Fisheries Investigations (CalCOFI) (https://newdata.calcofi.org/index.php), the Southwest Fisheries Science Center's Cooperative Fisheries Oceanography Research Team carries out ocean cruises to collect data at five stations along the Trinidad Head Line transect (https://www.fisheries.noaa.gov/west-coast/science-data/ocean-and-ecosystem-observations-

trinidad-head-line). However, nearshore nutrient data could not be sourced that may aid in the characterization nearshore water quality for this study. Additionally, the Trinidad Head Line is outside the spatial modeling domain and would not be representative of marine conditions near the outlet of Humboldt Bay.

– Additional data was directly sought from Dr. Jeffrey Abell of Humboldt State University. While Dr. Abell has collected additional data not currently published on CENCOOS or CalCOFI, including nutrient data associated with the Trinidad Head Line and pinpoint sampling at various locations in the Pacific Ocean, the data was not readily available for use by NAFC to supplement the Numeric Modeling Report and had not yet been vetted through a standard quality assurance/quality control (QA/QC) process (Abell Pers Comments 2021).
– STRATFORM (Wright et al. 1999) and Sediment Transport Events on Shelves and Slopes (STRESS; Sherwood et al. 1994) acoustic Doppler current profiler (ADCP) data from approximately 200 feet (60-70 meters) water depth off the Eel River was obtained beyond the model domain and the Study Area in much deeper waters and thus would be insufficient to reproduce representative of ocean currents in the Study Area. Additionally, the referenced datasets are now approximately thirty years old any may not be representative of current ocean conditions, given changing climatic conditions.
– National Oceanic and Atmospheric Administration (NOAA) high frequency radar data, which remotely measures ocean surface currents, was initially applied to the numeric modeling, in consultation with the Humboldt Bay office. Following initial analysis, the data was excluded because the six kilometer resolution of the radar data was much coarser than the model and resulted in a poor like-for-like comparison for calibration and validation purposes; spatial coverage of the data set was patchy at any given time and a valid radar dataset was not available in the nearshore region; and temporal coverage within the data set also contained many gaps. Given these issues, it was not possible to identify a location from the dataset that was both close enough to the modeled near-shore site to be considered a representative location and included enough temporal coverage to make a calibration exercise possible. Furthermore, data accuracy could not be verified, and the data set included the disclosure, “this is a research project and may contain errors.” Use of the dataset was thus dismissed.

Using a three-dimensional hydrodynamic model, Anderson estimated the 90% flushing time[1] between Entrance Bay and the ocean to be 1.6 days. Such a high flushing rate supports the assumption of the Numeric Modeling Report that the Humboldt Bay Entrance Bay water quality is representative of the adjacent coastal waters, including the water quality of the ambient water at the diffuser site. Hence, given the limited availability of water quality data to characterize the coastal water in proximity to the RMT II outfall, the focus of the Numeric Modeling Report was on the potential impacts from the stimulation of coastal ecosystem productivity by elevated nutrient loads, ammonia toxicity and salinity/thermal stress.

Impact analysis also considered the requirements of the draft NPDES order to which the Project’s treated effluent would be required to comply, as well as additional monitoring to be completed by the applicant. Both the draft NPDES order and the additional monitoring are summarized below.

NPDES Waste Discharge Order Requirements

The effluent discharge would be regulated under the NPDES program, which would require regular compliance monitoring. Failure to comply with NPDES permit requirements would result in penalties, fines, modified orders, and other regulatory compliance actions. Under the draft NPDES order, continuous sampling of effluent flow and temperature would occur at the point where the treated effluent enters the ocean outfall pipe, as summarized in Table 3.9-3 (NCRWQCB 2021). Note Table 2-9 – Project Daily Maximum Effluent Summary in Section 2.0 (Project Description) summarizes the maximum daily effluent for the Project, which in some cases are lower than corresponding regulated thresholds in Table 3.9-3. The final NPDES order would be authorized following the certification of the EIR and project approval by the County; thus, these monitoring requirements could potentially adjust in the final order subsequently approved by the NCRWQCB. The final NPDES order with final monitoring requirements would be issued following completion of the CEQA process and are anticipated to be similar to those summarized below.

[1] Time to flush 90% of the volume.

Parameters to be sampled at the point of entry into the ocean outfall pipe on a weekly basis would include: biochemical oxygen demand (BOD), oil and grease, pH, total suspended solids (TSS), settleable solids, and turbidity. Parameters to be sampled on a monthly basis at the point of entry into the ocean outfall pipe include total ammonia nitrogen, unionized ammonia as N, total organic nitrogen as N, and total nitrate nitrogen as N. Chronic toxicity would be sampled annually. 2019 Ocean Plan Table 3 Pollutants (Objectives for Protection of Marine Aquatic Life, SWRCB 2019) would be sampled one year after commencing discharge. A biological survey would be required once per five-year permit term, with prior review and approval of the biological survey work plan by the NCRWQCB. The biological survey would occur in the Pacific Ocean and would include an evaluation of objectionable aquatic growths, floating particulates or grease and oil, aesthetically undesirable discoloration of the ocean surface, color of fish or shellfish, and any evidence of degradation of indigenous biota attributable to the rate of deposition of inert solids, settleable material, nutrient materials, increased concentrations of organic materials, or increased concentrations of Ocean Plan Table 3 substances. Under the NPDES order, the Project would operate the ultraviolet (UV) disinfection system to ensure the UV design dose is met and pathogens (e.g., fish diseases) are not discharged to receiving waters. Ultraviolet (UV) transmittance of the effluent from the UV disinfection system would be monitored continuously.

According to the draft NPDES order, the chronic toxicity in-stream waste concentration (IWC) for the Project is 0.87 percent effluent, and the Project shall conduct annual chronic toxicity tests on effluent samples at the discharge IWC in accordance with species and test methods in Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms (EPA/600/R-95/136, 1995 as cited in the draft NPDES order). Under the required methods, chronic toxicity testing would occur in topsmelt, purple sea urchin, and giant kelp.

If sampling results show non-compliance, NCRQWCB would issue a Cease and Desist or a Time Schedule Order under the NPDES program. NAFC would then coordinate with the NCRWQCB to obtain compliance. As a standard provision in the draft order, failure to comply with provisions or requirements of the order, of violation of other applicable laws or regulations governing the NAFC discharge may subject NAFC to administrative or civil penalties, criminal penalties, and/or other enforcement remedies to ensure compliance. Additionally certain violations may subject NAFC to civil or criminal enforcement from appropriate local, state, or federal law enforcement entities (NCRWCB 2021, Section 6.1.2.1).

The draft order includes four reopener provisions that enable the NCRWQCB to modify the order at any point if:

– **Standard Revision** - If applicable water quality standards are promulgated or approved pursuant to section 303 of the Clean Water Act (CWA), or amendments thereto, the NCRWCB may reopen the order and make modifications in accordance with such revised standards.

– **Reasonable Potential** – The order may be reopened for modification to include an effluent limitation if monitoring establishes that the discharge causes, or has the reasonable potential to cause or contribute to, an excursion above a water quality criterion or objective applicable to the receiving water.

– **Whole Effluent Toxicity** - The order may be reopened to include a new narrative or numeric chronic toxicity limitation, acute toxicity limitation and/or a limitation for a specific toxicant identified in the Toxicity Reduction Evaluation, which is a study conducted in a step-wise process designed to identify the causative agents of effluent or ambient toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in toxicity. Additionally, if a numeric chronic toxicity water quality objective is adopted by the State Water Board, the order may be reopened to include a numeric chronic toxicity effluent limitation based on that objective.

– **303(d)-Listed Pollutants** - If an applicable total maximum daily load (TMDL) program is adopted, the order may be reopened and effluent limitations for the pollutant(s) that are the subject of the TMDL modified or imposed to conform to the TMDL requirements (NCRWQCB 2021).

Table 3.9-3 Summary of Draft NPDES Monitoring Requirements and Effluent Limitations (from NCRWQCB 2021)

Parameter	Unit	Minimum Sampling Frequency	Effluent Limitations and Surface Water Limitations
Effluent Flow	MGD	Continuous	12.5 MGD
Temperature	Degrees Fahrenheit	Continuous	The full WQO's for new discharges to coastal waters is as follows: *(1) Elevated temperature wastes shall be discharged to the open ocean away from the shoreline to achieve dispersion through the vertical water column.* *(2) Elevated temperature wastes shall be discharged a sufficient distance from areas of special biological significance to assure the maintenance of natural temperature in these areas.* *(3) The maximum temperature of thermal waste discharges shall not exceed the natural temperature of receiving waters by more than 20°F.* *(4) The discharge of elevated temperature wastes shall not result in increases in the natural water temperature exceeding 4°F at (a) the shoreline, (b) the surface of any ocean substrate, or (c) the ocean surface beyond 1,000 feet from the discharge system. The surface temperature limitation shall be maintained at least 50 percent of the duration of any complete tidal cycle.* (5) *Additional limitations shall be imposed when necessary to assure protection of beneficial uses*.
Biochemical Oxygen Demand (BOD)	Mg/L and pounds/day	Weekly	6,270 pounds/day Average Monthly and 10,230 pounds/day Maximum Daily based on 165,000 pounds of fish processed daily 12,566 pounds/day Average Monthly and 20,503 pounds/day Maximum Daily based on 330,693 pounds of fish processed daily BOD shall not be depressed by more than 10% from that which occurs naturally
Oil and Grease	Mg/L and pounds/day	Weekly	248 pounds/day Average Monthly and 693 pounds/day Maximum Daily based on 165,000 pounds of fish processed daily 496 pounds/day Average Monthly and 1,389 pounds/day Maximum Daily based on 330,693 pounds of fish processed daily
pH	Standard unit	Weekly	6.0 Instantaneous minimum and 9.0 instantaneous maximum pH shall not be changed at any time by more than 0.2 units from that which occurs naturally
Total Suspended Solids	Mg/L	Weekly	1,254 pounds/day Average Monthly and 2,145 pounds/day Maximum Daily based on 165,000 pounds of fish processed daily 2,513 pounds/day Average Monthly and 4,299 pounds/day Maximum Daily based on 330,693 pounds of fish processed daily

Parameter	Unit	Minimum Sampling Frequency	Effluent Limitations and Surface Water Limitations
Ammonia Nitrogen, Total (as N)	Mg/L	Monthly	The concentration of organic materials in marine sediments shall not be increased to levels that would degrade marine life. Nutrient materials shall not cause objectionable aquatic growths or degrade indigenous biota. Discharges shall not cause exceedances of water quality objectives for ocean waters of the state established in chapter II, Table 3 of the Ocean Plan. Table 3 of the Ocean Plan has ammonia water quality objectives of 6000 ug/L instantaneous maximum, 2400 ug/L daily maximum and 600 ug/L six-month median.
Unionized Ammonia (as N)	Mg/L	Monthly	
Organic Nitrogen, Total (as N)	Mg/L	Monthly	
Nitrate Nitrogen, Total (as N)	Mg/L	Monthly	
Settleable Solids	Ml/L	Weekly	
Turbidity	NTU	Weekly	75 average monthly, 100 average weekly, 225 instantaneous maximum
Ocean Plan Table 3 Pollutants	ug/L	Once per permit term (5 years)	The concentration of substances set forth in chapter II, Table 3 of the Ocean Plan shall not be increased in marine sediments to levels which would degrade indigenous biota.
Chronic Toxicity	ug/L	Annually	0.87 percent effluent

Ug/L = micrograms per liter ml/L = milliliter per liter NTU = Nephelometric Turbidity Units

Additional Monitoring to be Completed by the Applicant

As described in the Project Description, in addition to water quality and biological monitoring required under the NPDES order, NAFC would complete monitoring of coastal oceanography and water quality of receiving waters in the Pacific Ocean. This additional monitoring program would be carried out to understand interannual variability (e.g., cool vs warm years) and would commence with pre-discharge baseline monitoring. Baseline monitoring would commence one to two years prior to the discharge from the facility. Post-discharge receiving water monitoring would commence following completion of Phase 2 operations (full facility discharge) following the same methodology as the baseline monitoring. The post-discharge monitoring would continue for two to three years to provide “before-after-control-impact” or “before-after-gradient” design for the biological monitoring program. The monitoring program would be conducted during the summer/fall period of upwelling “relaxation,” when conditions are least energetic, and dilution of the discharge would thus be lowest. Two annual surveys would occur during the summer/fall period, ideally in August or September, separated by at least two weeks.

Coastal oceanographic data would be gathered with an acoustic doppler current profiler (ACDP) to measure current velocities (deployment and retrieval during the first and second surveys of each year, respectively), and the use of a conductivity, temperature, and depth (CTD) profiler to characterize spatial patterns of temperature and salinity of the ambient waters and any effects in proximity to the discharge. CTD profiles would be collected at approximately 100 to 300 feet (near diffuser) to approximately 500 to 1,000 feet (distant from diffuser), and reference profiles would be collected greater than one mile from the diffuser. The deployment of the ADCP would be within 0.5 mile of the diffuser at a similar depth.

Water quality monitoring of nutrients (NH_x, NO_x, TN), suspended solids and turbidity, and chlorophyll a would be conducted during each survey to confirm the predicted area of effect. Near surface (~1-3 ft below surface and near-seabed (approximately 5 feet above bottom) grab samples would be collected at half of the profiling stations (proportionally by near the diffuser, far from the diffuser, and reference profiles) and analyzed by an appropriately accredited laboratory.

In addition to the biological sampling required under the NPDES permit, supplemental biological surveys would be conducted to determine if effluent discharge is having a significant effect on biota in the Ocean Discharge Study Area, defined as the proximal marine waters as modelled in Appendix E. Supplemental biological surveys would occur concurrently with water quality monitoring. The study approach would utilize visual methods, either a remotely operated vehicle (ROV) and/or a drop camera with laser lights for scale. Transects and point surveys would be conducted at a height of two to five feet above the bottom. Surveys would be conducted outside of the zone of influence estimated in Appendix E for this time period (e.g., reference sites), and within the zone of influence, and along the discharge pipe, at approximately the 82 feet (25 meter) isobath.

Additional benthic monitoring to be completed by NAFC is not proposed. As described in Section 3.3 (Biological Resources), Impact (a), Ocean Discharge, the comingled discharge (~27 psu) is less saline than the ambient seawater (~33.5 psu) and the ambient salinity stratification is weak during the representative summer scenario, the plume has a greater tendency to rise to the surface as it undergoes dilution than detraining in the middle of the water column. Further, the zone of potential water quality degradation (i.e., elevated nutrients) near the seabed is much smaller than the areal extent of the surface and mid-water column, so that the risk of enhanced benthic productivity is low. The simulated zone of potential benthic impacts was affected by particle settling velocity, with 3 different particle settling velocities modelled for winter and summer seasons (Appendix E, GHD 2021c). The simulated zone of potential impacts for both summer and winter simulations ranged from 25 to 500 m depending on settling rate, but do not result in significant benthic impacts based on spatial area and organic loading, resulting in a low risk of impact to the benthic community in proximity to the diffuser (Appendix D, GHD and H. T. Harvey 2021). The combination of the limited spatial extent and relatively brief duration that the proximal benthic habitat would experience elevated nutrients indicates a ‘very low’ risk of increased benthic ecosystem productivity.

Annual reporting would be completed following each post-discharge monitoring event by a qualified consultant and shared with Project stakeholders, outside the NPDES order reporting requirements and reflective of seasonal variations.

3.9.6 Impacts and Mitigation Measures

Impact HWQ-a: Would the Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality? (Less than Significant with Mitigation)

Terrestrial Development

The Project Site is along the North Spit of the Humboldt Bay and situated directly east of the Pacific Ocean. Flowing waters (streams, rivers, or natural drainages) are not located on the Project Site. The Project Site does include one-parameter coastal willow wetlands, which would be avoided and protected.

Construction

Construction would commence with demolition of existing structures on the Project Site. Following demolition, Project construction would occur over two phases and therefore would require installation and monitoring of temporary erosion and sediment control BMPs during construction and throughout the entire construction duration to protect receiving waters from sediment or other construction debris. To ensure any potential construction-related impacts to water quality are less than significant, the Project would also be required to obtain a General Construction Stormwater Discharge SWPPP as detailed in Mitigation Measure HWQ-1. Mitigation Measure HWQ-1 requires measures to limit the potential for water quality impacts related to construction. Additional BMPs the Project would adhere to are included in Mitigation Measure GEO-2 and SWPPP requirements in Mitigation Measure HWQ-1. These would minimize and avoid water quality impacts to Humboldt Bay from construction-generated erosion and stormwater by establishing erosion control measures during construction (e.g., silt fences). minimize removal of vegetation, and avoidance of work during heavy rainfall. In addition, Mitigation Measure GEO-2 and HWQ-1 would also protect against accidental spill of hazardous materials during refueling and maintenance of construction-related heavy equipment by requiring spill prevention and contingency measures, including measures to prevent or clean up spills of hazardous waste and of hazardous materials used for equipment operation, and emergency procedures for responding to spills.

The current plan is designed to avoid working below the water table and avoiding the need to dewater. If dewatering is needed, water would be sampled and chemically characterized to determine the appropriate final disposal solution such as onsite infiltration or offsite disposal (SHN 2021).

Given implementation of Mitigation Measure GEO-2 and HWQ-1 would require BMPs to control erosion, sediment, and other hazardous materials potentially resulting from construction and that water sourced from dewatering would not be discharged to any wetlands or surface waters, the potential impact from construction would be less than significant.

Mitigation

Mitigation Measure HWQ-1: Implement BMP's as part of Construction Permitting and Stormwater Pollution Prevention Plan (SWPPP) for Terrestrial Development

The Project will implement, at a minimum, the list of Best Management Practices identified below as part of approved construction permits and as part of compliance with State Water Resources Control Board (Water Board) Order No. 2009-0009-DWQ, Waste Discharge Requirements for Discharges of Stormwater Runoff Associated with Construction and Land Disturbance Activities. NAFC will include these requirements on all construction plans and submit permit registration documents (notice of intent, risk assessment, site maps, Stormwater Pollution Prevention Plan (SWPPP), annual fee, and certifications) to the Water Board. The SWPPP will address pollutant sources, BMPs, and other requirements specified in the Order.

The following BMPs are the minimum necessary to reduce potential impacts to a less than significant level:

<u>General Construction</u>

a) Construction activities shall be scheduled and sequenced to minimize the areal extent and duration of site disturbance at any time.

b) Drainage from outside the construction area shall be directed away from or around the site through use of berms, ditches, or other structures to divert surface runoff.

c) Install weed-free fiber rolls, straw-wattles, coir logs, silt fences, or other effective devices along locations where water drain off the construction site.

d) All graded slopes shall receive slope protection measures such as fiber rolls, drainage ditches, or erosion control fabrics to minimize the potential for concentrated surface runoff to cause erosion.

e) Implement wind erosion or dust control procedures consisting of applying water or other dust palliatives as necessary to prevent or alleviate dust nuisance generated by construction activities. The contractor may choose to cover small stockpiles or areas as an alternative to applying water or other dust palliatives.

f) Control water application rates to prevent runoff and ponding. Repair leaks from water trucks and equipment immediately.

<u>Hazardous Materials</u>

a) Hazardous materials shall be stored in areas protected from rain, provide secondary containment and must be a minimum of 100 feet from any wetland or Environmentally Sensitive Habitat Area.

b) Implement the following hazardous materials handling, storage, and spill response practices to reduce the possibility of adverse impacts from use or accidental spills or releases of contaminants:

   i. Conduct all refueling and servicing of equipment more than 100 feet from any wetland or Environmentally Sensitive Habitat Area with absorbent material or drip pans underneath to contain spilled fuel. Collect any fluid drained from machinery during servicing in leak-proof containers and deliver to an appropriate disposal or recycling facility.

   ii. Prevent raw cement; concrete or concrete washings; asphalt, paint, or other coating material; oil or other petroleum products; or any other substances that could be hazardous to aquatic life from contaminating the soil or surface water.

<u>Dewatering and Treatment Controls</u>

In the event dewatering is determined to be necessary the following steps shall be taken:

a) Prepare a dewatering plan prior to excavation.

b) Impound dewatering discharges in sediment retention basins or other holding facilities to settle the solids and provide treatment prior to discharge to receiving waters as necessary to meet Basin Plan water quality objectives.

Mitigation Measure GEO-2: Construction Best Management Practices

Refer to Chapter 3.2 (Geology and Soils), Impact (b), for the full text of Mitigation Measure GEO-2: Construction Best Management Practices.

Implementation of Mitigation Measure HWQ-1 and GEO-2 would reduce potential construction related impacts to water quality to a less than significant level.

Mitigation Measures: Mitigation Measure HWQ-1 and GEO-2

Level of Significance: Less than Significant with Mitigation Incorporated

Operational

The facility once constructed will direct all storm water runoff to detention basins where the water will be allowed to percolate into the ground. There will not be storm drains conveying storm water to surface waters. All process water will be directed to the wastewater treatment facility as discussed above. The likelihood of water quality contaminants reaching waters of the United States is very low. In addition to preparing a Construction General SWPPP as detailed in Mitigation Measure HWQ-1 (in compliance with State Water Quality Control Board Order No. 2009-0009, as amended by Order No. 2010-0014), the Project would also obtain an Industrial SWPPP (in compliance with State Water Quality Control Board Order No. 2014-0057-DWQ).

The Industrial SWPPP would require the Project to implement industrial stormwater BMPs, such as good housekeeping, preventative maintenance, spill and leak prevention and response, material handling and waste management, erosion and sediment controls, employee training, and quality assurance and record keeping BMPs in accordance with the Industrial General Permit (IGP) guidelines. An Industrial SWPPP permit also would require the Project to sample stormwater discharges at least four times a year (during two qualifying storm events from July-December and two qualifying storm events from January-June each year); report sample results; inspect, maintain, and modify site-wide operations BMPs; provide employee training; and complete annual reports for the facility on an annual basis in compliance with the IGP operations requirements. As outlined in the preliminary stormwater design for the facility (GHD 2021c, Appendix H), no off-site stormwater discharge is expected for events up to a 100-year storm event; therefore, stormwater discharge sampling is not anticipated to occur or be required at the Project Site.

Operational stormwater would be monitored under the Industrial SWPPP, also requiring compliance with regulated water quality parameters. With compliance with regulatory requirements for the Industrial SWPPP, any potential impact resulting from operational stormwater or the effluent discharge into the Pacific Ocean or Humboldt Bay would be less than significant.

The Project would source domestic and industrial freshwater supply demands from the Humboldt Bay Municipal Water District (HBMWD). Required water volumes are within the HBMWD's permitted Mad River water right and well below the previous industrial demand supplied to the two former pulp mills on the Samoa Peninsula (HBMWD 2021b). Any potential impact related to surface waters of the Mad River from operational domestic and industrial water supplies via the HBMWD would thus be less than significant.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

<u>Ocean Discharge</u>

Construction

The Ocean Discharge would occur via the existing RMT II ocean outfall. Additional ports on the RMT II ocean outfall would be opened with divers and hand work. The proposed phased construction schedule for the land-based aquaculture facility would result in a phased increase in discharge water. The appropriate number of ports would need to be opened in each phase to accommodate the flow and maintain the target port velocities. After full buildout of the land-based aquaculture facility, a total of 64 of the 144 ports on the diffuser assembly would be opened by divers. It is anticipated that one additional dive day during routine Harbor District inspection dives would be required to open ports as needed by removing the toggle bolt blinds. Any damaged or inoperable ports encountered would be repaired through conventional methods or replaced if necessary. Given construction would not be required for this Project element, only opening of existing diffuser ports, no impact would result.

Mitigation Measures: No mitigation is necessary

Level of Significance: No Impact

Operational

Discharge Characterization

Once operational, the highly treated wastewater effluent would be discharged through the existing RMT II ocean outfall and diffuser into the Pacific Ocean 1.55 miles offshore. The Project would gradually ramp up to a maximum of 12.5 million gallons per day (MGD), as production increases over time. Discharge would increase over three phases, different from the two phases of construction described in Section 2.2.2 of the Project Description. Water to water cooling will be maximized to reduce energy consumption from the start of operations.

As summarized in Table 2-9 – Project Daily Maximum Effluent Summary, the effluent would include a maximum of 185 kilograms/day (KGD) of total suspended solids (TSS), 162 KGD of biochemical oxygen demand (BOD), 673 KGD of total nitrogen (TN), 0.07 KGD of ammonium nitrogen (NH_4), and 5.8 KGD of phosphorous (P). Dilution of the discharged pre-treated effluent with respect to water quality parameters established in both the Ocean Plan and the Thermal Plan was evaluated and determined to be compliant with all applicable regulations and water quality thresholds (Appendix E).

The Project would utilize the existing ocean outfall pipe and multiport diffuser to discharge water from the facility to the ocean. The multiport diffuser has 72 ports on either side of the pipe (total of 144 ports), each port is 2.4 inches in diameter at a spacing of 12 ft between ports (Appendix E). The Project would open an additional 24 diffuser pairs (48 ports). When combined with the existing 8 open diffuser pairs (16 ports), a total of 32 diffuser pairs (64 open ports) would be operational (Appendix E).

The Project would have an average discharge of approximately 8,700 gallons per minute (GPM). Source waters to the facility would be a mixture of saltwater (from Humboldt Bay), potable water (from the Humboldt Bay Municipal Water District sourced from the Mad River), and industrial freshwater (from the Humboldt Bay Municipal Water District sourced from the Mad River) yielding a salinity of approximately 26.8 practical salinity units (psu). Effluent temperature from the facility would range between 68 and 72°F. After passing through the facility and prior to discharge through the RMT II outfall infrastructure, the effluent would be fully treated in an advanced wastewater treatment plant that will employ moving bed biofilm reactors, membrane bioreactors and UV-C sterilization, thereby attaining low levels of inorganic nutrients and organic suspended solids (Appendix E). All floor drains from every building on campus including the fish processing area are routed to the Projects wastewater treatment plant for treatment. Processing water from the fish processing area will receive a pre-treatment to remove large solids and lipids prior to being sent to the Projects central wastewater treatment plant for complete tertiary treatment and disinfection prior to discharge.

The total nitrogen amount of 673 kilograms per day (kg/day) or 14 milligrams per liter (mg/L) is a conservative peak number providing NAFC a buffer to ensure discharge permits requirements would always be met. Typical operating levels would be lower and will average 10-12 mg/L of total nitrogen. All modeling and the application for coverage under the NPDES program included a conservative peak volume of nitrogen and other water quality constituents, assuming the potential maximum quantities of nutrients in the discharge water. All key aspects of water and waste treatment would have built in redundancy to allow for 100% operational capacity at all times such as during regular scheduled maintenance of the equipment. Examples of this include the two oxygen generators which would have excess capacity in each generator, with back up liquid oxygen tanks. All the equipment at the facility, including wastewater treatment, would be supplied with power by the onsite backup generators in the event of a power outage. Additional examples of redundancy in systems would be within the wastewater treatment plant:

– Six membrane bioreactor trains would be installed while only five are required to provide 100% treatment.
– Four UVs units would be installed for disinfection of the effluent prior to discharge, while only three are required, to provide 100% disinfection of the effluent.

All cleaning and chemical agents would be used in compliance with the intended use and label instructions and are included in the draft NPDES order. The cleaning agents that would be used interact with organic material. As they interact with organic material, they are consumed and thus are not present in the effluent discharge. All floor drains and pipes outside of the sanitary sewer system (sinks for hand washing, toilets, and showers) lead to the Project's onsite wastewater treatment facility where they would be comingled with other organic waste streams from the facility. Any cleaning agent not fully consumed in its use would interact with these organics and be consumed through that interaction within the facility and before discharge. The operation of a hatchery, grow-out systems, seafood processing, and water treatment operations will require the use of multiple chemical compounds. Some of these compounds will be used to ensure proper disinfection of new eggs arriving to the facility, while others will be used to clean and disinfect the seafood processing equipment and areas where food safety is regulated by the USDA. Additional compounds are listed below that will be used to optimize the performance of water treatment operations to ensure the highest level of environmentally protection effluent treatment is achieved. Annual usage estimates represent estimates of maximum quantity required given a chemical is the only one used for this application. NAFC has compiled this list in consultation with its sister commercial facilities currently in operation, and Nordic Aquafarms Tech, their in-house engineering company. The quantities utilized will be dependent on the site-specific conditions experienced which are difficult to establish prior to operations and are indicated as estimates only. Conservative estimates are presented to fully describe any potential operational scenario. It is likely a fraction of the estimated annual quantity of each of these products will be employed when the facility is in operation. NAFC will seek to optimize the effectiveness of the compounds they employ so as to ultimately reduce the amount utilized. All products listed will only be used for their intended purposes and according to label. NAFC may use therapeutant compounds, these products are used in fish farming operations to reduce stress of handling, for disinfection of eggs per best practices, or should the situation arise to alleviate fish health issues. In an effort to be fully transparent about all potential situations however unlikely, NAFC has also described compounds that are not part of the operations but could be prescribed for use by an accredited veterinarian in the unlikely event of a disease event which would warrant the use of those compounds to ensure fish welfare needs are met. Those compounds would be administered under the supervision and direction of accredited veterinarian for use in emergency situations only. All of the chemicals and compounds described below would be used in a manner to ensure they are fully consumed in its use and not discharged from the facility.

The following is a comprehensive list of all potential chemicals and aquaculture drugs that may be used at the Facility:

Detergents

- Aqualife® Multipurpose Cleaner: A biodegradable, nonhazardous cleaner that is designed specifically for use in fish hatcheries, aquaculture facilities, fish & food processing plants, & agricultural farms. Active ingredients: sodium hydroxide (1-5%), the product is phosphate free, contains no volatile organic compounds and is NSF certified for use in food processing facilities. Used according to the label at dilutions of 1:20. Approximate annual use: 2,232 gallons/year.
- Gil Save®: High-foaming chlorinated, alkaline, liquid detergent, Gil Save is designed for foam and high pressure spray cleaning of meat and poultry plants, breweries, dairies, and canneries. It is a complete product containing alkalis, water conditioners, chlorine, and high-foaming wetting agents. Gil Save is an effective cleaner of food processing equipment by removing fatty and protein soils, pectin, mold, yeast, and organic greases. Active ingredients: sodium hydroxide (7-9%), sodium hypochlorite (3-4%). Use according to label at concentrations of 0.2-3% (¼-4 oz/gallon). Approximate annual use: 678 gallons/year.
- **Clean in Place (CIP)**Gil Super CIP®: A heavy-duty, chelated-liquid caustic cleaner for use in CIP, boil-out, soak, spray clean and atomization cleaning systems, Gil Super CIP is formulated to remove protein, fatty and carbonized soils typically found in dairy and food processing. Active ingredients: sodium hydroxide (49%). Used according to label at 0.1-3% (1/8-4 oz/gallon). Approximate annual use: 5,840 gallons/year.
- Gil Hydrox®: A concentrated organic, liquid acid cleaner, Gil Hydrox rapidly removes milk/beer stone, alkaline/hard water film and stains/protein build-up from dairy and food processing equipment. It is specially formulated for use in CIP, spray, and acid rinse operations. Active ingredients: glycolic acid (29- 31%). Used according to label at 0.3-1.5% (½-2 oz/gallon). Approximate annual use: 5,840 gallons/year.

Disinfectants/Sanitizers

- Bleach: Active ingredient: sodium hypochlorite (8%) in concentrated form. Typically used at 100-1,000 ppm for general cleaning/disinfection. Approximate annual use: 1,500 gallons/year.
- Ozone: Ozone is a naturally occurring gas that is unstable and so has a very short half-life. It is formed when an oxygen molecule (O2) is forced to bond with a third atom of oxygen (O). The third atom is only loosely bound to the molecule, making ozone highly unstable. This property makes ozone an excellent oxidizing agent and ideal for use in water treatment. It reacts rapidly with organic materials (about 3,000 times faster than chlorine) and, unlike chlorine, there are no toxic residues. It reacts, then quickly disappears while the reaction by-product of ozone is oxygen. Closed process equipment which comes in to contact with fresh or processed food such as pipes, vessels and evaporators and other food contact surfaces must be kept clean and sanitized to maintain a proper level of hygiene. Ozone has been granted Generally Recognized As Safe approval by both the USDA and FDA for direct contact with food and ozone's strongly oxidizing characteristics makes it a viable complete replacement for traditional chemical disinfectants used to sanitize fillet machines, cutting tables, knives, and all equipment that may be used in the seafood processing areas. In addition, when used in the fish culture systems, ozone is responsible for reducing Total Suspended Solids and Dissolved Organic Carbon, as well as controlling the level of Biochemical Oxygen Demand / Chemical Oxygen Demand. Ozone breaks down large inorganic substances to smaller substances that are more readily biodegradable by bacteria contained in the recirculating aquaculture system (RAS) biological filters while ozone causes small organic particles to aggregate into larger particles which are more easily removed by filters. The combination of these factors leads to higher standards of environmental control and a reduction in effluent volumes. Approximate annual use: TBD. Concentration in discharge = 0 ppm.
- Zep FS Formula 12167® Chlorinated Disinfectant and Germicide: A liquid chlorine sanitizer and deodorant for use in all types of food handling establishments. Authorized as no rinse sanitizer for equipment. Provides deodorizing activity by destroying bacteria which generate many disagreeable odors. Can also be used to sanitize commercial laundry. Active ingredients: Sodium hypochlorite (5-10%) and sodium hydroxide (1-3%). Used according to label,

effective at concentrations as low as 0.3% (1 oz/ 2 gallons). USDA applicable and EPA and Maine registered. Approximate annual use: 1,980 gallons/year.

Drugs for Fish Treatment

- Parasite-S, Formalin-F, and Formacide-B. (Formalin): Active ingredient 37% formaldehyde. Used periodically according to the label if needed to alleviate fish health issues due to saprolegniasis, external protozoa and monogenetic trematodes. Typical dose rates from 25 ppm to 1,000 ppm. Approximate annual use: 925 gallons/year.
- Finquel® or Tricane-S (Tricaine methanesulfonate): Used periodically in accordance with the label to reduce stress on the fish when handling small numbers for examination. Typical dose rates of 15- 330 mg/L. Approximate annual use: 1.1 lbs/year (500 gallons/year).
- Ovadine® (PVP Iodine): A buffered 1% Iodine solution (Iodophor) specifically formulated for use in disinfecting fish eggs. It contains a 10% Povidone-Iodine (PVP Iodine) complex, which provides 1% available iodine. Used according to the label at dose rates of 50 -100 ppm as available iodine solution. Estimated usage: 160 gallons/year (600 l/year).

Other chemicals and aquaculture drugs can only be authorized if the Permittee (NAFC) submits a written request to the Executive Officer of the NPDES Permit to use a new drug or chemical. The request for new chemical usage shall contain the following:

- The common name(s) and active ingredient(s) of the drug or chemical proposed for use and discharge;
- The purpose for the proposed use of the drug or chemical (i.e., list the specific disease for treatment and specific species for treatment);
- The amount proposed for use and the resulting calculated concentration in the discharge;
- The duration and frequency of the proposed use;
- Safety Data Sheets (SDS) and available information; and
- Any related Investigational New Animal Drug (INAD), New Animal Drug Application (NADA) information, extra-label use requirements, and/or veterinarian prescriptions.

The Project would employ a high level of water treatment in the facilities recirculating aquaculture systems (RAS). The RAS systems employ both aerobic and anaerobic biological treatments for breaking down ammonia to less harmful nitrite. That nitrite is further broken down to even less harmful nitrate. Lastly the denitrification process breaks down nitrate into nitrogen gas, removing approximately 90% of total nitrogen from the water. Approximately 99% of the water that is recirculated through aquaculture systems would be reused. The remaining 1% is sent to the facilities wastewater treatment plant where additional nitrogen removal steps would be employed prior to the membrane bioreactors (MBR) where 0.04 micron filters would filter the water from the anaerobic mixed system, leaving behind the solids to be sent to dewatering. This additional anaerobic step further breaks down nitrogen products to nitrogen gas and removing them from the effluent prior to final step before discharge of disinfection through 300 (millijoule per square centimeter (mJ/cm2) End of Lamp Life (ELL) UV.

Numeric Modeling Completed for the Project

Near-field modelling completed for the Project predicts the dilution of a plume with the receiving marine waters in close proximity to the diffuser from momentum (jet-induced mixing upon exiting the port) and buoyancy (mixing as the plume rises through the water column). Modeling results predict mixing zone (i.e., marine toxicity (ammonia) and physiological stress (salinity and Temperature) to biotic receptors) would be met within 5 feet of the diffuser on the basis of the near-field modelling. The facility is project to emit 0.004 mg/l of ammonia and the state standard is 0.6 mg/l. Thus marine toxicity is well below the state standard. The project will have a positive impact over current conditions as the Project effluent will dilute current concentrations of ammonia and orthophosphate being discharged.

Discharge of low salinity water into the ocean has the potential to lens on the surface with limited mixing or dilution due to the differential density. The Project's effluent, by contrast, is only modestly less saline than the receiving body (33.5 practical salinity units [PSU]) at 26.8 PSU and would rapidly dilute to background eliminating risk of lensing at the surface of the ocean. The project will also significantly increase the salinity of the effluent currently being discharged. The effluent will not be within 1 PSU of the receiving body at the diffuser. Based on the modeling conducted, a dilution target of 7 (7 gallons of ocean water/gallon of effluent) is needed to dilute low salinity. This dilution target is met within 5 feet of the diffusers.

The Water Quality Objective for temperature is effluent cannot exceed receiving waters by more than 20 degrees Fahrenheit and cannot result in an increase of more than 4 degrees F. The facility will maximize water to water cooling to reduce energy needs and the facility's discharge will be between 68 and 72F. Modeling shows the temperature of the commingled discharge to be 71.34F in the winter and 71.47F in the summer. To meet the WQO for temperature a dilution target of 4 (gallons of ocean water/gallons of effluent) has been conservatively set. As with Salinity this dilution target is met within 5 feet of the diffusers. The regional water quality board has examined the larger overall impact on temperature to the receiving body in its draft permit and has calculated the increase in temperature to be approximately 0.1F at the edge of the mixing zone.

The port exit velocity of approximately 10 feet per second would also maintain the ports clear of sediment build-up and biofouling and maintains optimal levels of jet-induced near-field mixing. Modeling results also predicted the risk of enhanced pelagic productivity from elevated nutrients in the surface and mid- water column is 'very low'. Similarly, the risk of enhanced benthic productivity from elevated nutrients in the near-seabed waters is 'very low'. Modeling concluded the predicted organic gross sedimentation rates during both scenarios are very low and pose a low risk of impacting the benthic community (Appendix E).

The statistical contours for the dilution target of 200 (zone of potential water quality degradation) at the surface (0-6.5 feet [0-2 meters]), mid-water column (6.5-52 feet [2-16 meters]) and near-seabed (> 52 feet [16 meters]) for the representative worst case summer scenario are illustrated in Image 4-1. Because the comingled discharge (~27 psu) is less saline than the ambient seawater (~33.5 psu) and the ambient salinity stratification is weak, the plume has a greater tendency to rise to the surface as it undergoes dilution than detraining in the middle of the water column. Further, the zone of potential water quality degradation (i.e., elevated nutrients) near the seabed is much smaller than the areal extent of the surface and mid-water column; thus, the risk to water quality and enhanced benthic productivity is low (Appendix E).

<u>Evaluation of Potential Impacts to Humboldt Bay from Effluent Discharge</u>

Additionally, the 1% contour for the simulated dilution of 2,000 does not enter Humboldt Bay (Image 4-2). The model thus predicts a negligible effect of the proposed Project's discharge (i.e., a dilution factor of 2,000) on Humboldt Bay during the conservative, worst case summer scenario. Based on these modeling results, the effluent discharge would be compliant with established water quality thresholds in the Ocean Plan and the Thermal Plan, and the waters of Humboldt Bay would not be impacted. The highly treated discharge would have negligible, if any, effect on Humboldt Bay because of the large degree of mixing and dispersion that would occur during any water from the facility being transported to Humboldt Bay from the outfall location. This, coupled with the high tidal prism of Humboldt Bay (up to ~67% exchange of Humboldt Bay is exchanged with the ocean during spring tides), does not support the assumption that there is risk of temperature and/or nutrients having any material effect on Humboldt Bay water quality.

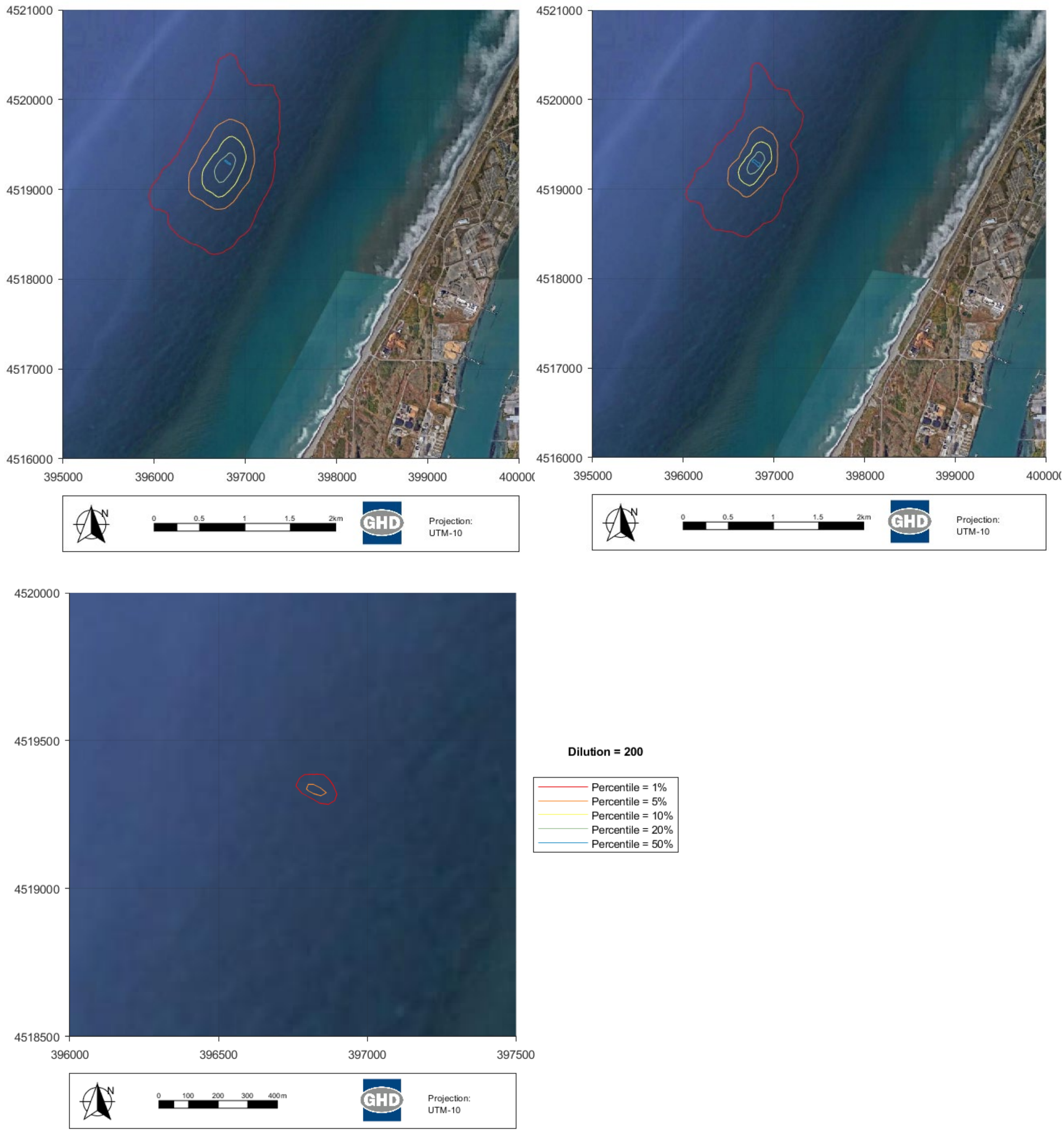

Image 4-1 ***Percentile Contours of a Plume Dilution of 200 at the Surface (top left, upper 6.5 feet [2 meters]), Mid-Water (top right, 6.5- 52 feet [2-16 meters]) and Near-Seabed (bottom, > 52 feet [16 meters]) for the Summer Scenario***

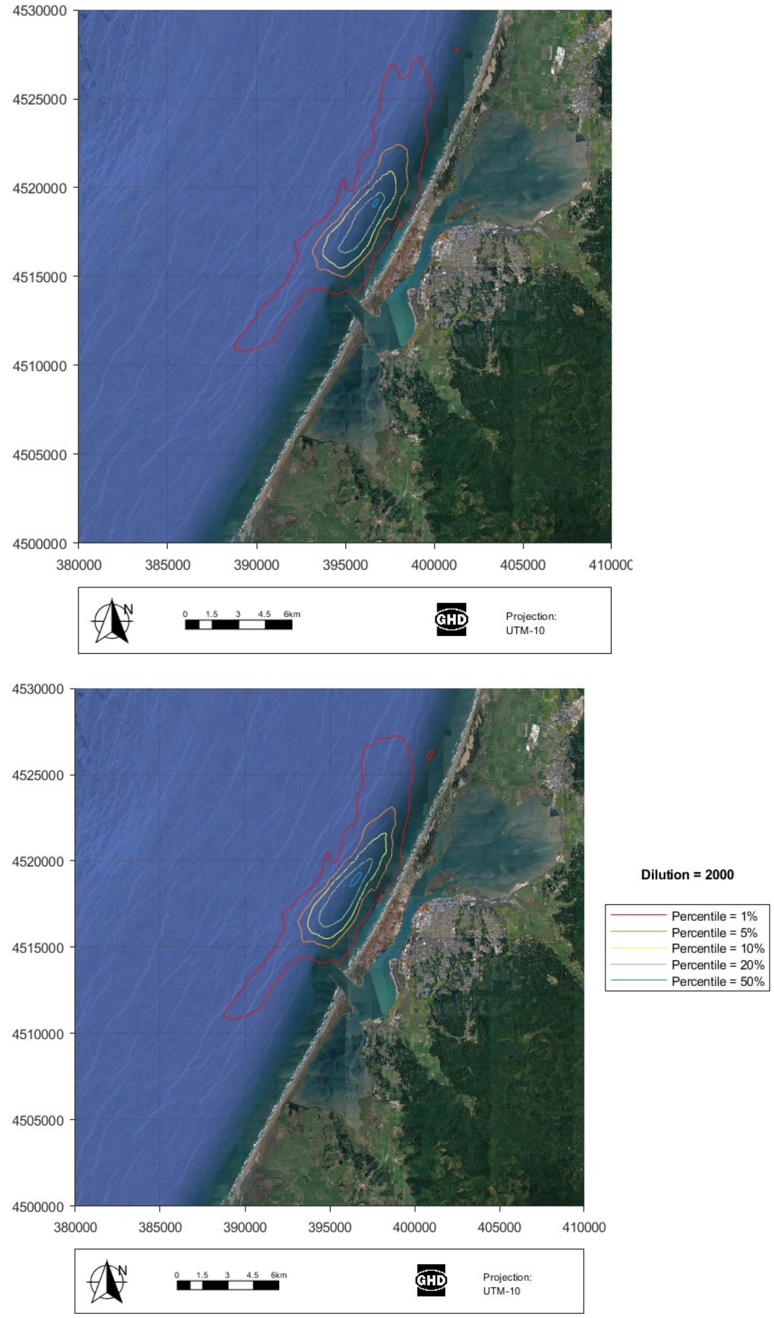

Image 4-2 Percentile Contours of a Plume Dilution of 2,000 at the Surface (left, upper 6.5 feet [2 meters]) and the Mid- to Lower Portions of the Water Column (right, 6.5-52 feet [2-16 meters]) for the Summer Scenario[2]

Operational Use of Chemicals, Vaccines, and Antibiotics

During operation, the existing outfall pipe would be used to discharge effluent from the wastewater treatment facility (WWTP). Effluent constituents from the entire facility would be comingled in a buffer tank at the entry of the WWTP where any residual cleaning agent and/or chemical is consumed by organic material. Residual cleaning agents or chemicals would thus not be present in the treated effluent discharged to the Pacific Ocean, and no impact would result.

[2] Plot of statistical contours >16 m not provided as entrance to Humboldt Bay is less than this depth.

The facility would operate a processing area certified by the Food and Drug Administration (FDA) and U.S. Department of Agriculture (USDA) for safe handling of raw seafood products. All employees would be required to follow strict health and safety guidelines for processing raw seafood that includes hand washing and equipment cleaning with detergent and sanitizers. Cleaning detergents and/or chemical agents used in the processing area would be used according to the label for intended use, application, and disposal as approved by the EPA (See above discussion for what types of cleaning products and their approximate annual use that may be used in the facility). Water from hand wash sinks, toilets, and showers would exit the facility through the sanitary sewar system. Thus, no impact would result to water quality in the Pacific Ocean associated with the ocean outfall.

Fish would undergo two vaccinations in their lifecycle. Vaccines would be used for protection against endemic pathogens and would be prescribed by the farm veterinarian through a legal VCPR relationship (Vet-Client-Patient-Relationship). Vaccines are administered with minimal stress according to manufacturer's instruction and veterinary guidance. The two-stage program aims to vaccinate young fry (2.5-4 grams) and pre-smolts (40-50 grams). Medicinal treatments (antibiotics, chemotherapeutants) would only be prescribed and administered under the advisement of an accredited veterinarian for fish welfare purposes. Vaccines would be used as a preventative health tool against endemic pathogens and are administered into the fish. Vaccines are metabolized by the fish to trigger immune function, and therefore, would not be present in the effluent. No impact to water quality from residual vaccines would result.

Given the facility would be biosecure, it would be very rare for a pathogen to enter the facility and cause fish disease. Thus, the use of medication such as antibiotics would be very rare and infrequent. In the rare case when medicines are required through proper diagnosis of an infection, they would be added to the feed per veterinarian prescription. The requirement of veterinary prescription ensures that the usage is well documented and justified, thus helping to eliminate the unnecessary use of antibiotics. All medicated feed that is not eaten by the fish would be recaptured and properly disposed and would not discharge through effluent. FDA approved withdrawal periods between the time of treatment and harvest would ensure that the medicine is no longer present in the fish when being consumed. Medications (e.g., antibiotics) are also metabolized by fish and would not be present in the effluent (See above discussion for the types of drugs and estimated usage used for fish treatment that may be used in the facility). No impact would result.

Evaluation of Potential Harmful Algal Blooms

Harmful Algal Blooms (HABs) are largely driven by large-scale oceanographic processes, and can represent a risk to the fisheries of Northern California as demonstrated by the mass of water 2.5 °C warmer than normal in 2013 through 2015 (Alaska Ocean Observing System 2021). McCabe et al. (2016) noted the outbreak was initiated by anomalously warm ocean conditions. *Pseudo-nitzschia australis*, which is a diatom that produces domoic acid, thrived north of its typical range in the warm, nutrient-poor water that spanned the northeast Pacific in early 2015.

HAB can be site-specific and are affected by natural processes, such as the hydrodynamics of receiving waters (e.g., vertical mixing). The coastal waters involved with the proposed Project are much more highly energetic than those elsewhere in the state (Southern California), where HABs have been known to occur. Coastal waters in the Study Area have higher energy wind and wave climate and substantially lower anthropogenic nitrogen fluxes. Further, numerical modeling (Appendix E) clearly demonstrates that elevated levels of nutrients are limited in spatial scale. The relatively energetic wave and wind climate induces substantive currents that limit the time scale (duration) in which elevated nutrients occur in the vicinity of the outfall. Hence, the risk of HAB blooms from the proposed Project's discharge is negligible due to the combination of these factors. Though HAB blooms can represent a risk to the fisheries of Northern California, these are largely driven by large-scale oceanographic processes, whereby the proposed Project discharge causing such an effect is insignificant.

Contingency Protocols for Water Quality Protection

Operational flexibility is inherent in the design, engineering, and operation of NAF facilities. By managing daily feeding activity, source water inputs, stock biomass, stocking rates, and fish processing activities, NAFC can control and adjust all key drivers of effluent constituents that are sent to the wastewater treatment facility. Each RAS unit in the facility will remove solids along with ammonia, nitrite, and nitrate through the utilization of aerobic biofilters and anaerobic denitrification systems. Before leaving the RAS unit on its way back to the fish tanks, the water pH is adjusted, CO2 is removed, and finally the water is disinfected with ozone and UV and oxygen is added. As the Recirculating Aquaculture Systems serve as a tertiary wastewater treatment system unto itself upstream of the facilities overall tertiary wastewater treatment system, active management and adjustment of the RAS inputs and individual components would be the first step in reducing nutrient inputs to the WWTP.

The high level of pre-discharge treatment in the Project's wastewater treatment plant, the phased approach to ramping up the discharge concurrent with NPDES and applicant-led monitoring, and the required reopening provisions in the NPDES order, all contribute to ensuring that NAFC will be compliant with the NPDES permit requirements.

The results of the numeric modeling completed for the Project shows that the water quality thresholds in the Ocean Plan and Thermal plan would not be exceeded. The NPDES treated effluent monitoring requirements and additional voluntary, receiving water monitoring conducted by NAFC, inclusive of transparent public reporting, is anticipated to confirm that any potential impact is not expected to be significant.

Out of an abundance of caution, NAFC would complete the following to ensure unanticipated detrimental effects to marine water quality related to the ocean discharge of treated effluent are not significantly impactful. Should the results of NPDES-related monitoring or additional monitoring completed by NAFC described above under Methods demonstrate water quality results that are (1) directly attributable to the Project, and (2) in conflict with the NPDES order for the Project, NAFC has the ability to immediately implement the one or more of the following operational management actions to reduce the volume of pollutants in its treated effluent discharge, in addition to any regulatory action taken by the NCRWCB to obtain compliance with the terms and conditions of the NPDES order:

- Reduce the amount of feed to be fed to fish per hour as well as adjust feed composition such as reducing phosphorus content. The primary source of constituents in the discharge wastewater are directly proportional to the amount of feed fed to the fish on the farm. In the unlikely event that water quality standards are exceeded the composition of the feed can be adjusted and/or feed volumes temporarily reduced to quickly bring the facility into permit compliance.
- Reduce the volume of fish processed per day. NAFC can control the constituents in the wastewater from fish processing in the effluent being discharged from the facility by reducing processing rates and/or adjusting pretreatment methods upstream of the wastewater treatment facility.
- Repair and/or replace any damaged equipment or systems that are contributing to the water quality impairment. NAFC has redundant equipment for all key water treatment processes. If one of these components is contributing to reduced water treatment levels NAFC will immediately repair and/or replace any damaged equipment or systems that are contributing to the water quality impairment.
- Adjust the ratio or volume of freshwater and seawater inputs. Atlantic Salmon are biologically capable of living in a range of salinities once they have smolted. NAFC can adjust the ratio or volume of freshwater and seawater inputs if necessary to affect the final density of the effluent.
- Track and adjust treatment methods across feed and biomass volumes as they build over phase one to ensure they are on track with performance metrics for Phase 2 wastewater treatment. NAFC will be building and operating the facility in phases. By tracking and adjusting operations and treatment methods across feed and biomass volumes during phase one the Project, NAFC can ensure they are on track with performance metrics for Phase 2. Wastewater treatment and operations will be optimized and can be adjusted to meet all required permits as the facility ramps up to full production over the course of approximately five years.

NPDES-required monitoring shall continue throughout these operational adjustments. Operational constraints shall continue until the water quality exceedance(s) attributable to the Project have been resolved to the satisfaction of the NCRWQCB. Implementation of these operational constraints would ensure potential impacts of the treated effluent discharge to marine water quality in the Pacific Ocean would remain at a less than significant level.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

Ongoing Maintenance

Annual maintenance of the RMTII outfall pipe would include dive operations and the utilization of surface vessel water pumps to power the diver operated jetting equipment. Maintenance activities include inspecting all joints, installing new anodes where depleted, jetting of sand away from ports, and jetting of any material inside the multiport diffuser. There are four joint couplings along the pipeline that would be inspected annually (ongoing and managed by the Humboldt Bay Harbor, Recreation, and Conservation District [Harbor District]). During the annual inspection of the joints, the zinc anodes would be inspected and replaced as necessary. As is currently the practice, the divers would use water jetting equipment to clear sand from the diffuser ports and clear any material that may be in the diffuser assembly. Consistent with existing conditions, Harbor District would continue current maintenance. Small quantities of sand and sediment would be temporarily mobilized in the immediate proximity of jetting activities for a period of less than one day in discrete locations. No impact from ongoing Harbor District maintenance would result.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

Humboldt Bay Water Intakes

Construction

Construction of the terrestrial pipeline associated with the Humboldt Bay Water Intakes would require 4,650 feet of trenching parallel to the Humboldt Bay shoreline. Construction to modernize and revitalize the sea chests on the RMT II dock and Red Tank dock would require in-water work in Humboldt Bay. These activities have the potential to impact water quality in Humboldt Bay during construction.

Trenching would be located in upland surfaces, away from the Humboldt Bay shoreline and any tidally active surfaces, preventing potential water quality impacts to Humboldt Bay. The Harbor District would utilize erosion control materials (e.g., silt fencing) to isolate the Humboldt Bay shoreline from the area of ground disturbance during construction as a standard permit condition required by jurisdictional permitting agencies. To ensure any potential construction-related impacts to water quality are less than significant, the Project would be required to obtain a General Construction Stormwater Discharge SWPPP (see Mitigation Measure HWQ-1). SWPPP requirements would minimize and avoid water quality impacts to Humboldt Bay from construction-generated erosion and stormwater by establishing erosion control measures during construction (e.g., silt fences), minimization of vegetation removal, and avoidance of work during heavy rainfall.

During trenching, any water sourced from dewatering activities would be pumped into Baker tanks or equivalent for sampling and chemical characterization (SHN 2021). Water sourced from trench dewatering would not be discharged to on-site wetlands or Humboldt Bay.

The water intakes are existing and in-place, requiring limited modification, including new pumps, screening, and piping. In-water work in Humboldt Bay required to modernize and revitalize the water intakes would occur at lower tides to support access to the sea chests. Use of a specialized equipment or hand removal via divers may be required for removal of small quantities of sediment that have settled at the bottom of the existing water intakes. Dredging or expansion of the existing water intakes would not occur.

As a component of the Project’s NPDES permit, the NCRWQCB must find the sea chests meet the criteria for California Water Code section 13142.5(b). The specific criteria are to employ, “best available site, design, technology and mitigation measures" feasible to minimize mortality of all forms of sea life, which includes avoidance of water quality impacts. As described in Section 3.3- Biology, the water intake screens have been designed with consideration for anadromous salmonid fry and juvenile Longfin Smelt per applicable NMFS guidelines and in consultation with CDFW. Please see Section 3.3. – Biology for additional discussion regarding impact analysis for special status fish specifically related to the water intakes. Given significant impacts to sea life will not result from the water intakes as analyzed in Section 3.3 – Biological Resources due to the application of the best available site, design, and technology, California Water Code section 13142.5(b) criteria is met.

The Harbor District would also be required to obtain a General Construction Stormwater Discharge permit for the Humboldt Bay Water Intakes (separate from the SWPPP required of NAFC for the Terrestrial Development). Similarly, the Harbor District would be required to obtain and following permits from the U.S. Army Corps of Engineers (USACE), NCRWQCB, the California Coastal Commission (CCC), and the California Department of Fish and Wildlife (CDFW). Permit requirements would include standard provisions to protect water quality, consistent with the Clean Water Act, California Coastal Act, and California Fish and Game Code. The Harbor District would employ BMPs and avoidance and minimization measures to limit and isolate in-water sediment disturbance or accidental spills during construction. Therefore, with the incorporation of Mitigation Measure HWQ-2, potential impact from construction would be less than significant.

Mitigation

Mitigation Measure HWQ-2: Implement BMP's as part of Construction Permitting and Stormwater Pollution Prevention Plan (SWPPP) for the Water Intakes

The Harbor District shall implement, at a minimum, the list of Best Management Practices identified below as part of approved construction permits and as part of compliance with State Water Resources Control Board (Water Board) Order No. 2009-0009-DWQ, Waste Discharge Requirements for Discharges of Stormwater Runoff Associated with Construction and Land Disturbance Activities. The Harbor District will include these requirements on all construction plans and submit permit registration documents (notice of intent, risk assessment, site maps, Stormwater Pollution Prevention Plan (SWPPP), annual fee, and certifications) to the Water Board. The SWPPP will address pollutant sources, BMPs, and other requirements specified in the Order.

The following BMPs are the minimum necessary to reduce potential impacts to a less than significant level:

<u>General Construction</u>

a) Construction activities shall be scheduled and sequenced to minimize the areal extent and duration of site disturbance at any time.

b) Drainage from outside the construction area shall be directed away from or around the site through use of berms, ditches, or other structures to divert surface runoff.

c) Install weed-free fiber rolls, straw-wattles, coir logs, silt fences, or other effective devices along locations where water drain off the construction site.

d) All graded slopes shall receive slope protection measures such as fiber rolls, drainage ditches, or erosion control fabrics to minimize the potential for concentrated surface runoff to cause erosion.

e) Implement wind erosion or dust control procedures consisting of applying water or other dust palliatives as necessary to prevent or alleviate dust nuisance generated by construction activities. The contractor may choose to cover small stockpiles or areas as an alternative to applying water or other dust palliatives.

f) Control water application rates to prevent runoff and ponding. Repair leaks from water trucks and equipment immediately.

Hazardous Materials

a) Hazardous materials shall be stored in areas protected from rain, provide secondary containment and must be a minimum of 100 feet from any wetland or Environmentally Sensitive Habitat Area.

b) Implement the following hazardous materials handling, storage, and spill response practices to reduce the possibility of adverse impacts from use or accidental spills or releases of contaminants:

    i. Conduct all refueling and servicing of equipment more than 100 feet from any wetland or Environmentally Sensitive Habitat Area with absorbent material or drip pans underneath to contain spilled fuel. Collect any fluid drained from machinery during servicing in leak-proof containers and deliver to an appropriate disposal or recycling facility.

    ii. Prevent raw cement; concrete or concrete washings; asphalt, paint, or other coating material; oil or other petroleum products; or any other substances that could be hazardous to aquatic life from contaminating the soil or surface water.

Dewatering and Treatment Controls

In the event dewatering is determined to be necessary the following steps shall be taken:

a) Prepare a dewatering plan prior to excavation.

b) Impound dewatering discharges in sediment retention basins or other holding facilities to settle the solids and provide treatment prior to discharge to receiving waters as necessary to meet Basin Plan water quality objectives.

Implementation of Mitigation Measure HWQ-2would reduce potential construction related impacts to water quality to a less than significant level.

Level of Significance: Less than Significant with Mitigation Incorporated

Operational

Following construction there would be no operational impact related to the waterline trenching. Operation of the two water intakes would require ongoing withdrawal of water from Humboldt Bay. The proposed intake design capacities are 5,500 gallons per minute (GPM) for the RMT II intake and 2,750 GPM for the Red Tank dock intake, for a total capacity of 8,250 GPM or 11.9 million MGD (Tenera 2021). Withdrawal of water into the water intakes would not result in sediment disturbance or other water quality impairments. The pumps required to power the water intakes would not be located in the waters of Humboldt Bay and would thus not result in any potential water quality impact. Any potential operational impact related to the two water intakes would be less than significant.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

Compensatory Off-Site Restoration

Removal of piles and Spartina would occur in and near wetted environments in tidal settings and has the potential to impact water quality primarily increases in turbidity due to ground disturbance. Removed Spartina may accumulate along the shoreline due to tidal action and contribute to diminished dissolved oxygen, which can also be detrimental to water quality. Absent mitigation, these impacts would be potentially significant.

Potential impacts and mitigation measures for the removal of Spartina were evaluated in the 2013 Spartina PEIR (H.T. Harvey & Associates and GHD 2013). Specific removal methods to be applied to Spartina include manual removal via a marsh master, weed-wacker, or similar machinery; herbicide application and water impoundment to create prolonged inundation are not proposed as a manner of treatment. The location of the Spartina removal would be located within the management area covered under the Spartina PEIR, and erosion control-related impact analysis of invasive plant removal as analyzed in the Spartina PEIR are incorporated by reference and summarized below.

- **Spartina PEIR IMPACT WQ-3: Fuel or Petroleum Spills -** Spills of gasoline or other petroleum products, required for operation of motorized equipment, into or near open water could degrade water quality, with potential for toxicity or contaminant bioaccumulation. Gasoline or other petroleum products, such as oil and hydraulic fluids, required for operation of motorized equipment, could spill into or near open water. Large spill volumes could degrade water quality, with potentials for toxicity and contaminant bioaccumulation in marsh organisms. Water quality impacts also may occur if ignition fluids such as gasoline used for burning were inadvertently sprayed or spilled to surface waters. Gasoline, diesel, and other distilled petroleum products are more water-soluble than crude oils and heavier distillate fractions. However, they are also more volatile and therefore lost rapidly from water to the atmosphere. The lower molecular weight aromatic hydrocarbon compounds in petroleum products can be toxic to marine organisms at low exposure concentrations. Consequently, some toxicity to marine organisms could occur in the immediate vicinity of a spill, whereas environmental weathering processes reduce the toxicity of the spill with time. This impact to water quality is potentially significant but would be localized to the general vicinity of the spill and temporary. Impacts related to spills generally can be reduced to less-than-significant levels by implementing specific mitigation measures and BMPs. With implementation of the following mitigation measure, this impact is less than significant (From 2013 Spartina PEIR, H.T. Harvey & Associates and GHD 2013, page 126.)
- **Spartina PEIR Impact WQ-6: Erosion/Sediment Control at Staging and Access Areas -** Temporary ground disturbance associated with site ingress/egress, staging, stockpiling, and equipment storage areas could occur in areas outside and adjoining treatment areas. These temporary disturbed areas have the potential to impact water quality from erosion and sediment mobilization. Rain and wind-induced erosion from these temporarily disturbed areas could carry soil contaminants (e.g., nutrients or other pollutants) into waterways adjacent to treatment areas and degrade water quality standards for specific chemicals, dissolved oxygen, suspended sediment, or nutrients. Impacts would be less than significant with mitigation. (From 2013 Spartina PEIR, H.T. Harvey & Associates and GHD 2013, page 128.)
- **Spartina PEIR Impact WQ-7: Decreased Dissolved Oxygen in Receiving Waters -** Treatment techniques (e.g., grinding) that increase and leave in place above ground biomass (wrack) could potentially result in decreased dissolved oxygen in receiving waters during the decay period, depending on where and how the wrack is deposited. Tidal currents and wind-induced waves could transport the wrack and debris into adjacent waters with low dissolved oxygen. In areas of poor tidal circulation, wrack and debris may accumulate, and further impede tidal exchange, further degrading dissolved oxygen. This impact would be less than significant with mitigation. (From 2013 Spartina PEIR, H.T. Harvey & Associates and GHD 2013, page 129).

Mitigation Measure HWQ-3 has been incorporated into the Project to reduce the effects to water quality from pile removal to a less than significant level. Implementation of Mitigation Measure HWQ-3 would reduce water quality impacts in Humboldt Bay related to the implementation of pile removal to a less than significant level. Mitigation Measures from the 2013 Spartina PEIR, specifically Mitigation Measure WQ-3, Mitigation Measure WQ-6, Mitigation Measure WQ-7, and Mitigation Measure HHM-2 have also been incorporated into the Project to reduce potentially significant impacts related to accidental fuel and petroleum spills, ground disturbance, and wracking to a less than significant level.

Mitigation

Mitigation Measure HWQ-3: Protection of Water Quality During Pile Removal

The following requirements shall be implemented during the removal of piles in and near the waters of Humboldt Bay. A Harbor District staff or representative will be present to ensure adherence to these requirements.

- Neither the barge nor the tug will anchor during the project. The barge may attach to existing piles in order to maintain its position.

- Piles will be removed during a tide of sufficient elevation to float the barge and tug boat adjacent to the piles being removed without scarring the mudflats or injuring eelgrass.
- Grounding of the barge is not permitted.
- A floating containment boom shall be installed and maintained around each pile being removed to collect any debris Including debris floating below the surface but not sinking to the bottom, weighted plastic mesh (similar to orange construction fencing) will be attached to the boom and extended across the area surrounding the pile. If debris sinks to the bottom, then it shall be removed by a diver.
- Any equipment used shall be without leaks of any coolant, hydraulic fluid, transmission fluid, or petroleum products. All equipment shall be checked before use in order certify that there are no fluid leaks. A spill response kit, including oil absorbent pads shall be on-site to collect any petroleum product accidently released.
- Crane excavator and tug operators shall be experienced with vibratory pile removal.
- The crane or excavator operator shall break I the soil/pile bond prior to pulling in order to minimize pile breakage and sediment adhesion
- Piles shall be removed slowly to limit sediment disturbance.
- Piles shall not be hosed off, scraped, or otherwise cleaned once they are removed from the sediment.
- Piles shall be placed in a containment area on the barge to capture sediment attached to the piles.
- The containment area shall include a structure around the perimeter which precludes sediment or contaminated water from reentering the bay.
- Holes left in the sediment by the removed pilings will not be filled. They are expected to naturally fill.
- Piles and debris shall be removed from the barge and moved to a designated site for disposal preparation in such a manner as to prevent . Prior to disposal, the piles and debris will be stored on paved areas, covered with tarps, and surrounded by a soil erosion boom in order to prevent potential leaching or discharge of debris or contaminated material.
- All removed piles or portions of piles shall be disposed of at an authorized facility. Piles or portions of piles shall not be re-used in Humboldt Bay or along shoreline areas.
- Land operations shall not be conducted in wetlands in proximity to the staging site.

Mitigation Measure Spartina PEIR WQ-3: Minimize Fuel and Petroleum Spill Risks

Fueling operations or storage of petroleum products shall be maintained off-site, and a spill prevention and management plan shall be developed and implemented to contain and clean up spills. Transport vessels and vehicles, and other equipment (e.g., mowers) shall not be serviced or fueled in the field except under emergency conditions; hand-held gas-powered equipment shall be fueled in the field using precautions to minimize or avoid fuel spills within the marsh. For example, gas cans will be placed on an oil drip pan with a PIG® Oil-Only Mat Pad placed on top to prevent oil/gas contamination. Only vegetable oil-based hydraulic fluid will be used in heavy equipment and vehicles during Spartina control efforts. When feasible, biodiesel will be used instead of petroleum diesel in heavy equipment and vehicles during Spartina control efforts. Other, specific BMPs shall be specified as appropriate to comply with the Basin Plan and the other applicable Water Quality Certifications and/or NPDES requirements. This mitigation is intended to be carried out in conjunction with Mitigation HMM-2 in order to reduce potential impacts to less than significant level (H.T. Harvey & Associates and GHD 2013, page 126).

Mitigation Measure Spartina PEIR WQ-6: Designate Ingress/Egress Routes

Temporary ground disturbance associated with site ingress/egress, staging, stockpiling, and equipment storage areas could occur in areas outside and adjoining work areas. Where areas adjacent to staging and stockpile areas are erosion prone, the extent of staging and stockpile shall be minimized by flagging their boundaries. An erosion/sediment control plan shall be developed for erosion prone areas outside the work area where greater than 0.25 acre (0.1 hectare) of ground disturbance may occur as a result of ingress/egress, access roads, staging and stockpile areas. The erosion/sediment control plan shall be developed by a qualified professional and identify BMPs for controlling soil erosion and discharge for treatment-related contaminants. The erosion/sediment control plan shall be prepared prior to any ground disturbing activities and implemented during construction (H.T. Harvey & Associates and GHD 2013, page 128).

Mitigation Measures Spartina PEIR WQ-7: Removal of Wrack

During site specific planning, tidal circulation will be visually assessed. In areas with relatively low tidal circulation, it will either be assumed that dissolved oxygen levels are depressed, or monitoring will be conducted to determine if dissolved oxygen levels are depressed. In treatment areas located within or adjacent to waters known or expected to have depressed dissolved oxygen, if wrack is generated during the treatment process, the wrack shall be removed from the treatment area subject to tidal inundation or mulched finely and left in place (H.T. Harvey & Associates and GHD 2013, page 129).

Mitigation Measure Spartina PEIR HHM-2: Accidents Associated with Release of Chemicals and Motor Fuel

Contractors and equipment operators on site during Project activities will be required to have emergency spill cleanup kits immediately accessible. If fuel storage containers are utilized exceeding a single tank capacity of 660 gallons or cumulative storage greater than 1,320 gallons, a Hazardous Materials Spill Prevention Control and Countermeasure Plan (HMSPCCP) would be required and approved by the NCRWQCB. The HMSPCCP regulations are not applicable for chemicals other than petroleum products; therefore, the contractor shall prepare a spill prevention and response plan for the specific chemicals utilized during Project activities (H.T. Harvey & Associates and GHD 2013, page 85).

Implementation of Mitigation Measure HWQ-3 and Spartina EIR Mitigation Measure WQ-3, Mitigation Measure WQ-6, Mitigation Measure WQ-7, and Mitigation Measure HHM-2 would reduce potential water quality impacts related to implementation of the compensatory off-site restoration to remove piles and Spartina to a less than significant level.

Level of Significance: Less than Significant with Mitigation Incorporated

Impact HWQ-b: Would the Project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin? (No Impact)

Terrestrial Development

The Project is located in groundwater basin 1-009 - Eureka Plain (DWR 2020) and is not listed as a basin in Critical Conditions of Overdraft (DWR 2016). The Project would increase impervious surface from 18.8 acres to 25.9 acres (20% net increase) from buildings and paving the area around buildings. The Project would not decrease groundwater supplies or interfere with groundwater management.

Depth to groundwater measurements at the Project Site indicate the elevation of the groundwater table is about 12 feet relative to sea level (approximately 10 feet to 13 feet below the existing ground surface) across the Project Site. Based on review of the historical groundwater data, the groundwater surface is nearly level with little to no discernible gradient (SHN 2020).

At the Project Site, seasonal fluctuations of a few feet or more in the groundwater elevation are expected to occur in response to rainfall (SHN 2020). Free groundwater and wet soil conditions would likely be encountered within any excavation greater than approximately ten feet deep below existing site grades. Flowing sands, caving conditions, and the rapid flow of water would also be anticipated for excavations that extend below the groundwater surface elevation.

Groundwater mounding has the potential to occur beneath stormwater management structures designed to infiltrate stormwater runoff. Concentrating recharge in a small area can cause groundwater mounding that affects the local water table by altering flow directions or causing groundwater to reach the surface (Colorado School of Mines 2005 cited in Appendix H). Groundwater mounding typically occurs in subsurface soils with low hydraulic conductivity (fine textured soils). Historical site-specific investigations at the Project Site demonstrate that the subsurface soils are extremely transmissive unconfined dune sands that are tidally influenced, with a minimum depth to groundwater of approximately 12 feet below ground surface (Appendix H). Review of the historical data for the Project Site indicates the Project Site would have sufficient capacity to assimilate additional stormwater in excess of natural infiltration and groundwater mounding is not anticipated to occur (Appendix H).

The Project is being designed to stay above water table for feasibility, environmental, and cost considerations. It is unlikely that dewatering will be needed for the foundation and piping installation and construction of the site. However, if it is determined dewatering might be required, all appropriate dewatering/soil erosion/sediment control measures and plans will be developed and approved prior to execution of work. Measures to control the flow of groundwater during excavation and construction are incorporated into Mitigation Measure HWQ-1 and would be implemented during construction. Any groundwater encountered during demolition and construction that requires removal would be pumped into appropriate containers, such as a Baker tanks for characterization. Excavation depths for construction are not anticipated to extend to groundwater and the use of dewatering wells for the Project is not planned (SHN 2021). Water sourced from dewatering would not be discharged to on-site one-parameter wetlands or Humboldt Bay to cause polluted runoff. Development of a plan for water management that includes handling, storage, testing, treatment, monitoring, and discharge will be prepared for the Project and submitted to the RWQCB for approval if dewatering is required to complete the Project. The plan will use available groundwater testing results to identify appropriate treatment and include a monitoring program to ensure discharge parameters contained in the permit are met. There would be no impact to groundwater supplies, recharge, or sustainable groundwater management as a result of the Project.

Mitigation Measures: No mitigation is necessary

Level of Significance: No impact

Ocean Discharge

The Ocean Discharge component of the Project would not involve groundwater resources. No impact would result.

Mitigation Measures: No mitigation is necessary

Level of Significance: No impact

Humboldt Bay Water Intakes

Trenching required for the water pipeline would not require deep excavation and thus would be highly unlikely to encounter groundwater. Trenches would have a maximum depth of approximately 5 to 6 ½ feet, which is shallower than the depth to groundwater measured at the nearby Project Site of 12 feet (SHN 2021). In the event groundwater is encountered during construction, water sourced from dewatering activities would be pumped into Baker tanks or equivalent for sampling and chemical characterization (SHN 2021). Water sourced from dewatering would not be illegally discharged to wetlands or Humboldt Bay to cause polluted runoff. Operational use of the Humboldt Bay Water Intakes would not involve groundwater resources. No construction or operational-related impact would result.

Impact Mitigation Measures: No mitigation is necessary

Level of Significance: No impact

Compensatory Off-Site Restoration

Removal of piles and Spartina would not involve groundwater resources. Groundwater recharge, quantity, or quality would not be diminished or otherwise effected. No impact would result.

Mitigation Measures: No mitigation is necessary

Level of Significance: No impact

HWQ-c.i: **Would the Project 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 result in substantial erosion or siltation on- or off-site? (Less than Significant)**

Terrestrial Development

The Project Site is generally flat and located in what was formerly a coastal dune environment prior to existing development. The topography of the Project Site does not support drainage to Humboldt Bay or the Pacific Ocean via tributaries or ditches, although the existing stormwater system does discharge offsite to Humboldt Bay and coastal waters during some rainfall events. Where impervious, the existing drainage pattern on the Project Site infiltrates to groundwater. Where impervious, an existing stormwater pipe borders the Project Site along the northern and western edge. The existing stormwater system on the western side of the Project Site connects to the RMT II ocean outfall to discharge stormwater to the Pacific Ocean. On the eastern side of the Project Site, the existing stormwater system discharges to Humboldt Bay. It is unknown if the existing stormwater pipes function and discharge to the Pacific Ocean under present conditions, given the dilapidated abandoned condition of the overall Project Site.

The Project would increase impervious surfaces from approximately 18.8 acres to 25.9 acres. Stormwater runoff from the proposed additional impervious surface have been accounted for in the Project's preliminary stormwater design and associated Construction SWPPP permitting, for events up to the 100-year rainfall. The Project's stormwater design would include a series of four bioretention and infiltration ponds combined with Low Impact Development (LID) facilities to manage stormwater generated on the Project Site. The ponds and LID features would have capacity for stormwater from events up to the 100-year storm event without requiring off-site discharge. Additional details about the Project's stormwater design approach are detailed in Appendix H – Nordic Aquafarms Preliminary Stormwater Analysis.

During construction, Mitigation Measure GEO-2 and HWQ-1 would be implemented to ensure compliance with the Construction General Permit (CGP) and implementation of erosion control BMPs to avoid sediment inputs related to construction and ground disturbance. A temporary detention basin would be installed around the entire perimeter of the Project Site to capture and infiltrate stormwater generated from the site up to the five year, 24-hour storm event during construction. Any stormwater that exceeds the capacity of the temporary stormwater detention basin will be tested for turbidity in compliance with the Construction General Permit for off-site stormwater discharge.

Erosion control measures implemented during construction combined with design features accommodating at 100 year storm event would limit any potential impact related to siltation or erosion. Given the Project Site does not naturally drain off-site, to the Pacific Ocean, or to Humboldt Bay, the Project Site is largely impervious, reducing erosion potential by limiting surface exposure to bare soils, and that the planned stormwater design would include capacity for storms events up to the 100-year event, erosion, or siltation on- or off-site would not be expected. Any potential impact would be less than significant.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

Ocean Discharge

The Ocean Discharge component of the Project does not involve alteration of the existing drainage pattern or any related on- or off-site erosion or siltation. No impact would result.

Mitigation Measures: No mitigation is necessary

Level of Significance: No Impact

Humboldt Bay Water Intakes

The area of ground disturbance required for trenching of the water pipeline is generally flat, parallel to the Humboldt Bay shoreline. The trench would cross one small drainage just south of the Red Tank dock; however, the drainage would not be altered. The existing drainage pattern on the Project Site is based on infiltration into the ground where no pervious surfaces exist. Following installation of the water pipeline, the ground surface would be returned to existing grade; a change in slope or topography would not result. The existing drainage pattern would not be altered.

During construction, Mitigation Measure GEO-2 and HWQ-2 would be implemented and implementation of erosion control BMPs to avoid sediment inputs related to construction and ground disturbance. Following construction, no off-site stormwater discharge is anticipated to occur at the Project Site. Any potential construction-related impact would be less than significant, and no operational impact would result.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

Compensatory Off-Site Restoration

Removal of piles and Spartina would not affect the existing drainage pattern of Humboldt Bay and/or adjacent salt marsh habitats. Spartina removal via mechanical techniques would not result in a change to surface topography; only vegetation would be removed. Floodplain alteration to impound water and increase inundation of Spartina is not proposed as a removal technique for this Project. Any potential impact would be less than significant.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

Impact HWQ-c.ii: **Would the Project substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site? (Less than Significant)**

Terrestrial Development

The Project Site is generally flat and does not include a river, stream, or other tributary (live surface waters). The Project Site is not tidally inundated, even during king tides (Appendix H). The Project Site is located outside the FEMA 100-year flood zone (Humboldt County 2020). Under existing conditions, fluvial or tidal flooding do not occur on the Project Site.

The Project would increase impervious surfaces from approximately 18.8 acres to 25.9 acres on the Project Site. Stormwater runoff from the proposed additional impervious surface have been accounted for in the Project’s preliminary stormwater design and associated Industrial SWPPP permitting. The stormwater design would include four large bioretention and infiltration ponds located throughout the Project Site as well as a series of LID features to capture and treat stormwater on-site. Stormwater design features would be planted in accordance with the overall landscaping design.

Stormwater modeling methods, results, and other stormwater design details can be found in Appendix H. The Project's stormwater drainage system would have capacity for on-site retention of stormwater resulting from events up to the 100-year event (Appendix H). Thus, on- and off-site flooding would not occur. Any potential impact related to surface runoff and on- and off-site flooding would be less than significant.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

Ocean Discharge

The Ocean Discharge component of the Project does not involve stormwater runoff. Stormwater runoff from the facility would not be discharged to the Pacific Ocean, such as was the case during the operation of the former pulp mill. No impact would result.

Mitigation Measures: No mitigation is necessary

Level of Significance: No Impact

Humboldt Bay Water Intakes

The project footprint for the water pipeline trenching alignment, RMT II dock, and Red Tank dock are located within the mapped FEMA 100-year floodplain (Humboldt County 2021). Modernization and revitalization of the two water intakes in Humboldt Bay would not increase the rate of surface runoff. The trenching alignment is primarily paved, under existing conditions. Thus, repaving the trenching alignment at the close of construction would not result in a considerable area of new impervious surface or increase the rate of surface runoff. Given the water pipeline would be located subsurface, the infrastructure would not present a flood hazard, even if a 100-year flood event were to occur. Similarly, modernization and revitalization of water intake sea chests would not increase flood hazard risks, including associated water quality risks, compared to existing conditions. Any potential impact would be less than significant.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

Compensatory Off-Site Restoration

Pile removal would not increase the rate or amount of surface runoff in Humboldt Bay or along the Humboldt Bay shoreline and no impact would result. Removal of Spartina would reduce vegetative roughness, which otherwise slows water velocities. However, localized tidal velocities during high and ebb tides are not dominated by salt marsh vegetation conditions. Thus, any potential change in the rate of surface runoff related to Spartina removal would be less than significant.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

Impact HWQ-c, 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? (Less than Significant with Mitigation)

Terrestrial Development

As discussed above in Section 4.10 c (i) and (ii), the Project's planned stormwater design, inclusive of LID components, would meet the State Regional Water Quality Control Board's requirement for supporting a post-development stormwater flow off the property for 85th percentile, 24-hour storm event (heavy rainfall event) and would retain all stormwater from a storm event up to the 100-year event, 6.19 inches in a 24 hour period (Appendix H). The planned stormwater design would account for stormwater runoff from the increased area of impervious surface.

A screening level analysis to determine conservative estimates for potential future groundwater level interactions with sea level rise (SLR) at the site. For the screening level analysis, GHD compiled preliminary design elevations for the proposed stormwater system, historical site groundwater elevation and tidal study data, and predicted sea level rise data for Humboldt Bay.

Figures B-3 and D-2 from Appendix H depict the preliminary locations, elevations, and depths of the proposed stormwater system at the Project Site. The stormwater feature at the lowest elevation includes the sitewide LIDs with a minimum surface elevation of 20.50 feet and associated bottom elevation of 14.50 feet (NAVD88).

Historical tidal and groundwater data was obtained for the site from the Geotracker database. Historical tidal study data was obtained in SHN Consulting's "2011 Conceptual Site Model," and the most up to date groundwater data (through March 2021) was obtained from SHN's recent "First Quarter 2021 Groundwater Monitoring Report" (SHN 2021). Relevant information obtained from these documents includes the following:

– Tidally influenced groundwater fluctuations are dampened as you head westward from the bay side of the site. Existing monitoring wells (MW) adjacent to Humboldt Bay (MW-11, MW-13, MW-13D) fluctuated almost 2.5 feet during a four-day spring tide study window with eight-foot tidal fluctuations, compared to 0.5 feet at MW-19, located 345 feet west from Humboldt Bay;
– The shallow groundwater gradient at the site is consistently eastward, with the highest groundwater elevations at the western edge of the property, compared to the Humboldt Bay side of the Project Site;
– The highest ever recorded groundwater elevation at the site was at 9.76 feet (NAVD88), recorded at MW-2 (located at the farthest western edge of the Project Site) on February 22, 2017 (the dataset includes monitoring well data dating back to October 1997); and
– The highest ever recorded groundwater elevation at MW-19 (the closest monitoring well to the LID nearest Humboldt Bay) was at 6.44 feet (NAVD88), recorded March 15, 2010.

The design life of the Project is 30 years. Assuming the Project is fully constructed by 2028, forecasting of the effects of sea level rise over the design life of the project requires forecasting until approximately 2063. The year 2063 is best approximated by the Ocean Protection Council (OPC) 2060 SLR rise projections. Based on 2018 OPC guidance, the middle range (0.5% probability) estimate for 2060 SLR is predicted to be 3.1 feet (OPC 2018). All of the data outlined above is compiled into the table below, which provides a conservative potential future groundwater level due to SLR and separation distance between the sitewide LID features and groundwater. Table 3.9-4 applies the most conservative estimates for each parameter including the lowest elevation LID feature, highest recorded historical sitewide groundwater elevation (which is from a monitoring well located farthest from Humboldt Bay) and translates all of the predicted SLR elevation to a rise in groundwater elevation.

Table 3.9-4 Groundwater Elevations at the Project Site with Respect to 2060 High Emissions Sea Level Rise with 0.5% Probability

Lowest LID Surface Elevation (ft, NAVD88)	Lowest LID Bottom Elevation (ft, NAVD88)	Highest Recorded Groundwater Elevation at the Site (ft, NAVD88)	Assumed Sea Level Rise (2018 OPC)	Potential Groundwater Level in 2060 (ft, NAVD88)	Potential 2060 Separation Between LID Bottom and Groundwater Elevation
20.50	14.50	9.76	3.10 ft [1]	12.76	1.64 feet

Notes:

1 The site-specific tsunami hazard analysis (Appendix I, Martin & Chock 2020) applied a value of 4.1 feet of sea level rise to tsunami-related analysis out of an abundance of caution and an effort to predict a worst-case scenario tsunami-related impact, aligned with the very nature of tsunamis and distinct from the applied groundwater elevation analysis. As applied in the site-specific tsunami hazard analysis, an increase of 4.1 feet corresponds with the OPC 2018 Likely Range (66% probability) of sea level rise for the 2100 high emissions scenario.

The conservative screening level analysis outlined in Table 3.9-4 predicts that SLR will not raise groundwater levels to an elevation that provides no separation between the bottom of the stormwater LIDs and groundwater. As such the infiltration capacity of the stormwater treatment system is not predicted to be reduced over the life of the project due to

SLR, and contingencies for adaptive management options for the stormwater treatment system in the future are not warranted at this time. Any potential impact to related to stormwater runoff, considerate of SLR projections for 30-year design life of the Project, would be less than significant.

Water quality concerns as they related to Contaminants of Potential Concern (COPC) in soil and groundwater at the Project Site are evaluated in Section 3.9 (d). Any potential impacts related to COPCs in soil and groundwater would be avoided with the implementation of a Health and Safety Plan and a Soil Gas Monitoring Program, which are subsets of Mitigation Measure HAZ-1 (Section 4.9) and would implement measures from the Interim Measures Work Plan (SHN 2021b). With the construction of the planned stormwater design features and implementation of Mitigation Measure HAZ-1, operational sources of polluted run-off would be reduced to be less than significant.

Mitigation

Mitigation Measure HAZ-1: Implement Recommendations of Interim Measures Work Plan

Refer to Chapter 3.8 (Hazards and Hazardous Conditions), Impact HAZ-b, for the full text of Mitigation Measure HAZ-1: Implement Recommendations of Interim Measures Work Plan.

Implementation of Mitigation Measure HAZ-1 would reduce potential impacts to water quality to a less than significant level.

Level of Significance: Less than Significant with Mitigation Incorporated

Ocean Discharge

As discussed above, the Ocean Discharge component of the Project does not involve stormwater or polluted runoff. Stormwater runoff from the facility, under normal operation conditions, would not be discharged to the Pacific Ocean. The NAFC stormwater treatment system has been designed to capture and treat onsite stormwater generated up to the 100-year storm event. Stormwater exceeding the capacity of the treatment system (from a flood event, for example) will be routed to drainage inlets connected to the existing stormwater pipe network, which discharges stormwater to both the existing bay and ocean outfalls. Any potential impact would be less than significant.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

Humboldt Bay Water Intakes

Modernization and revitalization of the two water intakes in Humboldt Bay would not result in polluted stormwater runoff. The trenching alignment is primarily paved, under existing conditions. A change in grade or topography would not result from the waterline trenching. As discussed above, repaving the trenching alignment at the close of construction would not result in a considerable area of new impervious surface or result in polluted runoff. Similarly, modernization and revitalization of water intake sea chests would not involve new sources of polluted stormwater runoff.

The Humboldt Bay Water Intakes component of the Project was evaluated for potential impacts related to SLR. Based on 2018 OPC guidance, the middle range (0.5% probability) estimate for 2060 SLR is predicted to be approximately three feet (OPC 2018), which best approximates the 30-year design life of the Project. The water intake structures would benefit from SLR, as the tidal inundation period for the would be larger. The point of connectivity on the RMT II and Red Tank docks would be above the three-foot SLR elevation and thus unaffected by 2060 SLR projections. Conservatively, even if the predominantly subsurface terrestrial water pipeline parallel to the Humboldt Bay shoreline were to experience periodic inundation due to SLR, a potential hydrology or environmental impact would not result.

Any potential impact would be less than significant.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

Compensatory Off-Site Restoration

Pile and Spartina removal do not involve stormwater runoff systems or infrastructure. Stormwater runoff would not be affected by compensatory off-site restoration. Impervious surface conditions and topography would not be altered. No impact would result.

Mitigation Measures: No mitigation is necessary

Level of Significance: No Impact

Impact HWQ-c.iv: Would the Project impede or redirect flood flows? (Less than Significant)

Terrestrial Development

The footprint for the Terrestrial Development component of the Project is not located in a FEMA 100-year flood zone (Humboldt County 2021). There is not a tributary on or near the Project Site that could contribute to flooding. The Project Site is never tidally inundated, even during king tides (Appendix H). Under existing conditions, the Project Site does not experience fluvial or stormwater-related flood flows. All surface waters would be limited to stormwater flow during precipitation events and would be attenuated by the Project's planned LID stormwater design features, accommodating stormwater up to a 100-year event.

Any potential impact would be less than significant.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

Ocean Discharge

The Ocean Discharge component of the Project is located in the Pacific Ocean and would not involve impediment or redirection of flood flows. No impact would result.

Mitigation Measures: No mitigation is necessary

Level of Significance: No Impact

Humboldt Bay Water Intakes

The project footprint for the water pipeline trenching alignment, RMT II dock, and Red Tank dock are located within the mapped FEMA 100-year floodplain (Humboldt County 2021). Modernization and revitalization of the two existing water intakes in Humboldt Bay would not impede or redirect flood flows, as the waters of Humboldt Bay would still be able to circulate freely around the water intakes during a flood or king tide event, even considerate of sea level rise. Given the water pipeline would be located subsurface, the infrastructure would not present a flood hazard, even if a 100-year flood event were to occur. No impact would result.

Mitigation Measures: No mitigation is necessary

Level of Significance: No Impact

Compensatory Off-Site Restoration

Pile and Spartina removal would not involve structures or alterations to topography that would affect drainage or impede or redirect flood flows. No impact would result.

Mitigation Measures: No mitigation is necessary

Level of Significance: No Impact

Impact HWQ-d: **Would the Project in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation? (Less than Significant)**

Terrestrial Development

Flood Hazard Zone

The Project Site is located outside of the FEMA 100-year flood zone (Humboldt County 2021). However, the 100-year flood zone is located adjacent to the Project Site, immediately east of the Project Site along the Humboldt Bay shoreline. Flooding would thus only occur on the Project Site as a result of a highly infrequent flood event in excess of the 100-year return period (e.g., tsunami event, discussed below).

The Terrestrial Development would not be affected by project SLR and would not become inundated as a result of SLR. Based on 2018 OPC guidance, the middle range (0.5% probability) estimate for 2060 SLR is predicted to be approximately three feet (OPC 2018), which best approximates the 30-year design life of the Project. Given the lowest elevation on the Project Site (bottom of the LID basin) would be 14.5 feet NAVD88, well above the projected 2060 water surface elevation of Humboldt Bay.

The State Water Resources Control Board's Construction General Permit would require that the Project's stormwater design to capture and treat stormwater generated from the 85th percentile, 24-hour storm event (heavy rainfall event). All stormwater from a 100-year event would be captured and retained on-site; discharge of stormwater from a flood event would not be discharged to Humboldt Bay or the Pacific Ocean for events up to the 100-year return period (Appendix H). As such, potential pollutants would not be released to Humboldt Bay or the Pacific Ocean as a result of a 100-year flood event.

Existing stormwater piping that discharges to Humboldt Bay and the Pacific Ocean via the RMT II ocean outfall would be retained and remain operational for managing stormwater generated from a substantial and unprecedented flood event in excess of a 100-year event or a tsunami. To prevent stormwater from entering the existing piping, the stormwater design would include elevated drainage inlets that would preclude capture and discharge of stormwater to Humboldt Bay for all events up to a 100-year event.

Given the Project Site is located outside the FEMA 100-year flood zone and stormwater generated by a 100-year event would be entirely retained on-site and not discharged to Humboldt Bay or the Pacific Ocean to risk release of pollutants, the impact of pollutants released as a result of a flood hazard event would therefore be less than significant.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

Seiche Zone

The Project is not located in a seiche zone. No impact would result from a seiche.

Mitigation Measures: No mitigation is necessary

Level of Significance: No Impact

Tsunami Inundation

The Project Site is located within the mapped Tsunami Inundation Area on the "Tsunami Inundation Map for Emergency Planning, Eureka Quadrangle" (CGS 2009 cited in SHN 2020). If a large earthquake were to occur on the Cascadia Subduction Zone, the Project Site and entire North Spit would be subject to tsunami inundation. Due to unknowns related to road condition and congestion, sheltering in the Tsunami Vertical Evacuation Refuge Area (TVERS) area until an all clear is issued is considered the most conservative approach to protection of the staff.

Based on the geologic evidence synthesized by SHN (2020), the potential for the Project Site to be subject to tsunami inundation should be considered high in the event of a Cascadia Subduction Zone-generated tsunami. It is estimated that wave scour depths of up to 10 feet could potentially occur in the non-cohesive sandy soils at the site due to the high tsunami flow velocities across the North Spit (Chock 2019 cited in SHN 2020). Because the depth of scour would otherwise jeopardize the structural integrity of the buildings, deep foundations and ground densification would be part of building design as recommended by the Project's geotechnical evaluation and site-specific tsunami inundation analysis.

The site-specific tsunami hazard analysis included a generated time history of flow depth and velocities for the Project Site (Appendix I, Martin & Chock 2020). The analysis applied the American Society of Civil Engineers (ASCE) Standard, which is a Maximum Considered Tsunami (MCT) with a 2% probability of being exceeded in a 50-year period, the equivalent to a return period of approximately 2,500 years (Appendix I, Martin & Chock 2020). Results indicated tsunami flow depth would be greatest along the north edge of the Project Site, nearest Building 1, with flow depths dissipating toward the south edge of the Project Site (Appendix I). The site-specific tsunami hazard analysis applied a value of 4.1 feet of sea level rise. An increase of 4.1 feet corresponds with the OPC 2018 Likely Range (66% probability) of sea level rise for the 2100 high emissions scenario (OPC 2018).

Based on the findings and recommendations of the site-specific tsunami evaluation (Appendix I), site-specific design conditions would be included for the design of each individual building and their structural systems, as well as nonstructural systems, and to numerically validate the expected performance of any mitigating features (Appendix I, SHN 2020). As such, exterior corners of buildings that are most likely to be directly impacted by a tsunami would be rounded to better deflect tsunami-related flow and flow depths and velocities experienced by other structures on the Project Site (Appendix I). Specifically, the design of Phase 1 will be sited such that it would shield Phase 2, additional grow-out buildings, and infrastructure from the impacts of wave run up action in the event a tsunami.

The facility would be designed in accordance with the California Building Code (2019) (our subsequently adopted version and Chapter 6, Tsunami Loads and Effects, of ASCE 7-16, Minimum Design Loads and Associated Criteria for Buildings and Other Structures or other regulations adopted as part of the California Building Code using site-specific design spectra provided within the Seismic Technical Memorandum, as well as the Probabilistic Site-Specific Tsunami Hazard Analysis Technical Memorandum, created by Martin & Chock (2020) for the Project Site. In conformance with ASCE 7-16 Chapter 21 "Site-Specific Ground Motion Procedures for Seismic Design," Martin & Chock (2020) provide criteria for the design of the primary structural systems and includes consideration of the soil improvement strategies that would be used to increase the density and bearing capacity of the existing site soils (SMRT et al. 2021).

The structural steel super-structure would be designed to resist lateral loads from seismic and wind forces using steel buckling-restrained braced frames. Location and number of frames are not finalized but are expected to be distributed around the structure to resist applied loads with consideration for torsional forces created by asymmetric loading. Foundation design would provide support for the super-structure's vertical and lateral load resisting systems, tanks, and other process equipment. Foundation settlement would be mitigated by densification of the existing site soils. Sliding restraint of the buildings would be provided by reinforced concrete shear keys, integral to the foundation. Collectively the structural design would provide code-based strength to minimize loss of life as well as catastrophic damage to the process systems during a seismic event. Non-structural system components, such as fish swim-piping, would utilize flexible connections where they exit the structure to allow for differential movement between the building and the surrounding site (SMRT et al. 2021).

The Project buildings would also be designed with features to address a tsunami. The structural design provides for the interior areas of the structures to be flooded, while providing restraint for the tanks and other large equipment to keep them within the building footprints. Water levels used in the designs are based on evaluations and recommendations within the Project site-specific tsunami study (Appendix I), which show water levels from a tsunami would be lower than the tops of tanks. Specifications for tanks containing fish would include requirements for seismic and tsunami loading in alignment with the building structures (SMRT 2021). Because the facility would be designed to structurally withstand the MCT, water elevations in tanks would be greater than the maximum water level possible under the MCT, and tanks and other infrastructure would be designed for seismic and tsunami loading, fish escape would not result from the MCT.

Diesel fuel storage would be underground in two 25,000-gallon tanks vented, anchored, and armored to prevent release. As described in Chapter 2.2.4 – Project Operations of the Project Description, typical double walled fiberglass USTs of this size are approximately 10 feet 6 inches outside diameter, approximately 40 feet in length. They are mounted to a concrete ballast pad or anchor designed to ensure that the tank remains seated regardless of the level of fuel in the tank and regardless the height of the groundwater outside the tank. Sea level rise and associated groundwater increases will be considered in the design of the concrete ballast. The USTs would be located under a paved area east of Building 5. The USTs would include associated piping that would provide primary and secondary containment and would be equipped with continuous vacuum, pressure, or hydrostatic (VPH) monitoring. The design and installation of the USTs would ensure that in the event of a tsunami there would be no release of fuel from the tanks. Tsunami mitigation would include anchoring and armoring the tanks, securing all ports with watertight locking hatches, and locating vents above the modeled inundation levels. Similarly, other potential pollutants such as water treatment chemicals, concentrated wastes, and process chemicals will be stored in areas designed to withstand tsunami forces or in areas above the maximum predicted wave height to prevent any potential release to the environment.

These design principles will be implemented to avoid any damage that could be caused to human life, the environment, or the Project as a result of a tsunami. In the event of a tsunami that was severe enough to mobilize vehicles and potentially damage the Project's structures, the cumulative environmental and human impact would be catastrophic and the impact directly attributable to the Project would be insubstantial by comparison. The tsunami analysis completed for the Project did presume some relatively small ground subsidence due to the local fault rupture is to be included in the analysis results per Figure 4 of Appendix I, as well as the specified allowance for relative sea level rise of 4.1 feet (Appendix I). Additionally, Appendix I applied the American Society of Civil Engineers (ASCE) 7 Chapter 6, which requires the incorporation of regional seismic subsidence from Cascadia seismic subduction events per ASCE 7 Section 6.7.6.2, *Seismic Subsidence before Tsunami Arrival*, and longer-term sea level change over the lifecycle of the project per ASCE 7 Section 6.5.3, *Sea Level Change*. This is illustrated in Figure 5 of Appendix I, which is reproduced from ASCE 7 Figure C6.1-2, *Effects of Relative Sea Level Change and Regional Seismic Subsidence on Tsunami Inundation*. The impact of pollutants released as a result of a tsunami would therefore be less than significant.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

Ocean Discharge

The Ocean Discharge component of the Project is located in the Pacific Ocean and thus would not be affected by a flood or a seiche. The portions of the ocean outfall between the Project Site and the Pacific Ocean are located underground and would not be affected by a tsunami. The portion of the ocean outfall with the diffusers is located 1.5 miles offshore in deep water and also would not be affected by a tsunami. The ocean outfall pipe has a concrete coating to add weight designed to keep it in place on the sea floor and to withstand potential disturbance related to strong ocean currents. Any potential impact would be less than significant.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

<u>*Humboldt Bay Water Intakes*</u>

Flood Hazard Zone

The waterline and water intakes are located within the FEMA 100-year flood zone (Humboldt County 2021). However, the infrastructure would contain only untreated sea water from Humboldt Bay. Thus, if the subsurface pipeline broke as a result of a large flood event, only sea water would be released to the environment. No impact would result.

Mitigation Measures: No mitigation is necessary

Level of Significance: No Impact

Seiche Zone

The Project is not located in a seiche zone. No impact would result from a seiche.

Mitigation Measures: No mitigation is necessary

Level of Significance: No Impact

Tsunami Inundation

The waterline and existing water intakes are located within the mapped Tsunami Inundation Area on the “Tsunami Inundation Map for Emergency Planning, Eureka Quadrangle” (CGS 2009 cited in SHN 2020). As noted above, if the subsurface pipeline broke as tsunami, only water would be released to the environment. Given the waterline would be located subsurface, it is unlikely the pipe would be dislodged and released, even partially, into Humboldt Bay. The sea chests would not be designed to withstand the MCT and would likely be obliterated during a significant tsunami event that overtops the Samoa peninsula. The discharge of sea chest debris into Humboldt Bay would be insignificant, given the Project would not be enlarging or expanding the size or potential volume of debris, beyond existing conditions. Any resulting impact would be less than significant.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

Compensatory Off-Site Restoration

Flood Hazard Zone

Pile removal would decrease the risk of pollutant release during flood conditions, as well as daily tidal conditions, by removing creosote-treated piles. A water quality improvement would result with no detrimental impacts.

Spartina removal would not involve the release of pollutants during a flood event. Herbicides would not be used to treat Spartina. No impact would result.

Mitigation Measures: No mitigation is necessary

Level of Significance: No Impact

Seiche Zone

The Project is not located in a seiche zone. No impact would result from a seiche.

Mitigation Measures: No mitigation is necessary

Level of Significance: No Impact

Tsunami Inundation

Pile removal would decrease the risk of pollutant release during a tsunami event by removing creosote-treated piles. A water quality improvement would result with no detrimental impacts.

Spartina removal would not involve the release of pollutants during a tsunami event. Herbicides would not be used to treat Spartina. No impact would result.

Mitigation Measures: No mitigation is necessary

Level of Significance: No Impact

Impact HWQ-e: Would the Project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan? (Less than Significant)

Terrestrial Development

The relevant water quality control plans for the Project include:

– NCRWQCB Basin Plan, which establishes thresholds for key water resource protection objectives for both surface waters and groundwater;
– Humboldt Bay's listing on the Clean Water Act 303 (d) list for impair water bodies for dioxin and polychlorinated biphenyls (PCBs);
– Humboldt Bay Municipal Water District 2021 Urban Water Management Plan (HBMWD 2021);
– Humboldt Bay Municipal Water District 2004 Habitat Conservation Plan (HBMWD 2004); and
– Humboldt Bay Municipal Water District 2012 California Department of Fish and Wildlife Long-Term Lake and Streambed Alteration Agreement No. R1-2010-0093 (HBMWD 2012).

As discussed in Section 4.10 (a), there are no waters present on the Project Site and wetlands are limited to one-parameter coastal willow clusters east of Vance Avenue. Construction impacts to water quality in nearby Humboldt Bay would be avoided via implementation of BMPs and SWPPP requirements included in Mitigation Measure GEO-2 and HWQ-1. Thus, a conflict with the NCRWQCB Basin Plan as a result of construction-related water quality impacts would not occur.

Project stormwater design includes a series of detention ponds and LID features, designed to accommodate up to a 100-year stormwater event. Therefore, operational water quality impacts to Humboldt Bay would not occur. Operational stormwater is further detailed above in Section 4.1 (c) and in the Appendix H. Thus, a conflict with the NCRWQCB Basin Plan as a result of potential operational water quality impacts would not occur.

As discussed in Section 4.10 (b), groundwater management would be required during construction; however, groundwater would not be degraded or reduced as a result of the Project.

The Project Site is located on a former pulp mill site that remains an active Brownfield site (Regional Water Quality Control Board case no. 1NHU892). With the exception of a few of the LID stormwater facilities located between Buildings 3 and 4, footprints of the proposed stormwater basins and LID features would not be located in areas with any remaining COPCs (Appendix H). The stormwater discharge volumes from the limited LID features that overly COPCs are anticipated to be relatively minor since this area captures minimal surface stormwater runoff. Thus, based on the location of almost all the stormwater management structures being outside of the primary areas of known contamination, the limited infiltration volumes into the LIDs that do overlap the COPCs between Buildings 3 and 4, the Project would have no significant impact on the residual soil and groundwater plumes at this site (Appendix H). Thus, the Project would not result in dioxin, furan, or other COPC contamination to groundwater resources and would not conflict with the NCRWQCB Basin Plan or the Humboldt Bay 303(d) listing for dioxins and PCBs.

Senate Bill (SB) 610 requires every urban water supplier to identify, as part of its urban water management plan, the existing and planned sources of water available to the supplier over a prescribed 5-year period. Additionally, a water quality assessment is required under SB 610 for industrial projects occupying more than 40 acres of land or having more than 650,000 square feet of floor area. As the lead agency, the County analyzed the Humboldt Bay Municipal Water District 2020 Urban Water Management Plan (UWMP) regarding the capacity to serve the Project Site based on the proposed water usage required for operations. According to the Urban Water Management Plan (HBMWD 2021), the District has estimated that demand up to 36 million gallons per day can be met reliably, even if the unprecedented conditions of continuous hydrology similar to the 1976-1977 drought occurred. Additionally, the UWMP identifies two former pulp mills, including the former pulp mill located at the Project Site, as former users of both industrial and domestic water supplied by HBMWD. The site contains existing water infrastructure that has been utilized by former pulp mill tenants and will continue to support reliable water delivery to the Project Site. A will-serve letter was provided by the HBMWD on March 12, 2021, followed by a revised will-serve letter dated August 14, 2021, which accurately describes the requested water use by NAFC. The letter confirmed the HBMWD has sufficient water to provide the needs of the Project, which include domestic water in the amount of 502,000 gallons per day and industrial non-potable fresh water of 2 million gallons per day to the Project Site. Based on an analysis of this evidence, the SB 610 requirements have been satisfied. Water delivered to NAFC by the HBMWD would be fully compliant with the terms and conditions stated in their 2004 Habitat Conservation Plan and 2012 California Department of Fish and Wildlife Long-Term Lake and Streambed Alteration Agreement No. R1-2010-0093.

The Project would not result in a conflict with the NCRWQCB Basin Plan, or Humboldt Bay's TMDL listing for dioxin and PCBs. The Project would also not conflict with the Humboldt Bay Municipal Water District Urban Water Management Plan, Habitat Conservation Plan, or Long-Term Lake and Streambed Alteration Agreement. Thus, any potential impact would be less than significant.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

Ocean Discharge

The relevant water quality control plans for the Ocean Discharge component of the Project include the Ocean Plan and the Thermal Plan, which establish thresholds germane to the planned discharge through the RMT II ocean outfall. As discussed in Section 3.9 (a), modeling required for the Project's NPDES and CCC Coastal Development Permit to authorize the use of the RMT II ocean outfall for discharge into the Pacific Ocean was conducted and is reported in Appendix E. NPDES monitoring requirements summarized in Section 3.9(a) would further ensure the Project would not conflict with the Ocean Plan and Thermal Plan. Results indicate that the Project's effluent discharge would be fully compliant with both the Ocean Plan and the Thermal Plan, and a conflict with these plans would not occur. No impact would result.

Mitigation Measures: No mitigation is necessary

Level of Significance: No Impact

Humboldt Bay Water Intakes

The relevant water quality control plans for the Project include:

– NCRWQCB Basin Plan, which establishes thresholds for key water resource protection objectives for both surface waters and groundwater; and
– Humboldt Bay's listing on the Clean Water Act 303 (d) list for impair water bodies for dioxin and polychlorinated biphenyls (PCBs).

Construction impacts to water quality in nearby Humboldt Bay would be avoided through implementation of BMPs and the Harbor District's General Construction Stormwater Discharge SWPPP requirements. Thus, a conflict with the NCRWQCB Basin Plan as a result of construction-related water quality impacts would not occur.

Operational water quality impacts to Humboldt Bay would not occur, as the stormwater associated with the water pipeline alignment would not substantially change from existing conditions Thus, a conflict with the NCRWQCB Basin Plan as a result of potential operational water quality impacts would not occur.

As discussed in Section 3.9 (b), trenching for the water pipeline would not require deep excavation and would be unlikely to encounter groundwater. Groundwater would not be degraded or reduced as a result of the Project. The Project would not release TMDL-related contaminants, including dioxin and PCBs, or other COPC contamination to Humboldt Bay or groundwater resources and would not conflict with the NCRWQCB Basin Plan or the Humboldt Bay 303(d) listing. Any potential impact would be less than significant.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

Compensatory Off-Site Restoration

Implementation of compensatory restoration would be consistent with the NCRWQCB Basin Plan and would not conflict with the 303(d) listing for Humboldt Bay. Removal of creosote piles is supported by both the Basin Plan and 303(d) listing, as pollutant removal would occur. No impact would result.

Mitigation Measures: No mitigation is necessary

Level of Significance: No Impact

3.9.7 Cumulative Impacts

Impact HWQ-C-1: Would the Project contribute to a cumulatively significant impact to Hydrologic and Water Quality Resources? (Less than Significant)

Cumulative impact analysis related to hydrology and water quality considers the projects identified in Table 3.1 – Projects Considered for Cumulative Impacts. As a whole, no Project component would impact any wetlands. Thus, no cumulative impacts to wetlands would result from any of the projects summarized in Table 3.1.

Existing NPDES permits for Fairhaven Power and the Samoa wastewater treatment facility would also result in discharge of treated effluent through the RMT II outfall into the Pacific Ocean. The Project's discharge of treated effluent would not result in a significant impact to marine water quality. However, while the two additional discharges would be significantly smaller in volume than the Project's proposed discharge, the cumulative sum was examined for its potential to affect marine water quality. The Project discharge would comprise 95-97% of the comingled discharge through the RMIT II diffuser with the Samoa Wastewater Treatment Plant (<1%) and DG Fairhaven Power Plant (~3-5%) comprising a much smaller proportion. The numeric composition of the comingled discharge can be found in Table 3 of Appendix E. Because of the larger proportion of comingled discharge associated with the Nordic facility, it would provide an environmental benefit in terms of the comingled stream water quality:

– Large reductions in the elevated ammonia (NH_3) and orthophosphate (PO_4) concentrations from the Samoa Wastewater Treatment Plant.
– A large increase in the low salinity (S) of the Samoa Wastewater Treatment Plant.
– Large reductions in the elevated settleable suspended solids (SS) concentrations from both the Samoa Wastewater Treatment Plant and DG Fairhaven Power Plant.

Constituents in the Project discharge would not combine with constituents in the Fairhaven Power and the Samoa wastewater treatment facility discharges to result in any undesirable chemical reactions. The volume of the NAFC discharge would substantially dilute the constituents present in the other two, smaller discharges. There is no potential for harmful interactions between the constituents of the two current dischargers and the future NAFC discharge. The fully treated effluent from the Project would contain low levels of organic solids and nutrients. Chemically, these nutrient and solids would be the same organic constituents as the Samoa wastewater treatment facility would discharge; therefore, any chemical reactions would not occur. Small quantities of discharge are presently occurring under the Samoa wastewater treatment facility NPDES permit, and the DG Fairhaven facility is planning to become operational under new ownership and again discharge under the DG Fairhaven NPDES permit. Additionally, operational compliance monitoring would be required for all three dischargers as regulated by the NPDES unit of the NCRWQCB, including the Project discharge.

The Harbor District's ongoing mariculture program involves in-water operations for commercial sea food production. The purpose of the mariculture operations is to provide high-quality commercial shellfish for food consumption, which is dependent upon avoidance of water quality impacts in Humboldt Bay to meet the California Department of Public Health regulatory requirements. The project is dependent on high quality water from Humboldt Bay to produce its own high quality seafood. The Project would not result in any operational discharge or water quality impact to Humboldt Bay, and the Project's highly treated effluent discharged to the Pacific Ocean would not enter Humboldt Bay. Any in-water construction related to the sea chests would be short-term in duration and fully permitted such that a significant impact to mariculture operations near RMT II would not result. Aside from construction related to the sea chest revitalization, no in-water work would occur in Humboldt Bay. Thus, a cumulative hydrology or water quality impact related to mariculture operations would not result.

The Renewable Energy Port would involve the waters of Humboldt Bay. Zoned as a Coastal Dependent Industrial facility, the Renewable Energy Port would include large-scale dock improvements, which would involve in-water work. The Renewable Energy Port would also result in a need for construction and operational stormwater management and design for terrestrial development. Currently the facility is only conceptually proposed; thus, detailed cumulative impact analysis remains speculative and high-level. Presumably, the facility would be fully compliant with CEQA and applicable permitting requirements, including the Coastal Act, Clean Water Act, federal and state Endangered Species Act, and the California Fish and Game Code. Receipt of federal funds for the facility, as envisioned, would also trigger requirements to be compliant with the National Environmental Policy Act (NEPA). Given the facility would be located in an appropriately zoned area intended for large scale industrial development and would be fully permitted, any potential cumulative impact would be less than significant. Additionally, the Project would not discharge stormwater off-site. All stormwater resulting from up to a 100-year event, considerate of 2060 sea level rise following OPC (2018) guidelines, would be retained onsite. Given the Project would not discharge any stormwater to Humboldt Bay or other waters, a potential cumulative stormwater impact is not possible, regardless of the potential stormwater impact that may or may not result from the Renewable Energy Port. A cumulative impact related to stormwater would not result.

All other projects identified in Table 3-1, including the proposed Project, would not include in-water construction or operations and would not otherwise involve Humboldt Bay. Standard BMPs would be required of all projects to ensure potential water quality in Humboldt Bay was not impacted as a result of indirect construction impacts related to sediment or accidental release of hazardous materials. The other four Humboldt Bay water intakes summarized in Table 3-1 are lawfully permitted, with respective operational conditions applied by the California Coastal Commission to address any potential water quality related impacts. Operationally, all stormwater from the proposed Project would be retained on-site for all events up to the 100-year event thus, discharge of stormwater, including pollutants, to Humboldt Bay would not occur. The potential cumulative impact to Humboldt Bay water quality resulting from both construction and operation would thus be less than significant.

Mitigation Measures: No mitigation is necessary

Level of Significance: Less than Significant

3.9.8 References

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