4.16 Utilities and Service Systems

This section presents a summary of existing public utilities and service systems available in the Project vicinity and evaluates the potential for the proposed Project to result in significant impacts related to wastewater, stormwater drainage, water supply, and solid waste. This section relies in part on technical reports and memos prepared by BKF Engineers in support of the Project, all of which were independently peer reviewed by ESA. These sources include the *Civil Narrative – CEQA Support, Oakland Athletics Proposed Development* (BKF, 2020); *Preliminary Sanitary Sewer Analysis* (BKF, 2019a); and *Preliminary Storm Drainage Study* (BKF, 2019b). Comments received on utilities and service systems in response to the Notice of Preparation (NOP) for this Draft EIR included concerns on the capacities of the wastewater and stormwater systems serving the Project site. These topics are addressed in this section. No comments in response to the NOP were received on other utility and service system topics. Analysis of energy utilities and service systems (e.g., gas, electricity) is provided in Section 4.5, *Energy*, of this Draft EIR.

This section also analyzes the Maritime Reservation Scenario, focused on environmental conditions, regulations, impacts, and mitigation measures that are different from those identified for the proposed Project.

4.16.1 Environmental Setting

Wastewater and Stormwater Drainage

Regional Setting

East Bay Municipal Utilities District (EBMUD) provides sanitary sewer treatment services to the City of Oakland and the six other communities that comprise the EBMUD Special District No. 1 service area. Capacity for the EBMUD system is provided by: (1) the interceptor system, (2) pump stations, and (3) Wet Weather Facilities (WWFs). WWFs provide a way to convey flows through EBMUD's system during system overload from stormwater entering the wastewater conveyance system requiring discharging wastewater into the East Bay (see **Figure 4.16-1**).

EBMUD's main wastewater treatment plant (MWWTP) is located southwest of the I-580/I-80 interchange in Oakland. Wastewater is collected by 29 miles of interceptor lines that move wastewater from local sewer collection systems to the MWWTP. The interceptor system has a total capacity of 760 million gallons per day (mgd) and includes 15 pump stations, over 8 miles of pressure pipeline, five emergency overflow structures, and storage facilities located at one of the pump stations and two of EBMUD's WWFs. The interceptors parallel the bay-shore between Oakland and Alameda and range in size from 12 inches to 9 feet in diameter. The pump stations, which range in capacity from 1.5 to 60 mgd, lift wastewater throughout the collection system as it flows to the MWWTP for treatment (EBMUD, 2016).

The wastewater system serves approximately 685,000 people within an 83 square-mile area along the east shore of San Francisco Bay, which includes the cities of Alameda, Albany, Berkeley, Emeryville, Oakland, Piedmont, and Stege Sanitary District, which includes El Cerrito, Kensington, and part of Richmond.

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SOURCE: EBMUD, 2019

Oakland Waterfront Ballpark District Project

Figure 4.16-1
EBMUD Wastewater Service Area

ESA

The community collection systems are individually owned and operated, and only these community sewer connections may discharge to EBMUD's collection system. Overall, approximately 1,800 miles of community-owned sewers discharge to the EBMUD's collection system.

Currently, the MWWTP is designed to provide primary treatment for a flow of up to 325 mgd and secondary treatment for a maximum flow of 168 mgd. The average daily dry weather flow (ADWF) is 63 mgd (EBMUD, 2019a). The treatment processes include (in order) prechlorination, screening, grit removal, scum disposal, primary sedimentation, secondary treatment using high purity oxygen activated sludge, final clarification, sludge digestion, and power cogeneration gas generated during collected from the digester. The treated effluent is disinfected and dechlorinated before being discharged into San Francisco Bay, approximately one mile off the East Bay shore (EBMUD, 2016).

Background on Consent Decree for Wet Weather Facilities Discharges

Capacity assessments were completed as part of the East Bay Wet Weather Program, which was developed out of a comprehensive EBMUD planning process between 1975 and 1987. This program combined the results from previous inflow and infiltration (I/I) studies and facilities planning efforts to develop an integrated approach to reducing sanitary sewer overflows (SSOs) from the WWFs into the East Bay through construction by EBMUD and the satellite communities of facilities to manage wet weather flows. Since the completion of the 1980s studies, EBMUD has conducted additional flow monitoring and capacity assessment. EBMUD began implementing its component of the East Bay Wet Weather Program in 1987 and completed it in 1998. Facilities constructed included three wet weather storage and treatment facilities, two relief interceptors, and additional system storage and pumping facilities. Between 2005 and 2007, extensive flow monitoring was conducted as part of the Wet Weather Infrastructure Improvement Studies. Based on the flow monitoring data collected during this period, a refined hydraulic model of the EBMUD interceptor system was developed and capacity constraints under storm conditions were analyzed to understand the influence of I/I on discharges of SSOs from the WWFs (EBMUD, 2016).

On January 14, 2009, the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) issued an order prohibiting discharges from EBMUD's WWFs with an accompanying Cease and Desist Order (CDO) that includes requirements for actions to be taken if discharges occur. On July 22, 2009, a Stipulated Order for Preliminary Relief (SO) issued by the U.S. Environmental Protection Agency (U.S. EPA), State Water Resources Control Board (State Water Board), and Regional Water Board became effective. This order required EBMUD to perform a variety of work, including additional flow monitoring and modeling by 2012, to lay the groundwork for future efforts to eliminate discharges from the WWFs. On September 22, 2014, a Consent Decree (CD) became effective, mandating work activities to reduce inflow and infiltration so that, by 2036, the WWFs are not used for storm events that generate flows that are less than design conditions. The CD negotiated among EBMUD, seven wastewater collection system agencies that discharge into EBMUD's interceptor system (including the City of Oakland), the State Water Board, and the Regional Water Board. The CD is a legal document that requires the elimination of WWF discharges by 2036 (EBMUD, 2016).

Design flows for components of the EBMUD collection system (interceptors, pump stations, and WWFs) were established based on the National Pollutant Discharge Elimination System (NPDES) permit requirements for both the MWWTP and WWFs prior to the 2009 SO. Capacity requirements are based on the East Bay design storm event, which uses a five-year return period rainfall event, combined with additional assumptions such as seasonally elevated groundwater levels. EBMUD is now required by the CD to perform certain activities, in concert with work performed by the satellite agencies, to reduce I/I flows such that discharges are eliminated from the WWFs by 2036. Activities are conducted under the Regional Technical Support Program to identify I/I sources and flows in areas that discharge into the interceptor system using flow monitoring, smoke testing, closed-circuit television inspection, manhole inspections, and other technical investigative technologies (EBMUD, 2018a).

Local Setting

Wastewater

The Project site is served by the Port of Oakland's wastewater collection system that discharges into the City's collection system prior to discharging into EBMUD's interceptor in 3rd Street. EBMUD's interceptor located in 3rd Street conveys nearly 60 percent of flows received at the MWWTP approximately two miles northwest of the Project site (EBMUD, 2018b). Current wastewater flows from the Project site are estimated at 7,200 gallons per day (gpd) based on EBMUD's wastewater fee collection for the connection from the Project site (EBMUD, 2019c). See **Figure 4.16-2** for current wastewater collection pipelines and connections on and adjacent to the Project site.

The City of Oakland owns, operates, and maintains the local sanitary sewer collection system in the City. Oakland's sewer collection system covers approximately 39 square miles and includes approximately 934 miles of pipelines. City sewer pipelines range from 6 to 72 inches in diameter, with most lines pre-dating 1938, and with some parts of the system over 100 years old. Most of the system is gravity-fed, and about 10 pump stations service the entire area. Some areas of Oakland, which consist primarily of former military bases, cemeteries, large parks, and some hillside areas, are not part of the sewer service system. Over 90 percent of customers in the City are residential users. The proposed Project would connect its new wastewater collection system to the City of Oakland's system. The wastewater collection system would then be under the jurisdiction, operation, and maintenance of the City. Therefore, the Project wastewater collection system would be required to meet the design and specifications under the City's ordinances for wastewater collection systems.

Stormwater

Similar to the wastewater system, the current stormwater system is within the jurisdiction of the Port of Oakland, and development of the Project would connect its new stormwater facilities to the City of Oakland stormwater facilities and become a part of the City of Oakland's stormwater system. Further, the Project site would be required to meet the City's design standards and specifications under the City's ordinance for stormwater collection and conveyance systems.

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SOURCE: BKF Engineers, 2020

Oakland Waterfront Ballpark District Project

Figure 4.16-2
Current Wastewater Collection System

ESA

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The City of Oakland is part of the Alameda County Flood Control District (ACFCD) Zone 12. The storm drainage system in the City consists of more than 300 miles of storm drainpipes, over 100 miles of open creeks, and 15,000 structures (mostly inlets, manholes, and catch basins). These facilities are both publicly and privately owned. The City categorizes drainage facilities into the following three natural and improved facilities:

- **Major Facilities** – waterways with tributary areas equal or larger than 25 square miles such as the San Leandro Creek and other major waterways that are primarily owned and maintained by the ACFCD.
- **Primary Facilities** – waterways and drainage facilities with tributary areas more than 50 acres and less than 25 square miles. These facilities mostly consist of creeks and larger improved waterways or drainage facilities. Most of these facilities are owned and maintained by the ACFCD.
- **Secondary Facilities** – waterways or drainage facilities with tributary areas equal or less than 50 acres. Most of the City's drainage facilities are under this category, including pipes, conduits, and drainage structures that are owned and maintained by the City.

City-owned storm drainage facilities are typically located within easements and rights-of-way. Privately owned facilities in the City's jurisdiction typically occur within private properties and include above-ground drainage systems, creeks, and watercourses. Most of the privately owned facilities are not maintained by the City. City-maintained drainage facilities include structures that are constructed through the permit process and dedicated to the City for maintenance. The stormwater facilities on the Project site are currently owned and operated by the Port of Oakland.

The Project site has two existing Port of Oakland gravity stormwater pipelines conveying stormwater under Market Street and Martin Luther King Jr. Way to outfalls that discharge approximately halfway between the Embarcadero and southern limit of the existing wharf, where the outfalls meet the shoreline beneath the wharf structure. These stormwater mains convey stormwater runoff from areas within the Port of Oakland stormwater drainage system properties and public rights-of-way within the City of Oakland. Additionally, both existing mains convey stormwater from several catch basins and laterals that collect stormwater runoff within the Project site. See **Figure 4.16-3a** for the existing stormwater drainage collection system on and adjacent to the Project site and **Figure 4.16-3b** depicting the two stormwater collection areas. **Figure 4.16-3c** depicts the proposed stormwater drainage realignment and outfall detail.

Water Supply

Regional Setting

EBMUD is a publicly owned utility that owns, operates, and maintains the water distribution system within the City of Oakland. EBMUD facilities collect snowmelt and runoff at the Pardee Reservoir in the Mokelumne River watershed and farther downstream in the Camanche Reservoir. EBMUD has water rights for up to 325 mgd from the Mokelumne River watershed and can store up to a 10-month supply for the 1.4 million water customers in EBMUD's service area. Runoff within the Bay Area is stored in several local reservoirs to assure emergency supplies are available. On average, EBMUD stores approximately a six-month emergency reserve in local

reservoirs. EBMUD also has rights to up to 100 mgd from the Sacramento River in dry years through a contract with the U.S. Bureau of Reclamation that is pumped at the Freeport Regional Water Facility owned by EBMUD and Sacramento County (EBMUD, 2019b).

EBMUD Water Supply, Water Rights and the 2015 Urban Water Management Plan

EBMUD has water right permits and licenses that allow for delivery of up to a maximum of 325 MGD from the Mokelumne River, subject to the availability of Mokelumne River runoff and the senior water rights of other users. EBMUD's position in the hierarchy of Mokelumne River water users is determined by a variety of agreements between Mokelumne River water right holders and the terms of the appropriative water right permits and licenses. Depending on hydrology, conditions that could restrict EBMUD's ability to receive its full entitlement include:

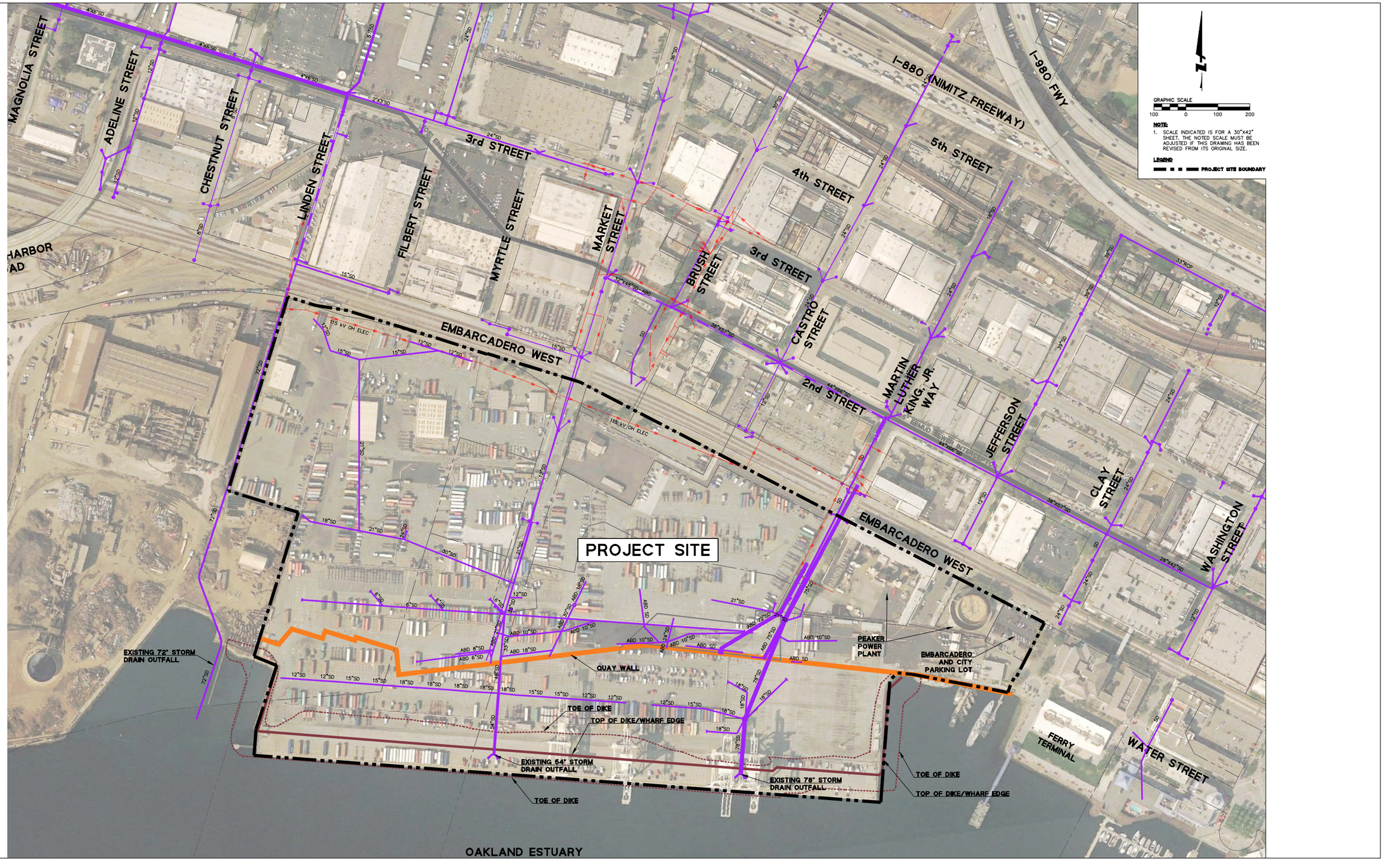
- Upstream water use by senior water right holders
- Downstream water use by riparian and senior appropriators and other downstream obligations, including protection of public trust resources
- Variability in precipitation and runoff.

During prolonged droughts, the Mokelumne River supply cannot meet EBMUD's projected customer demands. To address this, EBMUD constructed the Freeport Regional Water Facility and the Bayside Groundwater Project Phase 1, which are discussed below in more detail regarding supplemental planned water sources and drought management.

EBMUD's evaluation of water supply availability accounts for the diversions of both upstream and downstream water right holders and fishery releases on the Mokelumne River. Fishery releases are based on the requirements of a 1998 Joint Settlement Agreement (JSA) between EBMUD, the U.S. Fish and Wildlife Service, and the California Department of Fish and Wildlife. The JSA requires EBMUD to make minimum flow releases from its reservoirs to the lower Mokelumne River to protect and enhance the fishery resources and ecosystem of the river. As this water is released downriver, it is not available for use by EBMUD's customers.

EBMUD has obtained and continues to seek supplemental supplies. The 2015 Urban Water Management Plan (UWMP), adopted on June 28, 2016 by EBMUD's Board of Directors under Resolution No. 34092-16, is a long-range planning document used to assess current and projected water usage, water supply planning, and conservation and recycling efforts. In addition to its Mokelumne River rights, EBMUD has a Long-Term Renewal Contract (Contract No. 14-06-200-5183A-LTR1) with the U.S. Bureau of Reclamation to receive water from the Central Valley Project (CVP) through the Freeport Regional Water Facility in years when EBMUD's water supplies are relatively low. During some dry years, EBMUD may purchase water transfers to help meet customer demands.

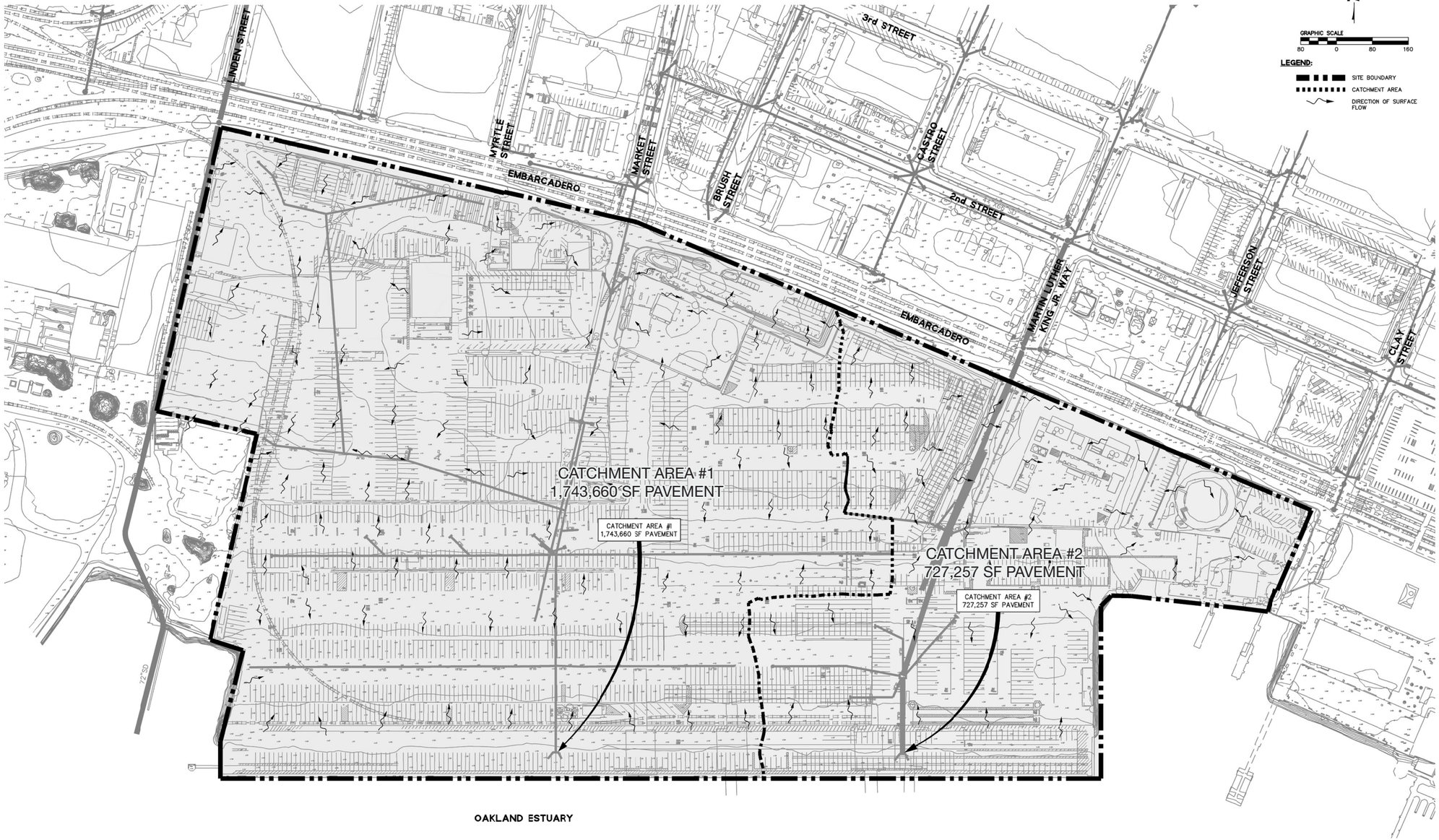
EBMUD maintains a biennial budget and five-year capital improvement program to optimize investments and maximize drinking water quality, and the reliability, safety, flexibility, and overall efficiency of the water supply system. EBMUD has published its most recently adopted budgets, which include capital expenditures for the delivery of water supplies to its customers, on its website at http://www.ebmud.com/about-us/investors/budget-and-rates/.



SOURCE: BKF Engineers, 2020

Oakland Waterfront Ballpark District Project

Figure 4.16-3a
Current Stormwater Drainage Collection System



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SOURCE: BKF, 2019

Oakland Waterfront Ballpark District Project

Figure 4.16-3b
Current Drainage System Collection Areas

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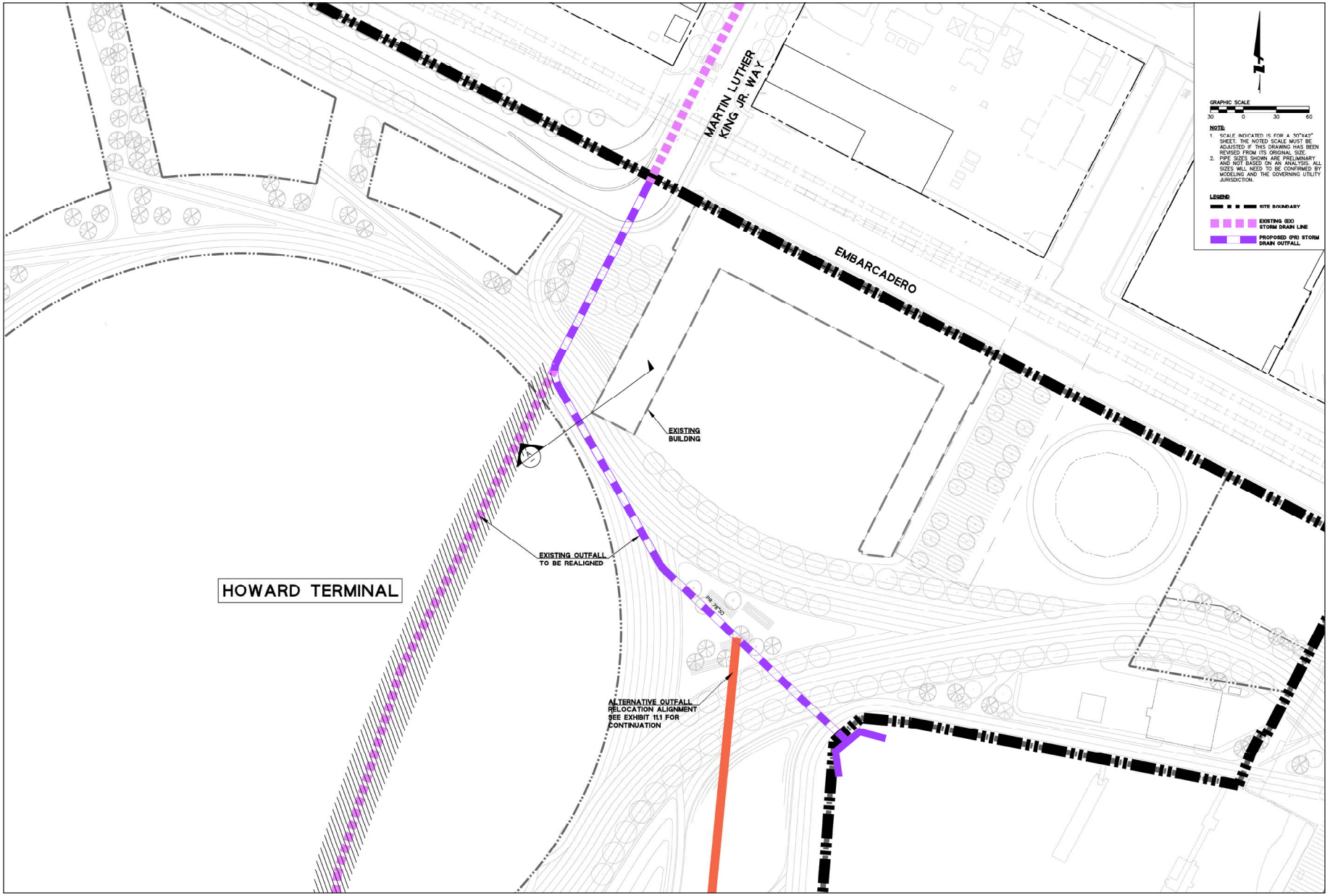

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SOURCE: BKF Engineers, 2020

Oakland Waterfront Ballpark District Project

Figure 4.16-3c
Proposed Stormwater Drainage Realignment and Outfall Detail

ESA

Water Treatment and Distribution Facilities

Water Treatment

Water is treated at six water treatment plants with a total treatment capacity of 375 mgd. The water treatment plants are Upper San Leandro in Oakland, San Pablo in Kensington, Sobrante in El Sobrante, and plants located in and named for Orinda, Lafayette, and Walnut Creek. The Orinda Water Treatment Plant has the largest output, with a maximum capacity of 200 mgd. This plant serves all or parts of Alameda, Albany, Berkeley, El Cerrito, Emeryville, Moraga, Oakland (including the Project site), Orinda, Piedmont, Richmond, and San Leandro. The other plants supply treated water in varying amounts to the balance of the EBMUD service area (EBMUD, 2015).

Water Distribution System

EBMUD owns and maintains the water distribution mains that provide water service in Oakland. The water distribution system in Oakland is divided into pressure zones covering approximately 200-foot elevation ranges. Water pressure is generally adequate throughout the city, ranging from 40 to 130 pounds per square inch, but pressure may be reduced in some locations with older water mains if they are not sized based on current standards or have lost capacity due to deterioration. The Project site is located within the EBMUD Central Pressure Zone, which provides water service to customers within an elevation range of 0 to 100 feet, by gravity, which meets required water pressures for residential and fire flows.

Solid Waste

Regional Setting

Non-hazardous waste in the City of Oakland is collected by Waste Management of Alameda County (WMAC), which provides curbside pickup for residential, commercial, and industrial non-hazardous waste, and transports it to WMAC's Davis Street Transfer Station in San Leandro. Transfer trucks haul most of the waste to the Altamont Landfill and Resource Facility, located approximately 35 miles east of Oakland near Livermore. In 2013, approximately 284,139 tons of disposed solid waste were generated in Oakland, including 235,478 tons that went to the Altamont Landfill, minus those materials that were recycled at the time. Most of the remaining solid waste was sent to four other landfills: Forward Landfill in San Joaquin County, the Keller Canyon Landfill in Contra Costa County, Potrero Hills Landfill in Solano County, and the Vasco Road Landfill in Alameda County (Alameda County, 2017). The Altamont Landfill has a maximum permitted capacity of 87.1 million tons. As of 2014, 46 percent of this capacity was remaining (Alameda County, 2017).

Alameda County's Integrated Waste Management Plan was prepared by the Alameda County Waste Management Authority (ACWMA) pursuant to Assembly Bill (AB) 939 (see below) to determine landfill capacity lifetimes with reductions based on mandatory recycling amounts. Using projections based on community waste diversion to landfills, the ACWMA has projected a steady rate of disposal that could result in the closure of the Altamont Landfill around 2049 and the Vasco Road Landfill in 2022 (Alameda County, 2017). The ACWMA has acquired land in the Altamont Hills area suitable for development of a public multi-purpose waste management facility. Depending upon need, the facility could include various diversion facilities in conjunction with a landfill with sufficient capacity to provide additional reserve disposal

capacity. The chosen site contains 98 million cubic yards of landfill capacity. The ACWMA determined not to proceed with permitting and development of a landfill and to hold the landfill site property as a potential reserve, as needed in the future.

AB 939, enacted in 1989, requires Source Reduction and Recycling Element of each city and county to include an implementation schedule to divert a percentage of its solid waste from landfill disposal through source reduction, recycling, and composting activities. AB 939 specifies a required diversion rate of at least 50 percent of wastes by the year 2000. The California Department of Resources Recycling and Recovery (CalRecycle) indicates that the City of Oakland's diversion rate was 59 percent in 2006. Beginning with the 2007 jurisdiction annual reports, diversion rates were no longer measured. With the passage of Senate Bill (SB)1016 in 2006, the Per Capita Disposal Measurement System, only per capita disposal rates are measured to determine if a jurisdiction's efforts are meeting the intent of AB 939. In 2012, Oakland had a per resident disposal target rate of 5.8 pounds per day (PPD) and a per employee disposal target rate of 15.3 PPD. In 2012, the City reported an actual annual per resident PPD of 3.9 and 9.0 PPD per employee, thereby meeting the City's waste diversion goals for 2012. In 2015, the City of Oakland implemented new collection service contracts for trash and organics with WMAC (see description of transfers above), and for residential recycling with California Waste Solutions (CWS). CWS is a private recycling collection company that separates up to 200 tons per day of recycled materials at two facilities in West Oakland, one on 10th Street and one on Wood Street. Once separated, CWS bundles the materials for shipment to businesses or transfer stations in Alameda County that recycle the materials.

Union Pacific Railroad and Existing Utility Infrastructure

The Union Pacific Railroad (UPRR) tracks run at-grade along the north boundary of the Project site, within the railroad right-of-way adjacent to the Embarcadero. Two railroad tracks exist, with a third track at some locations. Existing utility lines run beneath and/or adjacent to the railroad track, some of which may be replaced, relocated, or otherwise improved. These include the 10-inch and 12-inch high-pressure petroleum lines that run parallel to the tracks and cross beneath them near Filbert and Clay Streets. Existing sewer lines cross beneath the tracks along Martin Luther King Jr. Way, and existing gas lines cross at Castro and Market Streets.

4.16.2 Regulatory Setting

Wastewater and Stormwater Drainage

Federal

Title 40 Code of Federal Regulations (CFR) Part 503, Title 23 California Code of Regulations (CCR), and standards established by the Regional Water Boards coordinate to regulate the disposal of biosolids. The main purpose for these regulatory measures is to ensure appropriate limits for effluent discharge to surface waters. These limits affect the sizing and treatment capacities of wastewater utilities that serve communities in California. For discussion of stormwater quality regulations, see Section 4.9, *Hydrology and Water Quality*.

State

National Pollutant Discharge Elimination System

As authorized by the Clean Water Act (CWA), the National Pollutant Discharge Elimination System (NPDES) Permit Program controls water pollution by regulating point sources that discharge pollutants into waters of the U.S. The NPDES Program is a federal program that has been delegated to the State of California for implementation through the State Water Board and the nine Regional Water Boards. Each NPDES permit for point discharges contains limits on allowable concentrations of pollutants contained in discharges. Sections 401 and 402 of the CWA contain general requirements regarding NPDES permits. Section 307 of the CWA describes the factors that the U.S. EPA must consider in setting effluent limits for priority pollutants. As described previously in *Environmental Setting*, a CD was executed for wastewater discharge from EBMUD's WWFs and includes mandatory measures to reduce these to zero by 2036. The CD was signed by EBMUD and the satellite agencies.

The CWA was amended in 1987 to require NPDES permits for non-point source (i.e., stormwater) pollutants in discharges. Stormwater sources are diffuse and originate over a wide area rather than from a definable point. The goal of the NPDES stormwater regulations is to improve the quality of stormwater discharged to receiving waters to the "maximum extent practicable" through the use of structural and non-structural Best Management Practices (BMPs). BMPs can include the development and implementation of various practices including educational measures (workshops informing public of what impacts result when household chemicals are dumped into storm drains), regulatory measures (local authority of drainage facility design), public policy measures, and structural measures (filter strips, grass swales and detention ponds). For further information on water quality regulations, see Section 4.9, *Hydrology and Water Quality*.

Regional

EBMUD passed the Regional Private Sewer Lateral Ordinance, Ord. No. 359-13, on July 23, 2013, with the latest amendment effective May 24, 2019, in order to meet the requirements of its NPDES waste discharge permit and federal CD. To meet this requirement, EBMUD passed this ordinance to reduce I/I in the system. The ordinance requires private lateral sewer owners to comply with replacement and testing requirements to eliminate I/I from older sewer laterals. For new development or redevelopment, the ordinance requires the installation and testing of sewer laterals to document that no I/I is entering the wastewater flows.

Water Supply

Federal

U.S. Environmental Protection Agency

The U.S. EPA established primary drinking water standards in the CWA Section 304, and states are required to ensure that potable water for the public meets these standards. Standards for 81 individual constituents have been established under the Safe Drinking Water Act (SDWA), as amended in 1986. The U.S. EPA may add additional constituents in the future.

Safe Drinking Water Act

The U.S. EPA administers the SDWA, the primary federal law that regulates the quality of drinking water and establishes standards to protect public health and safety. The State Water Board Division of Drinking Water (DDW) implements the SDWA and oversees public water system quality statewide. The California Department of Public Health establishes legal drinking water standards for contaminants that could threaten public health.

State

Drinking Water Quality

As part of its efforts to implement the SDWA, the DDW inspects and provides regulatory oversight for public water systems within California. Public water system operators are required to monitor their drinking water sources regularly for microbiological, chemical, and radiological contaminants to show that drinking water supplies meet the regulatory requirements listed in Title 22 of the California Code of Regulations (CCR) as primary maximum contaminant levels (MCLs). Primary standards are developed to protect public health and are legally enforceable. Among these contaminants are approximately 80 specific inorganic and organic contaminants and six radiological contaminants that reflect the natural environment, as well as human activities. Examples of potential primary inorganic contaminants are aluminum and arsenic, while radiological contaminants can include uranium and radium.

Public water system operators are also required to monitor for a number of other contaminants and characteristics that deal with the aesthetic properties of drinking water. These are known as secondary MCLs. Secondary standards are generally associated with qualities such as taste, odor, and appearance, but these are generally non-enforceable guidelines. However, in California secondary standards are legally enforceable for all new drinking water systems and new sources developed by existing public water suppliers. The public water system operators are also required to analyze samples for unregulated contaminants, and to report other contaminants that may be detected during sampling.

Urban Water Management Planning Act

California Water Code Section 10610 (et seq.) requires that all public water systems providing water for municipal purposes to more than 3,000 customers, or supplying more than 3,000 acre-feet per year, must prepare an Urban Water Management Plan (UWMP). UWMPs represent key water supply planning documents for municipalities and water purveyors in California, and often form the basis of Water Supply Assessments (WSAs) (see below) prepared for individual projects. UWMPs must be updated at least every five years on or before December 31, in years ending in five and zero. EBMUD completed its last UWMP in 2015.

Water Supply Assessment

California Public Resources Code (PRC) Section 21151.9 requires that a Water Supply Assessment (WSA) be prepared for a project to ensure that long-term water supplies are sufficient to meet the project's demands in normal, single dry, and multiple dry years for a period of 20 years. Preparation of a WSA is required if a proposed action meets the statutory definition of a "project," which includes at least one of the following (Water Code Section 20912(a)):

- A proposed residential development of more than 500 dwelling units;
- A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space;
- A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space;
- A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area; or
- A mixed-use project that includes one or more of the projects specified in the above bullets.

Completion of a WSA requires the collection of proposed water supply data and information relevant to the project in question, an evaluation of existing/current use, a projection of anticipated demand sufficient to serve the project for a period of at least 20 years, delineation of proposed water supply sources, and an evaluation of water supply sufficiency under single year and multiple year drought conditions.

Written Verification of Water Supply

Government Code Section 66473.7(a)(1) requires an affirmative written verification of sufficient water supply for some proposed residential developments of more than 500 dwelling units. The written verification is designed as a "fail-safe" mechanism to ensure that collaboration on finding the needed water supplies to serve a new large subdivision occurs early in the planning process. This verification must also include documentation of historical water deliveries for the previous 20 years, as well as a description of reasonably foreseeable impacts of the proposed subdivision on the availability of water resources of the region. Government Code Section 66473.7(b)(1) states:

> The legislative body of a city or county or the advisory agency, to the extent that it is authorized by local ordinance to approve, conditionally approve, or disapprove the tentative map, shall include as a condition in any tentative map that includes a subdivision a requirement that a sufficient water supply shall be available. Proof of the availability of a sufficient water supply shall be requested by the subdivision applicant or local agency, at the discretion of the local agency, and shall be based on written verification from the applicable public water system within 90 days of a request.

As a result of the information contained in the written verification, the city or county may attach conditions to ensure an adequate water supply is available to serve the proposed plan as part of the tentative map approval process.

Following project certification, in most cases additional water supply verification is required to be completed at the Tentative Map stage, prior to adoption of the Final Map, for certain tentative maps. However, pursuant to Government Code Section 66473.7(i), this additional water supply verification is not required for:

> Any residential project proposed for a site that is within an urbanized area and has been previously developed for urban uses, or where the immediate contiguous properties surrounding the residential project site are, or previously have been, developed for urban uses, or housing projects that are exclusively for very low and low income households.

California Water Conservation Act

The California Water Conservation Act was enacted in November 2009, and requires each urban water supplier to select one of four water conservation targets contained in California Water Code Section 10608.20 with the statewide goal of achieving a 20-percent reduction in urban per-capita water use by 2020. EBMUD's goal of increasing conservation from its 2015 UWMP was to increase conservation savings from 32 mgd to 62 mgd by the year 2040.

Sustainable Groundwater Management Act of 2014

The Sustainable Groundwater Management Act of 2014 (SGMA) became law on January 1, 2015, and applies to all groundwater basins in the state (Water Code Section 10720.3). (The SGMA is comprised of three separate bills: SB 1168, SB 1319, and AB 1739; all three were signed into law by the Governor on September 16, 2014.) By enacting the SGMA, the legislature intended to provide local agencies with the authority and the technical and financial assistance necessary to sustainably manage groundwater within their jurisdiction (Water Code Section 10720.1). Currently, there are no groundwater sustainability plans that encompass the Project.

Solid Waste

Federal

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA), Subtitle D, contained in Title 42 of the United States Code Section 6901 et seq. contains regulations for municipal solid waste landfills and requires states to implement their own permitting programs incorporating the federal landfill criteria. The federal regulations address the location, operation, design, groundwater monitoring, and closure or landfills. The U.S. EPA waste management regulations are codified in 40 CFR 239–282. The RCRA Subtitle D is implemented by Title 27 of the PRC, approved by the U.S. EPA.

State

Integrated Waste Management Act (Assembly Bill 939)

Regulation affecting solid waste disposal in California is embodied in PRC Title 14, known as the Integrated Waste Management Act, originally adopted in 1989. AB 939 was designed to increase landfill life by diverting solid waste from landfills within the state and conserving other resources through increasing recycling programs and incentives. AB 939 requires that counties prepare Integrated Waste Management Plans to implement landfill diversion goals, and requires that cities and counties prepare and adopt Source Reduction and Recycling Elements (SRRE). The SRRE must set forth a program for management of solid waste generated with the jurisdiction of the respective city or county. Each source reduction and recycling element must include, but is not limited to, the following components for solid waste generated in the jurisdiction of the plan:

- A waste characterization component
- A source reduction component
- A recycling component
- A composting component
- A solid waste facility capacity component

- A funding component
- A special waste component

The SRRE programs are designed to achieve landfill diversion goals by encouraging recycling in the manufacture, purchase, and use of recycled products. AB 939 also requires that California cities implement plans designed to divert the total solid waste generated within each jurisdiction by 50 percent based on a base year of 2000. The diversion rate is adjusted annually for population and economic growth when calculating the percentage achieved in a particular jurisdiction.

Senate Bill 1016

In 2007, SB 1016 was passed, changing the way that CalRecycle measures waste diversion. The goal of the new per capita disposal measurement system was to make the AB 939 process of goal measurement simpler, timelier, and more accurate. SB 1016 changed to a disposal-based indicator—the per capita disposal rate—which uses only two factors: a jurisdiction's population (or in some cases employment) and its disposal as reported by disposal facilities. The AB 939 50 percent solid waste disposal reduction requirement is now measured in terms of per-capita disposal expressed as pounds of waste generated per person per day, or pounds per employee per day. The focus is on program implementation, actual recycling, and other diversion programs instead of estimated numbers. Under this measurement system, a city needs to annually dispose of an amount equal to or less than its "50 percent equivalent per capita disposal target" calculated by CalRecycle.

Public Resources Code 41780

The California State Legislature set the policy goal for the state that not less than 75 percent of solid waste generated be source reduced, recycled, or composted by the year 2020. Furthermore, a 50 percent diversion rate will be enforced for local jurisdictions.

Assembly Bill 1220

CalRecycle and the State Water Board completed a parallel rulemaking as a result of AB 1220 (Chapter 656, Statutes of 1993). AB 1220 required clarification of the roles and responsibilities of the two boards, the Water Board's and CalRecycle's local enforcement agencies, in regulating solid waste disposal sites. The approved Title 27 regulations combine prior disposal site/landfill regulations of CalRecycle and the Water Board that were maintained in Title 14 CCR and Chapter 15 of Title 23 CCR (which contains requirements for disposal of hazardous waste).

The purpose for CalRecycle standards in this subdivision is to protect public health and safety and the environment. The regulations apply to active and inactive disposal sites, including facilities or equipment used at the disposal sites. These standards make clear that the primary responsibility for enforcing State minimum standards rests with the local enforcement agency in cooperation with the Water Boards or other oversight agency. Subchapters of Title 27 include operating criteria for landfills and disposal sites, requirements to have enough materials to cover waste to prevent a threat to human health and the environment, requirements for operations at solid waste facilities for the handling of waste and equipment needs of the site, requirements for controlling activities on-site, requirements for controlling landfill gas that is created from the decomposition of wastes on-site, and requirements of the owner/operator of a facility to properly operate the site to protect the site from fire threat.

Assembly Bill 341

To reduce greenhouse gas emissions from disposing of recyclables in landfills, AB 341 (Chapter 476, Statutes of 2011) requires local jurisdictions to implement commercial solid waste recycling programs. Businesses that generate four cubic yards or more of solid waste per week or multi-family dwellings of five units or more must arrange for recycling services. To comply with AB 341, jurisdictions' commercial recycling programs must include education, outreach, and monitoring of commercial waste generators, as well as report on the process to CalRecycle. Jurisdictions may enact mandatory commercial recycling ordinances to outline how the goals of AB 341 will be reached. For businesses to comply with AB 341, they must arrange for recyclables collection through self-haul, subscribing to franchised haulers for collection, or subscribing to a recycling service that may include mixed waste processing that yields diversion results comparable source separation.[1]

Assembly Bill 1826

To further reduce greenhouse gas emissions from disposing of organic materials in landfills, AB 1826 (Chapter 727, Statutes of 2014) requires businesses to recycle their organic waste beginning on April 1, 2016, depending on the amount of solid waste they generate per week. Similar to AB 341, jurisdictions are required to implement an organic waste recycling program that includes the education, outreach, and monitoring of businesses that must comply. Organic waste refers to food waste, green waste, landscaping and pruning waste, nonhazardous wood waste, and food-soiled paper that is mixed with food waste.

Assembly Bill 901

In 2015, AB 901 was signed into law to change how organics, recyclable material, and solid waste are reported to CalRecycle. In the third quarter of 2019, CalRecycle will transition away from the current Disposal Reporting System (DRS) to a brand-new Recycling and Disposal Reporting System (RDRS). Until that time, permitted stations and disposal facilities will continue to report to the county or regional agency according to the DRS requirements for the first half of 2019. The law requires the following businesses to report directly to CalRecycle on a quarterly basis on materials sold and transferred by a reporting entity:

- Recycling facilities
- Composting facilities
- Disposal facilities including landfills
- Transformation facilities
- Engineered municipal solid waste conversion facilities
- Transfer/processor facilities
- Contract haulers
- Food waste self-haulers
- Brokers
- Transporters

[1] Assembly Bill 341: Mandatory Commercial Recycling, 2011. Available: http://www.calrecycle.ca.gov/recycle/commercial/#Elements.

Local Plans, Ordinances, and Policies

Wastewater and Stormwater Drainage

See Section 4.9, *Hydrology and Water Quality*, for a description of the Port of Oakland's and City of Oakland's NPDES permits and other water quality regulations.

City of Oakland General Plan

The *Open Space, Conservation, and Recreation Element* and *Public Safety Element* of the Oakland General Plan describe the following policies regarding drainage, adopted for the purpose of avoiding or mitigating an environmental effect, and that apply to the Project.

> ***Policy CO-5.3:*** Employ a broad range of strategies, compatible with the Alameda Countywide Clean Water Project to: (a) reduce water pollution associated with stormwater runoff; (b) reduced water pollution associated with hazardous spills, runoff from hazardous material areas, improper disposal of household hazardous wastes, illicit dumping, and marina "live-aboards;" and (c) improve water quality in Lake Merritt to enhance the lake's aesthetic, recreational, and ecological functions.
>
> ***Policy FL-1:*** Enforce and update local ordinances, and comply with regional orders, that would reduce the risk of storm-induced flooding.
>
> ***Policy FL*-2:** Continue or strengthen city programs that seek to minimize the storm-induced flooding hazard.
>
> ***Policy FL*-3:** Seek the cooperation and assistance of other government agencies in managing the risk of storm-induced flooding.

Oakland Municipal Code

The City and the Port are cooperating to establish a shared regulatory framework under which the City will apply all relevant provisions of the Oakland Municipal Code (OMC) to the Project, including Oakland Planning Code, Title 17. To protect sensitive receptors from wastewater and drainage impacts, the OMC, Title 13 - Public Services, Chapter 13.08 – Building Sewers allows the City to regulate the size, extent, use, construction, maintenance, and abandonment of building sewers and to provide for the administration of such regulations by the Director of Public Works. This code contains many criteria for new development construction, operation, and maintenance of sewers and connections with the City and EBMUD's wastewater conveyance systems.

In addition, OMC Chapter 13.16 – Creek Protection, Stormwater Management and Discharge Control codifies ordinances for the purpose of: eliminating non-stormwater discharges to the municipal separate storm sewer; controlling the discharge to municipal separate storm sewers from spills, dumping, or disposal of materials other than stormwater; reducing pollutants in stormwater discharges to the maximum extent practicable (including controls to prevent littering and trash from entering stormwater systems); preventing activities that would contribute significantly to flooding, erosion, or sedimentation, or that would destroy riparian areas or would inhibit their restoration; controlling erosion and sedimentation; protecting drainage facilities; and protecting public health and safety, and public and private property. As discussed in Section 4.9, *Hydrology and Water Quality*, this ordinance is not applicable to lands under Port permitting

authority; however, the City and the Port are cooperating to establish a shared regulatory framework under which the City will apply all relevant provisions of the Oakland Municipal Code.

Port of Oakland Ordinance No. 4311

The Port adopted Ordinance No. 4311, known as the Storm Water Ordinance, on January 15, 2015, to provide legal authority to control discharges to its storm drainage system to meet its NPDES Phase II Small MS4 Permit conditions for water quality in stormwater discharged into the Oakland-Alameda Estuary. Following the adoption of this ordinance, requirements for post-project stormwater design were detailed in the *Port of Oakland 2015 Post-Construction Stormwater Design Manual* (Larry Walker Associates, 2015). However, as discussed in Section 4.9, *Hydrology and Water Quality*, the City and the Port are cooperating to establish a shared regulatory framework under which the City will apply its MS4 NPDES permit requirements for design and enforcement.

Water Supply

EBMUD Drought Management Program (DMP)

If water supplies are severely depleted, EBMUD's Board of Directors may declare a water shortage emergency and implement the Drought Management Program (DMP), which is designed to allow EBMUD to minimize drought impacts on its customers while continuing to meet stream flow release requirements and obligations to downstream Mokelumne River water users. The Board may also implement the DMP in the absence of a declaration of water shortage emergency if the supplies are moderately depleted or the State mandates water use restrictions. The DMP guided EBMUD in successfully managing water demand during mandatory and voluntary rationing periods in calendar years 1976–1978, 1987–1994, 2007–2010, and 2014–2015 when supplies were limited.

The DMP guidelines offer two scenarios depending on whether the drought declaration is linked to local conditions, as measured by total system storage (TSS), or to a State mandate, such as the mandatory water use reductions set by the State Water Board in 2015. Historically, EBMUD's drought declarations have been based on local conditions. Under the "TSS Scenario," EBMUD declares different drought stages based on projected end-of-September TSS volumes. Stage zero corresponds to normal water year conditions, and Stages one through four reflect increasingly severe drought conditions corresponding to reduced TSS. Each stage is associated with recommendations for the quantities of CVP and additional dry year water supply that could be obtained in combination with the level of customer demand reduction that may be needed. As the projected end of season TSS decreases, the DMP guidelines call for higher levels of customer demand reduction, and dry year supplemental supplies. Demand management can include percent mandated reductions in water use, as mandated by the State, from 10 percent to greater than 20 percent reductions based on the higher the drought stage, and/or by increasing water rates, adding drought surcharges, and fines for excessive use. In addition, the EBMUD DMP includes other administrative remedies to reduce water demand through rebates and incentives on upgrading older plumbing fixtures and irrigation devices.

Regulations Governing Water Service to Customers of EBMUD - Section 31 Water Efficiency Requirements

EBMUD's Section 31 regulations requires project applicants for water service to meet the water-efficiency requirements for all new water service facilities to comply with all applicable local, State, and federal laws for indoor water use efficiency, including the California Green Building Standards (CALGreen). A project applicant for new or expanded water service is required maintain design documents and construction and installation records and furnish a copy of these documents and records to EBMUD upon request. EBMUD may inspect the installation of water efficiency measures to verify that the items are installed and performing to the required water efficiency levels. Section 31 provides a long list of indoor water use efficiency standards for many types of water using appliances, machines, and residential plumbing. Section 31 also includes requirements for project applicants to provide details on outdoor water use efficiency measures and requires a details site plan with outdoor water use equipment based on square footage of landscaped areas.

Oakland Municipal Green Building Ordinance

The OMC Chapter 18.02 requires implementation of the CALGreen mandatory measures and the applicable requirements of the Green Building Ordinance for projects using the StopWaste.Org Small Commercial or Bay Friendly Basic Landscape Checklist.

a. The following information shall be submitted to the Building Services Division for review and approval with application for a Building permit:
    i. Documentation showing compliance with the 2008 Title 24, California Building Energy Efficiency Standards.
    ii. Completed copy of the green building checklist approved during the review of a Planning and Zoning permit.
    iii. Permit plans that show in general notes, detailed design drawings and specifications as necessary compliance with the items listed in subsection
    iv. (b) below.
    v. Other documentation to prove compliance.
b. The set of plans in subsection (a) shall demonstrate compliance with the following:
    i. CALGreen mandatory measures.
    ii. All applicable green building measures identified on the StopWaste.Org checklist approved during the review of a Planning and Zoning permit, or submittal of a Request for Revision Plan-check application that shows the previously approved points that will be eliminated or substituted.
c. During construction. The applicant shall comply with the applicable requirements of CALGreen and Green Building Ordinance, Chapter 18.02 for projects using the StopWaste.Org Small Commercial or Bay Friendly Basic Landscape Checklist. The following information shall be submitted to the Building Inspections Division for review and approval:
    i. Completed copy of the green building checklists approved during review of the Planning and Zoning permit and during the review of the Building permit.

Other documentation as deemed necessary by the City to demonstrate compliance with the Green Building Ordinance.

Oakland Municipal Code Title 16

Section 16.08.030 of the OMC requires applicants for new development project to provide for the use of recycled water in the project for landscape irrigation purposes unless the City determines that there is a higher and better use for the recycled water, the use of recycled water is not economically justified for the project, or the use of recycled water is not financially or technically feasible for the project. Project applicants must contact the New Business Office of the EBMUD for a recycled water feasibility assessment by the Office of Water Recycling. If recycled water is to be provided in the project, the project drawings submitted for construction-related permits shall include the proposed recycled water system, and the project applicant shall install the recycled water system during construction.

Solid Waste

Oakland Municipal Code

Title 8, Health and Safety, Chapter 8.28 – Solid Waste Collection and Disposal and Recycling

To protect the health and safety of residents of the City from effects of solid waste, OMC, Chapter 8.28 allows the City, at its discretion, to collect fees and monitor and enforce compliance of specific means to dispose, collect, and separate solid waste and recycling for safe disposal by the waste management collection companies serving the City.

Title 15, Buildings and Construction, Chapter 15.34 - Construction and Demolition (C&D) Ordinance

The City of Oakland's C&D Ordinance is intended to further the goals of AB 939 and Alameda County's Measure D. The C&D Ordinance affects the following projects:

- All New Construction;
- All Alterations, Renovations, Repairs, or Modifications with construction value of $50,000 or greater, excluding R-3; and,
- All Demolition, including Soft Demo, and excluding R-3.

Building permit applicants must complete a Waste Reduction and Recycling Plan (WRRP) as part of the Building Permit Application process to detail the plan for salvaging and recycling C&D debris generated during the course of the project. Standards current at the time of this writing call for salvage and/or recycling 100 percent of asphalt and concrete, and at least 65 percent of all remaining debris. These standards are subject to administrative adjustment and applicants must follow the standards published at the time of building permit application.

The City will not issue a building permit for a covered project without an approved WRRP on file. Upon approval of the WRRP and issuance of the permit(s), the applicant shall execute the plan. Prior to the Final Inspection, Temporary Certificate of Occupancy or Certificate of Occupancy, the Applicant must complete and obtain approval of a Construction and Demolition Summary Report (CDSR). The CDSR documents the salvage, recycling and disposal activities that took place during the project. The CDSR must include documentation, such as scale tickets, that support the data provided in the CDSR.

Title 17, Planning Code, Chapter 17.118 – Recycling Space Allocation Ordinance

Project applicants are required to submit project drawings for construction-related permits that contain recycling collection and storage areas in compliance with this ordinance. As previously stated, the City and the Port are cooperating to establish a shared regulatory framework under which the City will apply all relevant provisions of the Oakland Municipal Code to the Project, including Oakland Planning Code, Title 17. For residential projects, at least two cubic feet of storage and collection space per residential unit is required, with a minimum of 10 cubic feet. For nonresidential projects, at least two cubic feet of storage and collection space per 1,000 square feet of building floor area is required, with a minimum of 10 cubic feet.

Port of Oakland Resolution 01197 Construction Waste Diversion

Adopted by the Board of Port Commissioners in 2001, this resolution requires a minimum diversion of 50 percent of construction and demolition debris from landfills.

4.16.3 Significance Criteria

The City of Oakland has established thresholds of significance for CEQA impacts which incorporate those in Appendix G of the CEQA Guidelines (City of Oakland, 2016). The Project would have a significant adverse impact related to utilities and service systems if it would:

1. Exceed wastewater treatment requirements of the San Francisco Bay Regional Water Quality Control Board;
2. Require or result in construction of new storm water drainage facilities or expansion of existing facilities, construction of which could cause significant environmental effects (see also Criterion 5 in Section 4.9, *Hydrology and Water Quality*);
3. Exceed water supplies available to serve the project from existing entitlements and resources, and require or result in construction of water facilities or expansion of existing facilities, construction of which could cause significant environmental effects;
4. Result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the providers' existing commitments and require or result in construction of new wastewater treatment facilities or expansion of existing facilities, construction of which could cause significant environmental effects;
5. Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs and require or result in construction of landfill facilities or expansion of existing facilities, construction of which could cause significant environmental effects; or
6. Violate applicable federal, State, and local statutes and regulations related to solid waste.

The changes to Appendix G of the State CEQA Guidelines effective in December 2018 were intended to reflect recent changes to the CEQA statute and court decisions. Many of these recent changes and decisions are already reflected in the City's adopted significance thresholds, which have been used to determine the significance of potential impacts. The topics or questions in Appendix G are reflected in the City's current thresholds even though there are differences in the text between them.

Specifically for water supply, the following water supply analysis is done in accordance with standards set forth in the Supreme Court of California *Vineyards* case,[2] including those stated in revised Appendix G of the CEQA Guidelines, to address whether the water supplier (EBMUD) has sufficient water supplies "reasonably likely" to be available to serve the Project and reasonably foreseeable development during normal, dry and multiple dry years. In addition, the analysis addresses the reliability of identified water sources which is analyzed in the 2015 UWMP. To the extent that the topics or questions in Appendix G are not reflected in the City's thresholds, these topics and questions are considered in the impact analysis below.

Approach to Analysis

Wastewater and Stormwater Drainage

The analysis in this section is based on: the pre- and post-Project conditions described in the Howard Terminal Civil Narrative – CEQA Support Report prepared for the Project site (BKF, 2019); on publicly available published reports; and, on the information provided previously in the environmental and regulatory settings in this section of the Draft EIR. The capacity of existing and proposed stormwater infrastructure are analyzed based on City Criterion 2 under Utilities and Services Systems and City Criterion 5 in Section 4.6, *Hydrology and Water Quality*: "create or contribute substantial runoff which would exceed the capacity of existing or planned stormwater drainage systems."

Construction

The analysis of effects of Project construction as a whole (e.g., air quality and noise impacts from trenching for pipeline routes, grading, use of construction equipment, etc.) occur throughout the other technical sections in this Draft EIR (e.g., air quality emissions in Section 4.2, *Air Quality*) and are not discussed further in this section. Therefore, City Criterion 2 on the analysis of potential significant environmental effects of construction of stormwater drainage facilities is not analyzed in this section. The physical impacts of earthwork and construction involved with removing, relocating or installing new pipeline are therefore subsumed in the analysis of impacts of constructing the Project. Mitigation measures are identified to reduce construction-related impacts to air quality, biological resources, cultural resources, geology, soils, and paleontological resources, hazards and hazardous materials, hydrology and water quality, noise, and transportation to the extent feasible. These include **Mitigation Measures AIR-1a** (Dust Controls); **AIR-1b** (Criteria Air Pollutant Controls); **AIR-1c** (Diesel Particulate Matter Controls); **AIR-1d** (Super Compliant-VOC Architectural Coatings during Construction); **BIO-1a** (Disturbance of Birds during Nesting Season); **BIO-2** (Pre-Construction Assessments and Protection Measures for Bats); **BIO-3** (Management of Pile Driving in the Water Column for Protection of Fish and Marine Mammals); **BIO-4** (Compensation for Fill of Jurisdictional Waters); **CUL-1a** (Maritime Resources Treatment Plan); **CUL-1b** (Vibration Analysis for Historic Structures); **CUL-2a** (Archaeological Resources and Tribal Cultural Resources – Discovery During Construction); **CUL-2b** (Archaeologically Sensitive Areas – Pre-Construction Measures); **CUL-3** (Human Remains – Discovery During Construction); **GEO-1** (Site-Specific Final Geotechnical Report); **GEO-2** (Inadvertent Discovery of Paleontological Resources During Construction); **HAZ-1a** (Preparation and Approval of Consolidated RAW, LUCs and Associated

[2] *Vineyard Area Citizens for Responsible Growth v. Rancho Cordova* (2007) 40 Cal.4th 412.

Plans); **HAZ-1b** (Compliance with Approved RAW, LUCs and Associated Plans); **HAZ-1c** (Health and Safety Plan); **HAZ-1d** (Hazardous Building Materials); **HYD-1a** (Creek Protection Plan); **NOI-1a** (Construction Days/Hours); **NOI-1b** (Construction Noise Reduction); **NOI-1c** (Extreme Construction Noise Measures); **NOI-1d** (Project-Specific Construction Noise Reduction Measures); **NOI-1e** (Construction Noise Complaints); **NOI-1f** (Physical Improvements or Off-site Accommodations for Substantially Affected Receptors); and **TRANS-4** (Construction Management Plan).

Wastewater

Criterion 4 is analyzed herein for impacts on the capacity of existing wastewater treatment by EBMUD's MWWTP and need for new Project-related wastewater infrastructure. The City would be assigned all responsibilities and jurisdiction regarding stormwater and wastewater facilities on the Project site, and that these would be covered under the City's current NPDES permits discussed in Section 4.9, *Hydrology and Water Quality*, of this Draft EIR.

Analysis of the effects on the capacity of the wastewater collection systems is based on the calculations and modeling presented in **Table 4.16-1** for wastewater demands.

TABLE 4.16-1
PROPOSED PROJECT BUILDOUT SEWER DEMAND

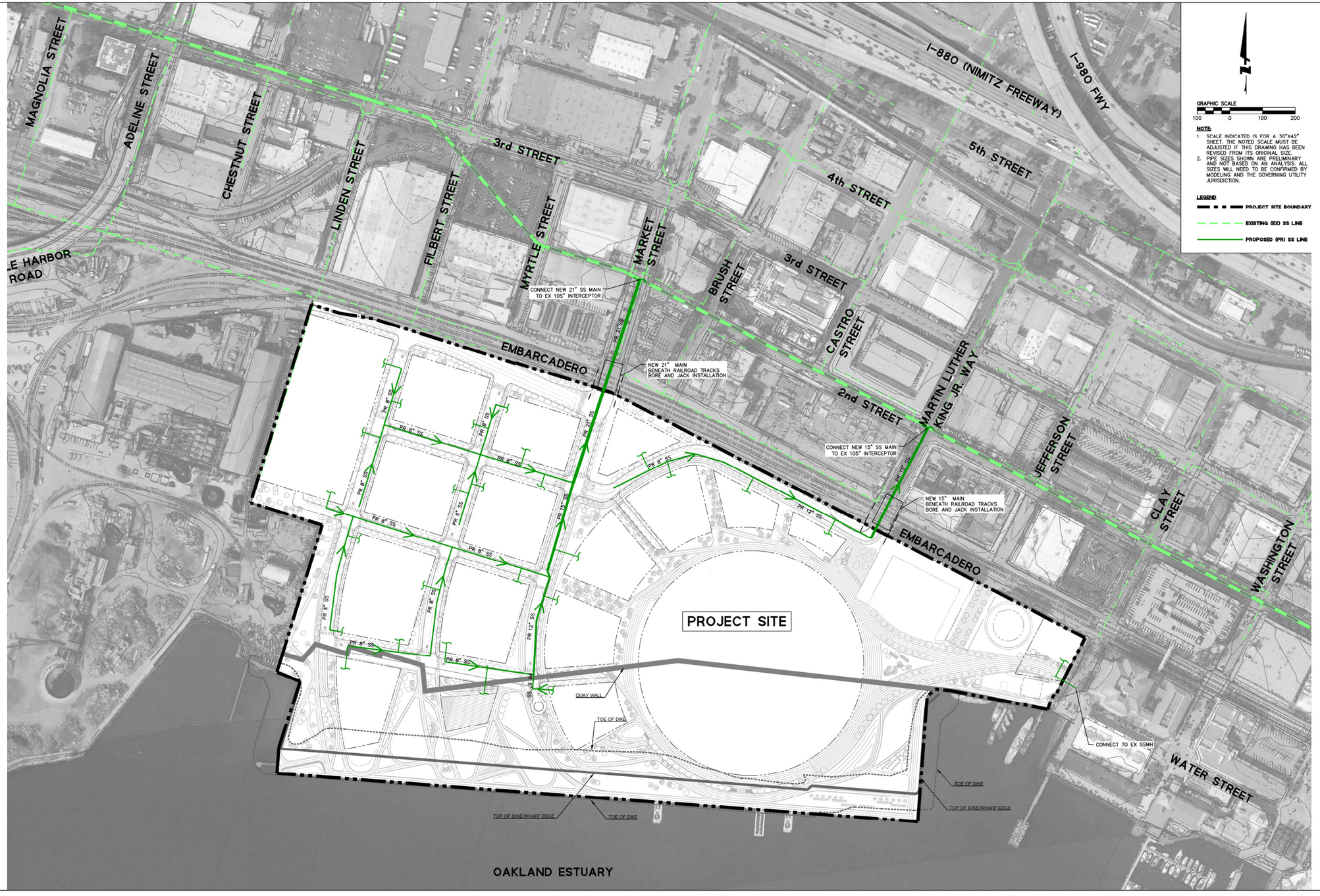
Total Plumbing Demands	Square Footage	Units or Capacity	Sewer Demand/SF	Demand /Unit	Demand (gpd)	Sewer	
						I/I is 0 gallons	Sewer Totals (gpd)
Residential	3,300,000	3,000	N/A	250	750,000	-	750,000
Office	1,500,000	N/A	0.2	N/A	300,000	-	300,000
Retail/Cultural/Civic	270,000	N/A	0.15	N/A	40,500	-	40,500
Hotel	280,000	400	N/A	150	60,000	-	60,000
Hotel Conference Room	50,000	3,333	N/A	5	16,667	-	16,667
Performance Center	50,000	3,500	N/A	5	17,500	-	17,500
Ballpark	1,200,000	35,000	N/A	8	280,000	-	280,000
						Avg Day	**1,464,667**
						Peaking Factor	3.75[a]
						Peak Hour	**5,492,500**

NOTES:

a Based on maximum peak factors in the City of Oakland's design specifications. Overall sewer demand excludes wet weather infiltration to avoid overstated potable water demand for certain uses, per EBMUD's WSA (September 24, 2019).

SOURCE: BKF, May 2019a.

The analysis of impacts on wastewater conveyance is based on the buildout of the proposed Project with replacement of the existing wastewater conveyance system with a completely new impervious conveyance system to prevent I/I and as depicted in **Figure 4.16-4**.



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SOURCE: BKF Engineers, 2020

Oakland Waterfront Ballpark District Project

Figure 4.16-4
Proposed Wastewater Collection System

ESA

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Stormwater

The analysis of impacts on stormwater conveyance is based on buildout of the proposed Project in each of the stormwater collection areas as shown in **Figures 4.16-5a** and **4.16-5b**. Analysis of stormwater runoff collection and capacity is based on the BKF Technical Memorandum (BKF, 2019b) that reports stormwater flows for the 10-year storm event for the two proposed stormwater drainage collection areas depicted in Figure 4.16-5b and Table 4.16-2 as follows:

- Stormwater Drainage Collection Area #1 pre-Project flow of 81.42 cubic feet per second (cfs) and post-Project flow of 74.68 cfs, and
- Stormwater Drainage Collection Area #2 pre-Project flow of 33.96 cfs and post-Project flow of 31.49 cfs

The modeling calculates a reduction of approximately 8-percent in on-site stormwater flows with further reductions expected through on-site landscaping (BKF, 2019b).

In addition to flows during the 10-year storm event upon which the impact analysis is based, **Table 4.16-2** also shows flows based during 15-year, 25-year and 100-year storm events for informational purposes.

TABLE 4.16-2
EXISTING AND PROPOSED STORMWATER COLLECTION AREA RUNOFF RATES BY PHASE

Surface	Area (acre (ac))	10-year (cubic feet per second (cfs))	15-year (cfs)	25-year (cfs)	100-year (cfs)
EXISTING					
Collection Area #1					
Impervious Area	40.03	81.42	88.98	97.99	121.41
Pervious Area	0	0	0	0	0
Total	**40.03**	**81.42**	**88.98**	**97.99**	**121.41**
Collection Area #2					
Impervious Area	16.70	33.96	37.11	40.87	50.64
Pervious Area	**0**	**0**	**0**	**0**	**0**
Total	**16.70**	**33.96**	**37.11**	**40.87**	**50.64**
POST-PROJECT					
Collection Area #1					
Impervious Area	34.49	70.15	76.67	84.43	104.51
Pervious Area	5.54	3.76	4.10	4.52	5.60
Total	**40.03**	**73.91**	**80.78**	**88.95**	**110.21**
Collection Area #2					
Impervious Area	14.66	29.83	32.60	35.90	44.47
Pervious Area	2.03	1.38	1.51	1.66	2.05
Total	**16.70**	**31.20**	**34.10**	**37.55**	**46.53**

SOURCE: BKF, 2019b.

Water Supply

The following information provides the information from EBMUD on the inputs to and results of data analyses of past and projected future water supply and demands based on multiple documents to inform the CEQA analysis on the reasonably likely water supply to meet the Project's and the projected future water needs by EBMUD. EBMUD's demand projections indicate both densification and land use changes in a few existing land use classifications, including commercial and residential land use areas. These changes increase demand for EBMUD water. EBMUD's 2015 UWMP projects water demands over time, accounting for estimated variations in demand usage minus conservation and recycled supply sources, as noted in **Table 4.16-3**.

TABLE 4.16-3
EBMUD MID-CYCLE DEMAND PROJECTIONS

Average Annual Demand (mgd)	2015	2020	2025	2030	2035	2040
Projected Total Demand	232	267	276	290	304	312
Conservation[a]	-33	-39	-44	-51	-57	-62
Non-potable Water[a,b]	-9	-11	-14	-17	-18	-20
Estimated Net Demand	190	217	218	222	229	230

NOTES:
a See Chapters 6 and 7 of the UWMP for more discussion of water recycling and conservation, respectively.
b Non-potable water includes recycled water and raw water projects.

Typically, EBMUD prepares a full demand study every 10 years; the most recent version, the 2040 Demand Study, was completed in 2009. For planning purposes, EBMUD estimates water demands in five-year increments, recognizing that actual increases in demand amounts may occur in shorter time increments. For example, an increase in use by one customer in a particular customer class does not require a strict gallon-for-gallon increase in conservation by other customers in that class. Realistically, the amount of potable demand, conservation, and recycled water use in EBMUD service area will vary somewhat annually. In 2014, EBMUD prepared the Mid-Cycle Demand Assessment (MCDA) in order to assess any significant effects on metered water consumption caused by the 2008-2010 drought and the economic downturn that affected growth in the Bay Area. As part of the MCDA, EBMUD reviewed recently updated city and county general plans for significant changes since the 2040 Demand Study, and held meetings with representatives from the cities of Alameda, Oakland, Richmond and San Ramon. The MCDA concluded that, while the cities and counties might reach their build-out goals later than originally anticipated, they would still reach these goals by 2040. Accordingly, the MCDA validated the 2040 Demand Study, as demands are expected to gradually increase back to 2040 projected levels as development and correlated water consumption return to pre-drought and pre-recession conditions. EBMUD plans to complete another comprehensive demand study in 2019 with a long-term horizon of 2050. As part of the demand study, EBMUD will reach out to each city and county in the service area to ask about projected development and future land-use changes.

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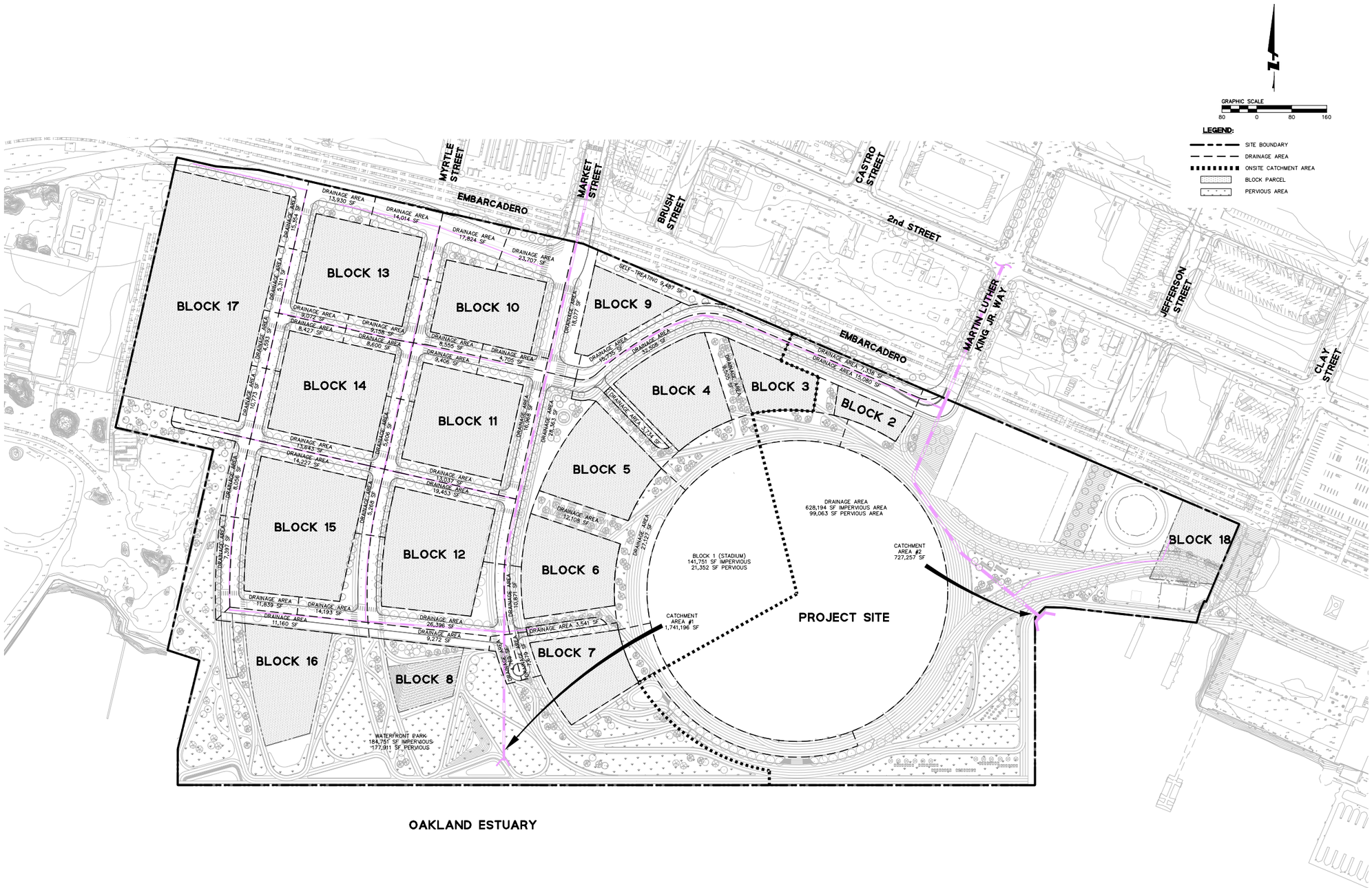
SOURCE: BKF Engineers, 2020

Oakland Waterfront Ballpark District Project

Figure 4.16-5a
Proposed Stormwater Drainage Collection System

ESA



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SOURCE: BKF, 2020

Oakland Waterfront Ballpark District Project

Figure 4.16-5b
Proposed Stormwater Drainage Collection Areas

ESA

The analysis in this section is based on the pre- and post-Project conditions described in the Howard Terminal Civil Narrative – CEQA Support Report prepared for the Project site (BKF, 2020); on the initial WSA prepared for the Project by EBMUD (cited below); and on the information provided previously in the environmental and regulatory settings in this section of the Draft EIR. The following water demand information is taken from the WSA prepared by EBMUD as approved by the EBMUD Board of Directors on May 14, 2019, with an amended WSA approved on September 24, 2019.

EBMUD Water Demand Projections

Since the 1970s, water demand within EBMUD's service area has ranged from 200 to 220 mgd in non-drought years. EBMUD's 2015 UWMP outlines past and current water demand, including historic water use (including metered and unmetered demands) within EBMUD's service area, along with the number of customer accounts. The 2040 water demand forecast of 312 mgd for EBMUD's service area can be reduced to 230 mgd with the successful implementation of water recycling and conservation programs, as outlined in the 2015 UWMP. Current demand is lower than estimated in the MCDA as a result of the recent multi-year drought. This is because the planning level of demand differed from the actual demand in any given year due to water use reductions that occurred during drought years. After droughts, a rebound effect is expected where demand may rise back to the original 2040 Demand Study projected levels. Thus, the MCDA and the 2040 Demand Study still reflect a reasonable expectation for demand in the year 2040, as demands gradually increase back to 2040 projected demand levels as development and water use return to pre-drought and pre-recession conditions. The proposed Project's future development and operations will not change EBMUD's 2040 demand projection.

A summary of EBMUD's demand and supply projections, in five-year increments, for a 25-year planning horizon is provided in **Table 4.16-4** from the 2015 UWMP (Preliminary EBMUD Baseline Supply and Demand Analysis). The available supply and demand shown in Table 4.16-4 were derived from EBMUD's baseline hydrologic model with the following assumptions:

- Customer demand values are based on the MCDA, and planning-level demands account for projected savings from water recycling and conservation programs.
- EBMUD Drought Planning Sequence assumes water years 1976, 1977 and a modified 1978 hydrology.
- Total system storage is depleted by the end of the third year of the drought.
- EBMUD will implement its Drought Management Program (DMP) when necessary.
- The diversions by Amador and Calaveras Counties upstream of Pardee Reservoir will increase over time, eventually reaching the full extent of their senior rights.
- Releases are made to meet the requirements of senior downstream water right holders and fishery releases, as required by the JSA.
- EBMUD allocation of CVP supply is available the first year of a drought and subsequent drought years, according to the U.S. Bureau of Reclamation's Municipal and Industrial Shortage Policy.
- The Bayside Groundwater Project Phase 1 is available and brought online in the third year of a drought.

TABLE 4.16-4
PRELIMINARY EBMUD BASELINE SUPPLY AND DEMAND ANALYSIS

		2015	2020	2025	2030	2035	2040
Supply and Demand Comparison – Normal Year (mgd)							
	Mokelumne System Supply	>190	>217	>218	>222	>229	>230
	Demand Totals	*190*	*217*	*218*	*222*	*229*	*230*
	Difference	*0*	*0*	*0*	*0*	*0*	*0*
Dry Year Results from EBMUDSIM (mgd)							
Single Dry Year or First Year of Multi-Year Drought	Mokelumne System	145	169	170	173	179	179
	CVP Supplies[b]	36	35	35	35	35	35
	Bayside[c]	0	0	0	0	0	0
	Supply Totals	*181*	*204*	*205*	*209*	*214*	*215*
	Planning Level Demand[a]	190	217	218	222	229	230
	Rationing[d]	5%	6%	6%	6%	7%	7%
	Demand Totals	*180*	*203*	*204*	*208*	*213*	*214*
	Need for Water (TAF)[e]	*0*	*0*	*0*	*0*	*0*	*0*
Second Year	Mokelumne System	81	103	103	107	112	113
	CVP Supplies[b]	71	71	71	71	71	71
	Bayside[c]	0	0	0	0	0	0
	Supply Totals	*152*	*174*	*174*	*178*	*183*	*184*
	Planning Level Demand[a]	190	217	218	222	229	230
	Rationing[d]	20%	20%	20%	20%	20%	20%
	Demand Totals	152	174	175	178	184	185
	Need for Water (TAF)[e]	0	0	0	0	0	0
Third Year	Mokelumne System	111	132	132	125	120	104
	CVP Supplies[b]	40	40	40	40	40	40
	Bayside[c]	1	1	1	1	1	1
	Supply Totals	*152*	*174*	*173*	*166*	*162*	*145*
	Planning Level Demand[a]	190	217	218	222	229	230
	Rationing[d]	20%	20%	20%	20%	20%	20%
	Demand Totals	*152*	*174*	*174*	*178*	*183*	*184*
	Need for Water (TAF)[e]	*0*	*0*	*2*	*13*	*24*	*48*

NOTES:

a Planning Level of Demand accounts for projected savings from water recycling and conservation programs as discussed in Chapters 6 and 7, respectively. Customer demand value are based on the Mid Cycle Demand Assessment, October 2014.
b Projected available CVP supplies are taken according to the Drought Management Program Guidelines discussed in Chapter 3.
c For the purposes of this modelling effort, it is assumed that the Bayside Groundwater Project would be brought online in the third year of a drought.
d Rationing reduction goals are determined according to projected system storage levels in the Drought Management Program Guidelines discussed in Chapter 3.
e Need for Water includes unmet customer demand as well as shortages on the Lower Mokelumne River.

Solid Waste

The analysis in this section is based on the pre- and post-Project conditions described in the Chapter 3, *Project Description*; on publicly available published reports; and, on the information provided previously in the environmental and regulatory settings in this section of the Draft EIR. The following **Table 4.16-5** provides the solid waste generation for operations on the Project site used in the impact analysis.

TABLE 4.16-5
PROPOSED PROJECT BUILDOUT SOLID WASTE GENERATION

Use Category	Maximum Numbers of People	Waste Generation (tons[a]/year)
Attendance at 95 games	35,000	4,157
Attendance at 9 Concerts	35,000	394
Attendance at 35 Other Events	7,500	329
Attendance at 100 Corporate/Community Events	2,000	250
Attendance at 16 Waterfront Park Events	4,000	80
Attendance at 100 Performance Venue Events	3,500	438
Office Staff	6,667	1,500
Retail Staff	540	1,004
Hotel Staff	360	909
Residential Staff	94	237
Parking/Other Staff	33	83
Residents	6,000	1,920
	Total	**11,301**

NOTES:

a 2000 pounds = 1 ton

Waste generation rates were derived from Coliseum Area Specific Plan Draft EIR, 2019 (State Clearinghouse Number 2013042066) using the following:

- Sports/Event Venues: 250 lbs./100 visitors
- Retail: 3,715 lbs/employee
- Hotel: 5,050 lbs./employee
- Office/Industrial/Science and Tech./Institutional: 2,000 lbs./1,000 square feet
- Residential: 640 lbs./capita

4.16.4 Impacts of the Project

Wastewater Conveyance and Treatment

Impact UTIL-1: The Project could exceed the capacity of the existing wastewater conveyance or treatment system and would not result in exceedance of EBMUD's wastewater discharge limitations. (Criteria 1 and 4) (*Less than Significant with Mitigation*)

Construction Impacts

Phase 1 and Buildout - Construction

Construction of the Project would require minimal service by the EBMUD MWWTP through the collection of wastewater by on-site portable toilet systems for construction workers and would not use the existing on-site wastewater pipeline system. Collection of wastewater from these

portable toilets would be limited to the number of construction workers and to the number of active construction days on the Project site. As detailed in Chapter 3, *Project Description*, approximately 1,200 to 1,300 construction workers would be employed during peak construction of the Project, with an estimated 1,000 employees during other phases. Compared to the current limited number of employees on the Project site (total of 40 on-site Howard Terminal employees and 58 contractors/drivers, and up to 12 fire personnel), the increase in employees during the construction phases would result in a higher amount of wastewater. However, wastewater would be collected at portable toilets and discharged by the portable toilet provider under permit through EBMUD's resource recovery base permit for non-hazardous waste and trucked to and disposed of at the resource recovery location at the EBMUD MWWTP. Currently, the EBMUD MWWTP has approximately 114 mgd ADWF in excess dry weather treatment capacity (EBMUD, 2015). Therefore, the limited amount of wastewater from Project construction would not exceed the conveyance or treatment capacity of the MWWTP or result in exceedance of discharge limitations, and impacts would be less than significant. No mitigation is required.

Operational Impacts

Phase 1 and Buildout - Operations

The proposed Project would increase population on the Project site, resulting in an increase in wastewater discharge to the EBMUD interceptor and MWWTP systems compared to current conditions. Currently, wastewater generation from the Project site is limited to the employees that work at the Howard Terminal and employees at Fire Station 2; as discussed in Section 4.12, *Population and Housing*, in this chapter, approximately 98 full time or part time employees are currently associated with Howard Terminal tenants and up to 12 fire personnel. The estimated wastewater generation is approximately 7,200 gpd. After buildout of the Project, wastewater generation would be approximately 1.5 mgd average dry weather flow (ADWF) with a peak hour generation of 5.5 mgd during maximum use of the entire Project site (i.e., during events at the stadium). According to EBMUD, there is excess capacity to accept the maximum wastewater flows of 5.5 mgd from the Project in its interceptor and wastewater treatment system (EBMUD, 2019c). Currently, the EBMUD MWWTP has approximately 114 mgd ADWF in excess dry weather treatment capacity (EBMUD, 2015). The Project's maximum wastewater discharge of 5.5 mgd is only about five percent of the excess treatment capacity.

Per **Mitigation Measure UTIL-1** below, the City would require the Project sponsor to submit a final design Sanitary Sewer Impact Analysis to the City for review and approval in accordance with the City of Oakland Sanitary Sewer Design Guidelines. The final design Sanitary Sewer Plans and Analysis requires estimates of pre-project and post-project ADWF from the Project site. The Project sponsor would be required to pay the Sanitary Sewer Impact Fee in accordance with the City's Master Fee Schedule for funding improvements to the sanitary sewer system if the increase in post-Project flows indicates that the net increase in wastewater flow exceeds City-projected increases in wastewater flow in the sanitary sewer system. Furthermore, although the Project would install sealed and impervious wastewater pipelines to convey wastewater and not add to wet weather flows, compliance with the required EBMUD Private Sewer Lateral Ordinance would require the Project to test and meet the requirement of preventing I/I from entering the wastewater pipelines.

Although regulatory and permitting review by the City and EBMUD would ensure that wastewater conveyance system would be designed to not exceed capacities, design of Project wastewater design features has not been completed. Therefore, implementation of the following mitigation measure would ensure that the Project's wastewater design features would meet the City's and EBMUD's design standards to ensure the Project would not result in exceeding the available conveyance and treatment capacity of the MWWTP, and would not result in I/I discharged to the MWWTP during wet weather conditions. Implementation of the mitigation measure would reduce potential impacts on wastewater conveyance and treatment capacities to less than significant.

Mitigation Measure UTIL-1: Preparation and Approval of Final Design Wastewater Conveyance System Plans and Analysis.

Prior to approval of any construction related permits, the Project sponsor shall prepare and submit a Sanitary Sewer Impact Analysis to the City for review and approval in accordance with the City of Oakland Sanitary Sewer Design Guidelines. The Impact Analysis shall include an estimate of pre-project and post-project wastewater flow from the Project site. In the event that the Impact Analysis indicates that the net increase in Project wastewater flow exceeds City-projected increases in wastewater flow in the sanitary sewer system, the Project sponsor shall pay the Sanitary Sewer Impact Fee in accordance with the City's Master Fee Schedule for funding improvements to the sanitary sewer system.

Significance After Mitigation: Less than significant.

Stormwater Conveyance

Impact UTIL-2: The Project could exceed the capacity of the City's stormwater drainage system. (Criterion 2) (*Less than Significant with Mitigation*)

Construction and Operation Impacts

Phase 1 and Buildout – Construction and Operation

Construction of the Project site would include removal of existing impervious surfaces and importation of fill to raise the elevation of the Project site for adaptation to future sea level rise. Installation of a new stormwater drainage system would occur prior to, during, and after importation of fill and final grading. Design and final grading of the Project site would result in capture of all site runoff into the newly installed stormwater drainage systems once the site has been resurfaced and structures begin construction. Construction activities would overlap with operation of the proposed Project. Operation of the Project would include the capture of stormwater runoff in two different stormwater collection areas as shown in Figure 4.16-5b at buildout of the Project that would discharge into two separate discharge locations, one of which (the Martin Luther King Jr. Way on-site pipeline and discharge) would be newly constructed.

During construction, portions of the Project site could remain in the current impervious condition with stormwater runoff from those areas isolated from the stormwater runoff in the active construction zone(s). As a result, runoff from the Project site during the construction phase would

be similar to or reduced compared to volumes under existing conditions because the construction activities would replace the existing stormwater pipelines and prevent runoff from entering the new collection system until it is completed for each of the stormwater collection areas. Further, implementation of the Regional Water Board's NPDES Construction General Permit BMPs and monitoring enforcement by the Regional Water Board and the City would ensure potential impacts from stormwater runoff velocities and volumes from the site during construction activities would result in less-than-significant impacts.

Specific control measures required for stormwater treatment from impervious runoff from the Project site would be located within the streets, parks, and developed areas near the catch basins or inlets and would also provide reduction of stormwater runoff velocities and volume compared with pre-project conditions. The ballpark and surrounding walkways, landscape, and support services would be designed to meet the City's NPDES Permit conditions through either capture and re-use, landscape based treatment, bio-retention or flow through planters, such as stormwater gardens, pursuant to applicable NPDES Permit requirements and ordinances, other water quality regulations, and **Mitigation Measure HYD-1b** (NPDES Stormwater Requirements) as referenced in Impacts HYD-1 and HYD-2 in Section 4.9, *Hydrology and Water Quality*. The grass field of the ballpark is anticipated to meet the standard for a self-treating area for water quality because it would be a permeable surface on grade and would filter sediment and other particulates before stormwater percolates into a collection system under the ballpark that would discharge to the newly constructed on-site stormwater system. The parks and open spaces within the Project site would provide landscape-based treatment areas within, or adjacent to, the footprint of each park and open space. The streets within the Project site would also include landscape-based treatment in the adjacent streetscape and open space areas (see Figure 3-22, *Preliminary Stormwater Treatment Plan*, in Chapter 3, *Project Description*).

Permeable materials may be utilized in some areas to offset stormwater treatment requirements. Although regulatory and permitting review by the City, and **Mitigation Measure HYD-1a** (Creek Protection Plan) and HYD-1b would ensure that the City's NPDES permit would meet water quality criteria for stormwater runoff, including the requirements of Provision C.3, and provide reduction of stormwater runoff velocities and volume, final design of Project stormwater treatment design features to meet the City's Storm Drainage Design Standards and Guidelines has not been completed. Therefore, implementation of Mitigation Measure UTIL-2: Preparation and Approval of Storm Drainage System. would ensure that the Project's stormwater treatment design features would meet the City's Storm Drainage Design Standards and Guidelines and would ensure a reduction in the velocity and volume of stormwater runoff compared to existing conditions entering the City's drainage system would result in a less-than-significant impact with mitigation.

> **Mitigation Measure UTIL-2: Preparation and Approval of Final Design Storm Drainage System Plans.**
>
> Prior to approval of any construction related permits, the Project sponsor shall design and submit Project Storm Drainage System plans to the City for review and approval in accordance with the City of Oakland's Drainage Design Standards and Guidelines. To the

maximum extent practicable, peak stormwater runoff from the Project site shall be reduced by at least 25 percent compared to the pre-Project condition.

Mitigation Measure HYD-1a: Creek Protection Plan (See Section 4.9, *Hydrology and Water Quality*)

Mitigation Measure HYD-1b: NPDES Stormwater Requirements (See Section 4.9, *Hydrology and Water Quality*)

Significance After Mitigation: Less than significant.

Water Supply

Impact UTIL-3: The Project would not increase the demand for treated water and conveyance systems that could exceed existing entitlements or capacities. (Criterion 3) (*Less than Significant*)

Construction Impacts

Phase 1 and Buildout - Construction

Construction activities would involve the use of non-potable water for dust suppression when available using water tank trucks, when required and on an intermittent basis. Potable water for construction workers would be provided by the construction contractors, as needed based on the number of construction workers each day. Because of the limited amount of water required for dust suppression and limited number of construction employees on the site during work hours, the demand for water supply would be approximately the same as existing demand as calculated by EBMUD at 7,200 gpd, and impacts would be less than significant, since construction activities would not increase the demand for treated water and conveyance systems that could exceed existing entitlements or capacities.

Mitigation: None required.

Operational Impacts

Phase 1 Operations

The water demand for the Project is accounted for in EBMUD's water demand projections, as published in EBMUD's 2015 Urban Water Management Plan (UWMP). EBMUD's water demand projections account for anticipated future water demands within EBMUD's service boundaries and for variations in demand-attributed changes in development patterns.

The historical water use in the Project area is approximately 7,200 gpd. Given EBMUD's demands approach for multi-family residential, retail, hotel, office space, and ballpark land-use, system capacity charge studies on similar projects, and various reference data, EBMUD's estimated increase in water demands is 1,029,400 gpd for the Project at buildout, as confirmed in its amended WSA dated September 24, 2019. Further, data from EBMUD indicates that existing pressure in the mains the Project would connect to have sufficient fire flow pressure (BKF, 2019c).

EBMUD has calculated that future demand would increase based on an increase in development and increased water use to pre-recession levels (i.e., recession that began in 2008). Although EBMUD has predicted no deficit of available water supplies to serve customers during normal water years and the first and second year of a multi-year drought, a deficit in water supply is predicted in the third year of a multi-year drought starting in year 2025, as presented in Table 4.16-4. Although there are predicted deficits in water supplies to meet demand in the third year of a multi-year drought, EBMUD will implement its Drought Management Program including water use restrictions within its service area. Furthermore, EBMUD is actively planning and implementing additional sources of water supplies from multiple sources, including development of the Bayside Groundwater Project to bank excess water in wet years and withdraw water in drought years, increasing the production and delivery of recycled water in its service area, use of the Freeport Regional Water Facility Long Term Renewal Contract with the U.S. Bureau of Reclamation, and developing water transfers and contracts with other water agencies, including access to water from Contra Costa Water District's Los Vaqueros Reservoir.

In addition, CALGreen standards, the City of Oakland Green Building Ordinance, Sustainable Green Building Requirements for Private Development and Water Efficient Landscape Requirements found in Chapter 18.02 of the Oakland Municipal Code would further reduce water demand from the proposed Project. Considering all of this information, EBMUD has determined that the additional water demand from the proposed Project would be within the forecasted planning horizon and that water demands would be met with existing and future water rights and entitlements.

The water system for the proposed Project would connect to the existing EBMUD water main in 2nd Street via extension of new Project water pipelines in Market Street and Martin Luther King Jr. Way. An additional new water pipeline would extend from the Project site east to connect with an existing EBMUD water pipeline in Water Street. Additional water lines are proposed within the streets of the proposed Project and around the stadium. All of the above water lines are within or adjacent to the Project site, except for the length of pipelines to connect with the EBMUD mains. The sizes and locations of on-site water pipelines are identified in Figure 4.16-7 and would be subject to review by the City and EBMUD to ensure that design standards have been met. Under development review procedures for individual projects, the City would determine the actual fire flow and water system design requirements for the Project. The Project would connect to multiple water mains to provide redundant water supply flows and maintain constant pressures in the on-site water supply system. According to EBMUD data, water pressures at the connection points are adequate for meeting fire flows. Should the City determine that fire flows are not adequate, then the Project would install on-site booster pumps within the on-site buildings (BKF, 2019c).

The need for any improvements to the existing water supply infrastructure would be determined in consultation with EBMUD upon application for water service, with all costs to be paid by the Project sponsor. However, through EBMUD's water demand planning, including the 2015 UWMP current work being done on its 2050 Water Demand Study and its Capital Improvement Program studies of its infrastructure, the Orinda Water Treatment Plant would continue to be improved to meet current and future treatment capacity needed for the service area. Each individual future development project would be required to pay applicable City development and connection fees, pay its fair share toward necessary water system facilities to support the

proposed development's water infrastructure needs, and submit final project water system design specifications and construction modifications for approval by the Public Works Department. Final approvals by City staff would be necessary prior to delivery of water to the Project site.

As previously discussed in the *Approach to Analysis* in this section, any impacts associated with the installation of water supply infrastructure on-site are addressed with mitigation measures that reduce construction-related impacts to air quality, biological resources, cultural resources, geology, soils, and paleontological resources, hazards and hazardous materials, hydrology and water quality, noise, and transportation to the extent feasible. The impacts are evaluated as part of the construction-related impacts analyzed in the other technical sections of this Draft EIR, listed in the *Approach to Analysis* section, and therefore are not discussed further in this section. Overall, because there is adequate water supply reasonably likely to be available to meet Project water demands during normal, dry and multiple dry years (as confirmed in EBMUD's WSA) and existing water treatment and conveyance infrastructure would have existing capacity to serve the Project with treated water for fire flow pressure, impacts on water supply, treatment, and conveyance would be less than significant. No mitigation is required.

Solid Waste

Impact UTIL-4: Development of the Project could violate applicable federal, State, and local statutes or regulations related to solid waste, but it would not generate solid waste that would exceed the permitted capacity of the landfills serving the area. (Criteria 5 and 6) (*Less than Significant with Mitigation*)

Construction Impacts

Phase 1 and Buildout - Construction

Future development within the Project site will be served by landfills described previously with the capacity to handle solid wastes generated by the demolition, construction and operational phases of the Project. Demolition activities associated with the removal of the existing buildings, paved asphalt areas and utilities would be subject to City of Oakland waste reduction and recycling requirements. Compliance with the City's Recycling Space Allocation Ordinance and the City's Waste Reduction and Recycling Standards, and OMC Chapter 15.34 (which requires implementation of a recycling and waste reduction plan for construction and demolition activities) and Port of Oakland construction waste diversion ordinance would reduce construction debris diverted to landfills. Construction-related impacts associated with on-site crushing and recycling of concrete and asphalt from demolition activities are analyzed in the other technical sections of this Draft EIR, as appropriate (e.g., air quality and noise impacts from trenching for pipeline routes, grading, use of construction equipment) and are not discussed further in this section. Reuse of concrete and asphalt (either on-site or off-site) would substantially reduce the amount of construction waste otherwise needing landfill disposal. The Project would also be required to comply with existing solid waste reduction requirements, including applicable federal, State and local solid waste statutes and regulations. Therefore, construction of the Project would result in less-than-significant impacts. No mitigation is required.

Operational Impacts

Phase 1 and Buildout - Operations

Although solid waste generation rates can vary substantially by specific use, the generation rates provided in Table 4.16-4 can be used to approximate the additional amount of waste that would be generated by operations within the Project site. A total of 40 on-site employees and 58 contractors/ drivers currently work at Howard Terminal, as well as up to 12 fire personnel at Fire Station 2. In addition, ABM parking has leased 2,576 spaces to truck drivers as of May 16, 2019. Each tenant retains its own waste management services. The largest tenant has dumpsters available for waste disposal that are serviced regularly. At buildout of the Project site, the increase in population, new land uses and activities on the site would be expected to substantially increase the total waste stream to a total of 11,301 tons per year total solid waste (including recyclables).

The City and the Port are cooperating to establish a shared regulatory framework under which the City will apply all relevant provisions of the Oakland Municipal Code. **Mitigation Measure UTIL-3: Recycling Collection and Storage Space**, would require that the Project comply with the Recycling Space Allocation Ordinance (OMC Chapter 17.118). The ordinance requires the Project sponsor to submit a plan that includes Project drawings for construction-related permits that show recycling collection and storage areas in compliance with this ordinance, in addition to capacity calculations, and specify the methods by which the development will meet the current diversion of solid waste generated by operation of the proposed Project from landfill disposal in accordance with current City requirements. The required plan would be in implemented and maintained for the duration of the lifetime of the Project, including any future updated requirements by the City. Changes to the plan may be re-submitted to the Environmental Services Division of the Public Works Agency for review and approval. Any incentive programs shall remain fully operational as long as residents and businesses exist at the Project site.

Compliance with existing policies and regulations, including the City of Oakland's CALGreen Building requirements, which would reduce the non-renewable sources of solid waste, minimize the solid waste disposal requirements of the Project to the extent feasible, and would not cause the City to violate other applicable federal, State, and local statutes and regulations related to solid waste. The impact would be less than significant. Furthermore, as discussed in the *Regulatory Setting* in this section, the ACWMA has enough capacity to serve the Project solid waste stream projected until the projected closure of the Altamont Landfill around 2049 (ACWMA, 2017). However, the ACWMA has acquired land in the Altamont Hills area suitable for development of a public multi-purpose waste management facility. Depending upon need, the facility could include various diversion facilities in conjunction with a landfill with sufficient capacity to provide additional reserve disposal capacity. The chosen site contains 98 million cubic yards of landfill capacity, enough to serve the Project for the foreseeable future. Therefore, the Project would not violate applicable federal, State, and local statutes or regulations related to solid waste or generate solid waste that would exceed the permitted capacity of landfills, and impacts would be less than significant.

Mitigation Measure UTIL-3: Recycling Collection and Storage Space.

Prior to the approval of a construction-related permit, the Project sponsor shall comply with the City of Oakland Recycling Space Allocation Ordinance (Chapter 17.118 of the Oakland Planning Code). The Project drawings submitted for construction-related permits shall contain recycling collection and storage areas in compliance with the Ordinance. For residential projects, at least two (2) cubic feet of storage and collection space per residential unit is required, with a minimum of ten (10) cubic feet. For nonresidential projects, at least two (2) cubic feet of storage and collection space per 1,000 square feet of building floor area is required, with a minimum of ten (10) cubic feet.

Significance after Mitigation: Less than Significant.

Maritime Reservation Scenario

As discussed in Chapter 3, *Project Description*, Section 3.5.1, *Major Project Components,* the proposed Project includes a Maritime Reservation Scenario. Under this scenario, the Port of Oakland may retain up to approximately ten acres of the site to accommodate future expansion of a turning basin that is used to turn large vessels accessing berths in Oakland's Inner Harbor. If this option is exercised, that portion of the proposed Project site would not be developed.

The impacts identified above for the proposed Project would be the same or slightly less under this scenario. The impacts and required mitigation measures of the Maritime Reservation Scenario for wastewater would be the same as for the Project because the amount of development and associated wastewater demand would be the same. However, stormwater impacts would be slightly less than the proposed Project because there would be a reduction in the amount of impervious surfaces in the Project site, however the impact conclusions would be the same and no additional analysis is required.

Regarding water supply, while the reconfigured Project site would become smaller, the amount of development (i.e., the ballpark and other land uses) would remain the same, and therefore impacts of the Project relative to water supplies would be the same as those discussed above for the proposed Project because the water demand is based on the amount of development and land uses.

Lastly, regarding solid waste, while the reconfigured Project site would become smaller, the impacts of the Project relative to solid waste would be the as those discussed above for the proposed Project solid waste would be based on the same amount of development and land uses.

Overall, no additional analysis of this impact is required for the Maritime Reservation Option. The impacts from the construction of an expanded turning basin would be analyzed by the Port of Oakland under a separate CEQA document if that project goes forward.

4.16.5 Cumulative Impacts

Impact UTIL-1.CU: The Project, combined with cumulative development in the Project vicinity and citywide, could result in a significant cumulative impact on water supplies; the capacity of EBMUD's wastewater systems or the City's stormwater conveyance capacity; or generation of solid waste. (*Less than Significant with Mitigation*)

Geographic Context

The geographic scope for cumulative impacts on wastewater treatment and conveyance are EBMUD's service area for the MWWTP for treatment and the interceptor in 3rd Street for conveyance capacity. The cumulative context for stormwater conveyance capacity includes the cumulative development within the stormwater drainage collection area that includes the Project site. For water supply, the geographic scope for cumulative impacts on water supply is EBMUD's service area. Cumulative development includes all development considered in the 2015 UWMP, the MCDA, and the 2040 Demand Study, as described previously. The geographic scope for cumulative impacts on solid waste capacity is Alameda County, which is governed by the ACWMA. The impacts from the construction of an expanded turning basin would be analyzed by the Port of Oakland under a separate CEQA document. No additional analysis of this impact is required for the Maritime Reservation Option.

Cumulative Impact and Project Contribution

Wastewater Conveyance and Treatment

The proposed Project, in addition to past, present, and reasonably foreseeable future development within the EBMUD service area, would result in a cumulative increase in wastewater volumes in the interceptors and demands on treatment at the MWWTP. Currently, discharges from WWFs occur in wet weather and these could be exacerbated by future development unless steps are taken to either increase conveyance and treatment capacity or reduce wet weather flows. EBMUD's latest planning for treatment capacity at the MWWTP includes coordination with the communities it serves, implementation and enforcement of source control measures, and implementation of its capital improvement plan on MWWTP and conveyance facilities, as needed for increased demands. EBMUD and the cities it serves have committed through a federal consent decree to NPDES waste discharge permit limitations on wet weather flows requiring all new development and redevelopment to replace old pipelines with new impervious pipelines to prevent I/I from entering EBMUD's interceptors. This strategy, which is mandatory under EBMUD's Private Sewer Lateral Ordinance, and the City's sewer design standards, would reduce I/I over time to prevent discharges from WWFs by 2036. Until such time I/I is reduced significantly, impacts on the MWWTP treatment capacity and EBMUD interceptor system are likely to be exceeded during wet weather flows resulting in a significant cumulative impact.

The proposed Project would replace the existing wastewater conveyance pipelines in the Project site and the laterals which connect to EBMUD's interceptor in 3rd Street with new pipelines impervious to I/I to meet the Private Sewer Lateral Ordinance and prevent I/I. By doing so, the Project would result in a reduction of I/I from the Project site and from the area along the laterals to zero compared to current conditions. In addition, wastewater flows from the Project site would connect and discharge at the 3rd Street interceptor downstream of two of EBMUD's WWFs

located approximately 1.3 and 5 miles to the southeast at the San Antonio Creek WWF and Oakport WWF, respectively. EBMUD's third WWF is located on a separate interceptor and does not combine with flows in the 3rd Street interceptor service area. Thus, the Project discharge to the 3rd Street interceptor would occur well downstream of the two WWFs and would not exacerbate capacity within the interceptor during wet weather, as the excess flows would have already been discharged further upstream in the interceptor system. The proposed Project's contribution to cumulative conditions, which include wet weather overflows, would be less than considerable because the Project would eliminate I/I from the Project site and wastewater would enter EBMUD's interceptor at a location downstream of WWFs. Therefore, the Project would not contribute I/I flows during wet weather and would result in a less-than-considerable contribution to cumulative conditions. However, because the Project wastewater design features have not yet been designed, implementation of Mitigation Measure UTIL-1 (Preparation and Approval of Final Design Wastewater Conveyance System Plans and Analysis) would ensure that the Project's wastewater design features would meet the City's and EBMUD's design standards and would ensure the Project does not exacerbate capacity within the interceptor during wet weather and would result in a less-than-significant impact with mitigation**.**

Stormwater Conveyance

The proposed Project, in addition to past, present, and reasonably foreseeable future development within the Port of Oakland and City's stormwater drainage systems, could result in a potential increase in volume and velocity of flows entering the system. However, because the stormwater drainage in the City's collection area is mostly urbanized and covered in impervious surfaces, stormwater runoff volumes and flows in the stormwater drainage collection system would generally remain the same. Flows from the Project site would be captured on-site and discharged into the two on-site City stormwater mains and into two outfalls located at the most downstream end of the City's stormwater system. Further, implementation of required stormwater quality regulations (e.g., City of Oakland NPDES Stormwater Discharge Permit conditions), Mitigation Measures HYD-1a and HYD-1b, and other ordinances would maintain or reduce flows on new or redevelopment site and prevent trash, sedimentation, and other materials from entering the stormwater conveyance system. Although Mitigation Measures HYD-1a and HYD-1b, and regulatory and permitting review by the City to meet the City's NPDES permit would meet water quality criteria for stormwater runoff, including the requirements of Provision C.3, design of Project stormwater treatment design features, to meet the City's Storm Drainage Design Standards and Guidelines has not been completed. Therefore, as discussed in Impact UTIL-1, implementation of Mitigation Measure UTIL-2 (Preparation and Approval of Final Design Storm Drainage System Plans) would ensure that the Project's stormwater treatment design features would meet the City's Storm Drainage Design Standards and Guidelines and regulatory requirements and would ensure a reduction in the Project's contribution to velocity and volume of stormwater runoff compared to existing conditions entering the City's drainage system would result in a less-than-significant impact with mitigation.

Summary

For the reasons explained above, operation of the Project would not have a cumulatively considerable contribution to a cumulative impact on wastewater treatment or conveyance capacities, or the capacities of existing stormwater conveyance systems.

Water Supply

As described previously in the methodology section, EBMUD's planning and forecasting for future water demand and water supply availability includes existing development, and other planned areas of development within the EBMUD service area, including known projects, such as the proposed Project, and other areas of planned development included in proposed planning documents and approved general plans. The available supply and demand shown previously in Table 4.16-3 were derived from EBMUD's baseline hydrologic model with the following assumptions:

- Customer demand values are based on the MCDA, and planning-level demands account for projected savings from water recycling and conservation programs.
- EBMUD Drought Planning Sequence assumes water years 1976, 1977 and a modified 1978 hydrology.
- Total system storage is depleted by the end of the third year of the drought.
- EBMUD will implement its Drought Management Program (DMP) when necessary.
- The diversions by Amador and Calaveras Counties upstream of Pardee Reservoir will increase over time, eventually reaching the full extent of their senior rights.
- Releases are made to meet the requirements of senior downstream water right holders and fishery releases, as required by the JSA.
- EBMUD allocation of CVP supply is available the first year of a drought and subsequent drought years, according to the U.S. Bureau of Reclamation's Municipal and Industrial Shortage Policy.
- The Bayside Groundwater Project Phase 1 is available and brought online in the third year of a drought.

The 2015 UWMP concluded that EBMUD has, and will have, adequate water supplies to serve existing and projected demand within their service boundary during normal and wet years, but that deficits are projected for multi-year droughts. During multi-year droughts, EBMUD may require significant customer water use reductions and may also need to acquire supplemental supplies to meet customer demand.

The 2015 UWMP includes Drought Management Program Guidelines that generally allows EBMUD to continue serving its customers during dry-year events. EBMUD typically imposes water use restrictions based on the projected storage available at the end of September and, based on recent changes to its Drought Management Program Guidelines, may also implement water use restrictions in response to a State of California mandate, similar to recent past executive order by Governor Edmund Brown. By imposing water use restrictions in the first dry year of potential drought periods, EBMUD attempts to minimize water use restrictions in subsequent years if a drought persists. Throughout dry periods, EBMUD must continue to meet its current and subsequent-year fishery flow release requirements and obligations to downstream agencies.

The 2015 UWMP Drought Management Program Guidelines establish the level of water use restrictions EBMUD may implement under varying water supply conditions. Under the guidelines, water use restrictions may be determined based on either projected end-of-September

Total System Storage (TSS) or water use restriction mandates from the State Water Board. When State-mandated water use restrictions exceed the reductions that would otherwise be called for based on end-of-September TSS, EBMUD's water use reduction requirements may be guided by the applicable State mandates. Under either scenario, while EBMUD strives to keep water use reductions at or below 15 percent, if the drought conditions are severe enough, mandatory water use reductions could exceed 15 percent.

Despite water savings from EBMUD's aggressive conservation and recycling programs and water use restrictions called for in the Drought Management Program Guidelines described previously, supplemental supplies would still be needed in significant, severe, and critical droughts. The proposed Project would be subject to the same drought restrictions that apply to all EBMUD customers. In addition, the proposed Project would be subject to EBMUD's regulations aimed at encouraging efficient water use, such as Section 29 (Water Use Restrictions) and Section 31 (Water Efficiency Requirements) of EBMUD' s Regulations Governing Water Service. Section 29 promotes efficient water use by EBMUD customers and prohibits certain uses of potable water and Section 31 identifies the types of water efficiency requirements (i.e., maximum flow rates for flow control devices) for water service.

Supplemental Water Supply and Demand Management

EBMUD’s goals of meeting projected water needs and increased water reliability rely on supplemental supplies, improving reliability of existing water supply facilities, water conservation and recycled water programs. In 2011, EBMUD completed construction of the Freeport Regional Water Facility and the Bayside Groundwater Project Phase 1 to augment its water supply during drought periods. However, additional supplemental supplies beyond those provided through these facilities will still be needed, as previously described and projected by EBMUD. The 2015 UWMP describes potential supplemental water supply projects that could be implemented to meet projected long-term water demands during multi-year drought periods.

EBMUD' s ability to take delivery of CVP water through the Freeport Regional Water Facility, based on its Long Term Renewal Contract with the U.S. Bureau of Reclamation, provides for up to 133,000 acre feet of CVP supply in a single dry year, not to exceed a total of 165,000 acre feet in three consecutive dry years. Under the Long Term Renewal Contract, the CVP supply is available to EBMUD only in dry years when EBMUD's total stored water supply is forecast to be below a total of 500,000 acre feet on September 30 of each year.

EBMUD is developing the Bayside Groundwater Project in phases to provide a source of supplemental supply in dry years. Construction of the first phase was completed in 2010, allowing EBMUD to inject treated potable water into a deep aquifer in the South East Bay Plain Groundwater Basin for later extraction, treatment, and use during severe droughts. A permit from the Department of Public Health is required before the groundwater can be extracted and treated for municipal use. As described in the 2015 UWMP, EBMUD's drought planning calls for using the Bayside Groundwater Project Phase 1 during the third year of multi-year droughts to provide up to 1 mgd of water to meet customer demands.

Other potential supplemental water projects under consideration in the 2015 UWMP, include Northern California water transfers, Bayside Groundwater Project expansion, expansion of Contra Costa Water District's Los Vaqueros Reservoir (currently underway), and others that could be implemented to meet projected long-term supplemental water demand during multi-year drought periods. EBMUD identifies a broad mix of projects, with the ability to adjust implementation schedules for particular components, which would allow EBMUD to pursue the necessary supplemental supplies while minimizing the risks associated with future uncertainties, such as project implementation challenges and the effects of climate change. The Environmental Impact Report that EBMUD certified for the Water Supply Management Program 2040 examined the impacts of pursuing these supplemental supply projects at a program level. Separate project-level environmental documentation will be prepared, as appropriate, for specific components as they are developed in further detail and implemented in accordance with EBMUD' s water supply needs.

In addition to pursuing supplemental water supply sources, EBMUD also maximizes resources through continuous improvements in the delivery and transmission of available water supplies and investments in ensuring the safety of its existing water supply facilities. These programs, along with emergency interties and planned water recycling and conservation efforts, would ensure a reliable water supply to meet projected demands for current and future EBMUD customers within the current service area.

EBMUD accounted for the water demands of cumulative development within its analysis of water demand and supplies, based on the its service area development, water demand projections, water supply constraints, and future planned water supplies to supply demands during multi-dry year events. Therefore, based on EBMUD's planning projections and conclusions in its WSA, EBMUD has sufficient water supplies that are reasonably likely to be available to meet current and future water demand through 2040 during normal, single dry, and multiple dry years. Therefore, cumulative impacts related to water service would be less than significant and the Project would have a less than considerable contribution.

Summary

Therefore, the Project would not result in a cumulatively considerable contribution to a cumulative impact, and the cumulative impact on water supply would be less than significant.

Solid Waste

The proposed Project, in combination with past, present, and reasonably foreseeable future development in Alameda County, would result in an increase in solid waste generation collected and deposited in the Altamont Landfill. Using projections based on community waste diversion to landfills, the ACWMA has projected a steady rate of disposal that could result in the closure of the Altamont Landfill around 2049 and the Vasco Road Landfill in 2022. Further, the ACWMA has acquired land in the Altamont Hills area suitable for development of a public multi-purpose waste management facility. Depending upon need, the facility could include various diversion facilities in conjunction with a landfill with sufficient capacity to provide additional reserve disposal capacity. The chosen site contains 98 million cubic yards of landfill capacity. The ACWMA determined not to proceed with permitting and development of a landfill and hold the landfill site property as a potential reserve, as needed in the future. Based on the existing landfill

capacities and closure date, along with ACWMA projections, planning, and waste reductions within the service area of the ACWMA, and compliance with City of Oakland waste reduction ordinances, including Mitigation Measure UTIL-3 required for the Project, which ensures compliance with the City of Oakland's the Recycling Space Allocation Ordinance, cumulative impacts on landfill capacity are considered less than significant.

Summary

Therefore, the Project would not result in a cumulatively considerable contribution to a cumulative impact, and the cumulative impact on solid waste capacity would be less than significant.

> **Mitigation Measure UTIL-1: Preparation and Approval of Final Design Wastewater Conveyance System Plans and Analysis.** (see Impact UTIL-1)
>
> **Mitigation Measure UTIL-2: Preparation and Approval of Final Design Storm Drainage System Plans.** (see Impact UTIL-2)
>
> **Mitigation Measure UTIL-3: Recycling Collection and Storage Space.** (see Impact UTIL-4)
>
> **Mitigation Measure HYD-1a: Creek Protection Plan** (See Section 4.9, *Hydrology and Water Quality*)
>
> **Mitigation Measure HYD-1b: NPDES Stormwater Requirements** (See Section 4.9, *Hydrology and Water Quality*)
>
> **Significance after Mitigation:** Less than Significant.

Maritime Reservation Scenario – Cumulative

As analyzed above for the proposed Project, if Maritime Reservation Scenario option is exercised, approximately 10 acres of the Project site would not be developed, although the amount of development (i.e., the ballpark and other land uses) would remain the same. Thus, while the reconfigured Project site would become smaller, the impacts of the Project relative to stormwater and wastewater conveyance, water supply and solid waste would be the same since the development would be the same, and the contributions to any significant cumulative impacts on utility and services system would therefore also be the same as identified for the Project. Therefore, the Maritime Reservation Scenario would not result in a cumulatively considerable contribution to a cumulative impact with the implementation of all mitigation measures identified in this section.

4.16.6 References – Utilities and Service Systems

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