City of Brisbane
Planning Commission

TO: Planning Commission For the Meeting of October 8, 2015

FROM: John Swiecki, Community Development Director

SUBJECT: Brisbane Baylands Public Hearing #2 - Hazards and Hazardous Materials, Geology, Hydrology and Water Quality

Background:

Tonight's public hearing is the second scheduled public hearing for the Brisbane Baylands, and will focus on addressing issues related to hazards and hazardous materials, geology, and hydrology and water quality. Considerations that the Planning Commission might want to take into account when making their recommendations to the City Council pertaining to environmental considerations, land use, and future development of the Baylands will also be discussed. Future hearings will continue to focus on the environmental resource topics included in the Brisbane Baylands EIR

Although this evening's hearing focuses on hazards and hazardous materials, geology, and hydrology and water quality issues, it is important to understand that the EIR and pending planning applications are the subject of each public hearing, including tonight. This approach recognizes that planning and environmental issues are intertwined and that each of the issues being focused on in the public hearings is relevant to the EIR as well as the to the land use planning recommendations the Planning Commission is tasked with making.

Specifically, tonight's public hearing will focus on:

- Providing the public and Commission with a summary of the conclusions and mitigation measures set forth in the Brisbane Baylands Final EIR related to the topics under discussion;
- Identifying major issues that were raised in public and agency comments on the Draft EIR;
- Providing some context regarding the implications of these issues on the larger planning and land use considerations that are before the Planning Commission as it considers its future recommendations to the City Council; and
- Providing the public with the opportunity to provide input regarding the discussion of hazards and hazardous materials, geology, and hydrology and water quality issues in the EIR, and how these issues should be taken into consideration by the Planning Commission as part of its ultimate planning recommendation at the close of the public hearing process.

Discussion:

Hazards and Hazardous Materials

Regulatory Authority

In addressing hazards and hazardous materials issues for the Baylands, it is important to remember that site remediation and Title 27 landfill closure actions are subject to the regulatory authority of the California Department of Toxic Substances Control (DTSC), Regional Water Quality Control Board (RWQCB), and the San Mateo County Health System. While the Brisbane Baylands EIR is required to address impacts associated with hazardous materials onsite, the City does not have the authority to approve or to impose requirements on DTSC or the RWQCB in relation to site remediation or Title 27 landfill closure requirements, activities, or monitoring. Such approvals rest with DTSC and the RWQCB, and will require subsequent CEQA review by those agencies prior to approval of remedial action plans or Title 27 landfill closure plans.

Introduction

The history of landfill and industrial/railyard use of the Baylands has resulted in two primary areas where past hazardous materials releases have occurred: the former landfill and the former railyard. Remediation of contamination within the former railyard and closure of the former landfill pursuant to California Code of Regulations Title 27 represent critical issues when considering development within the Baylands. While physical remediation within the former railyard and Title 27 landfill closure must be completed prior to site development activities, there is a substantial overlap between the process undertaken by DTSC and RWQCB for site remediation/Title 27 landfill closure and the planning and review process being undertaken by the City for development of new land uses within the Baylands.

Some of the key terms used in the management of hazardous materials include:

- A "hazardous material" is any material that, because of its quantity, concentration, or physical, or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous waste, and any material that a handler or an administering agency has a reasonable basis for believing would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment (*California Health and Safety Code*, Section 25501).
- A "hazardous waste" is a waste substance that, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may either cause, or significantly contribute to an increase in mortality or an increase in serious illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed (*California Health and Safety Code*, Section 25117).
- "Remedial action" or "remediation" refers to actions required by federal; state; or local laws, ordinances, or regulations necessary to prevent, minimize, or mitigate damage that may result from the release or threatened release of a hazardous material. These actions include site cleanup, monitoring, testing, and analysis of site conditions, site operation and maintenance, and placing conditions or restrictions on the land use of a site upon completion of remedial actions.

- "Landfill closure" refers to the requirements contained in California Code of Regulations Title 27 for closure and post-closure maintenance plans to ensure that landfill closure and post-closure maintenance and the eventual reuse of disposal sites will conform to state performance standards and substantive requirements.
- "Constituent of concern" or "contaminant of concern" is a hazardous material that has the potential to cause damage to human health or the environment, and create a "risk" to human health and the environment.
- "Exposure pathway" is the course a chemical or pollutant takes from the source to the organism exposed. A "complete" exposure pathway consists of four elements: chemical sources, migration routes (i.e., transport in the environment), an exposure point for contact (i.e., soil, air, or, water); and exposure routes.
- "Exposure route" is the way a chemical or pollutant enters an organism after contact. Four exposure routes are recognized in risk evaluation methods: ingestion, inhalation, dermal (skin and eye), and injection.

There are three primary ways in which a person may come into contact with a hazardous substance: inhalation, ingestion, or direct contact. Some common exposure pathways by which people may be exposed to hazardous substances include the following:

- **Groundwater and Surface Water:** Exposure will occur if people drink contaminated groundwater or surface water, accidentally ingest it while swimming, or if it comes into contact with their skin.
- **Soil, Sediment, Dust:** People will be exposed to hazardous substances in soil, sediment, or dust if they accidentally ingest it (e.g., the contaminants such as lead dust or other heavy metals land on their food), if they breathe it in (especially dust), or if their skin comes into direct contact with the contaminated materials.
- **Air:** When a hazardous substance takes the form of vapors or is absorbed by particulate matter (e.g., benzene, volatile organic compounds, dust, etc.), breathing can expose people to contamination.
- **Food:** Eating food that has been contaminated is another common exposure route.

While a "hazard" includes any situation that has the potential to cause damage to human health or the environment, the "risk" to human health and the environment is determined by the probability of exposure to hazardous materials (which are also referred to as "constituents of concern" or "contaminants of concern" in many investigations of past releases of hazardous materials) and the severity of harm that such exposure would pose. The "risk" to human health and the environment is determined by (1) the probability of exposure to hazardous materials and (2) the severity of harm such exposure would pose.

Existing Conditions

The Baylands contains two primary areas where past hazardous materials releases have occurred: the former landfill and the former railyard. For regulatory purposes, the former railyard was divided into two regulatory units: Operable Unit 1 (OU-1) north of Geneva Avenue and Operable Unit 2 (OU-2) south of Geneva Avenue (see Attachment 1). It was divided into two units under separate regulatory control in recognition of differences in the type of contamination present and the scope of regulatory authority of the agencies involved. DTSC has regulatory authority for remediation of OU-1, while RWQCB has regulatory authority for remediation of OU-2. Regulatory

authority for Title 27 landfill closure rests with RWQCB and the San Mateo County Health System in its role as the "local enforcement agency" for solid waste management.

In general, more is known regarding soils and groundwater contamination affecting OU-1 and OU-2 than is known about the waste materials placed within the former landfill. Because landfill operations ceased in the 1960s, detailed records (such as would now be required to be maintained) of the types of materials placed in the landfill are not available. Nevertheless, a number of waste characterization studies were undertaken over the years on behalf of the landowner. As a result, a general characterization of waste within the landfill is available.

The former railyard portion of the Baylands contains contaminants in the soil and groundwater that require remediation prior to future development. Both DTSC and the RWQCB provide regulatory oversight for this remediation. These agencies will oversee establishment of remediation goals based on the land uses determined by the City to be appropriate, along with development of remediation techniques and requirements in accordance with the Remedial Action Plans (RAPs) that need be prepared, approved by the regulatory agencies, and implemented prior to any development on the Project Site. Although the City's regulatory authority is over the land uses to be permitted with OU-1, OU-2, and the former landfill, the Brisbane Baylands EIR provides a programmatic analysis of site contamination, remediation, and Title 27 landfill closure. Both DTSC and the RWQCB will be required to undertake further CEQA analysis as part of their review and approval of RAPs and Title 27 landfill closure plans.

Operable Unit 1 (OU-1)

DTSC oversees OU-1. A portion of OU-1 is located within San Francisco (Schlage Lock property) north of the Baylands Project Site, and consists of soil and groundwater impacted by VOCs that underlie a portion of OU-1. The San Francisco portion of OU-1 is undergoing remediation separate from the Brisbane (Baylands) portion. Groundwater contamination within the Brisbane portion of OU-1 largely originated from the San Francisco portion of OU-1 (Schlage Lock property).

Soil and groundwater constituents of concern associated with OU-1 contamination within the Baylands include volatile organic compounds (VOCs) (primarily trichloroethylene (TCE), tetrachloroethylene (PCE), cis-1.2-dichloroethylene [cis-DCE], and vinyl chloride [VC]); total petroleum hydrocarbons (TPH) as Bunker C (fuel oil); and metals in the soils including arsenic, lead, cadmium, and mercury and chromium in groundwater. A groundwater treatment system has been in place since 1995 to improve groundwater conditions. Groundwater continues to be monitored through quarterly reports to DTSC.

Operable Unit 2 (OU-2)

Various petroleum hydrocarbons, volatile organic compounds (VOCs), and metals have been released to soil and groundwater at OU-2. In response to known contamination, investigation and sampling activities were commenced as early as March 1984 as a precursor to site remediation. In addition to railyard operations, contamination of soil with petroleum hydrocarbons and heavy metals within OU-2 is thought to have originated from the oil tank farm operations.

The primary contaminants of concern within OU-2 are petroleum hydrocarbons (including Bunker C fuel oil) and heavy metals. A north-south ditch was constructed as a temporary measure to reduce Bunker C contamination of soils and surface water. Monitoring wells are also monitored for VOCs (primarily PCE) on a semi-annual basis.

As a result of past efforts by the landowner to address onsite contamination within OU-2 in relation to existing land uses, a proposed remediation plan was submitted to RWQCB, which provided a conditional Approval Letter dated May 9, 2002. This plan was not implemented. Because proposed development within the Baylands involves changes to existing land use within OU-2, preparation and implementation of a new RAP prior to any ground disturbing activities for proposed Baylands development within OU-2 is required.

Former Landfill

The eastern half of the Baylands north of the lagoon served as a landfill from 1932 to 1967. The landfill operated and closed before modern waste disposal practices were developed and formal regulatory designs for closure were required. As a result, waste disposal design features such as liners, segregation of waste into disposal cells, and leachate collection systems were not provided. Waste containment was consistent with practices at that time providing for wastes to be placed directly on native soils

Following cessation of landfill operations, the landfill was buried with a soil cover approximately 20–30 feet deep to prevent future human contact with contamination. Some methane gas is still being generated by decomposing solid waste within the landfill. Currently, methane gas emissions are collected through wells and piping, and burned periodically in a flare.

Of the estimated 12.5 million cubic yards of solid waste within the landfill, an estimated 73 percent was produced by residential and commercial/industrial activities, with inert fill accounting for approximately 25 percent, and the remaining 2 percent assumed to be liquid waste. Waste tires were also placed in the landfill. The depth of the waste layer is estimated to range from 20 to 35 feet. The San Mateo County Health System oversees the landfill site, along with the RWQCB.

Groundwater/leachate and stormwater quality is being monitored by consultants for the landowner at well and outfall locations and reported to the RWQCB. The Regional Water Quality Control Board also approved a plan in 2007 providing for interim management of landfill leachate for the current (pre-development) site use. Preparation and implementation of closure and post-closure maintenance plans pursuant to California Code of Regulations Title 27 to ensure that landfill closure and post-closure maintenance and the eventual reuse of disposal sites will (1) conform to state performance standards and substantive requirements, (2) prevent exposure of wastes within the landfill to the public and the environment, and (3) manage generation of landfill gas and leachates within the landfill so as to protect public health and the environment.

Potential Impacts

Remediation and Title 27 landfill closure need to be completed prior to commencement of construction within that area. Remediation of OU-1 and OU-2 would be required prior to any future development of these portions of the Project Site. Title 27 landfill closure would require

containment of existing waste and leachates to prevent exposure of the public or the ecosystem, prevention of liquid percolating through to the underlying waste, and prevention/control of landfill gas emissions. While the remediation technologies that will ultimately be approved by DTSC and the RWQCB are required to be designed to (1) effectively remediate contaminated soils and groundwater, (2) protect the environment and health of workers during remediation, and (3) prevent creation of new exposure pathways for contaminated materials to enter the environment and endanger the health of workers and the public.

Hazardous materials such as asbestos-containing materials and lead-based paint are likely to be encountered during demolition of onsite structures. Such hazards would be addressed pursuant to existing regulations for abatement of asbestos-containing materials and lead-based paint hazards.

Following site remediation and landfill closure, construction activities would require the use and transportation of hazardous materials (e.g., fuels, cement products, lubricants, paints, adhesives, and solvents). Accidental releases of hazardous materials during demolition and construction activities could impact soil and/or groundwater quality, which could result in adverse health effects to construction workers, the public, and the environment. However, contractors' compliance with federal, state and local requirements related to use, storage, and disposal of hazardous materials during construction would reduce impacts related to inadvertent release of hazardous materials.

Nearly all proposed uses associated with Baylands development under each development scenario would involve the presence of hazardous materials (or products containing hazardous materials) at varying levels, and this would represent an increase in hazardous materials use compared to existing conditions. It would also increase the number of people who would potentially be exposed to potential health and safety risks associated with routine use.

Recommended Mitigation Measures

Mitigation Measure 4.G-2a sets forth requirements for preparation and implementation of site remediation and Title 27 landfill closure plans under DTSC and RWQCB regulatory authority in relation to the City's planning and CEQA review process. This measure ensures that site remediation and Title 27 landfill closure activities are completed prior to development occurring within areas subject to those activities. This process is described in greater detail below under "Review Process and Responsibilities for Site Remediation and Title 27 Landfill Closure."

Measures to protect workers and the public during construction activities are set forth in Mitigation Measures 4.G-2b (Soil and Groundwater Management Plan) and 4.G-2c (Master Deconstruction and Demolition Plan), which will supplement state and federal OSHA requirements.

Recognizing hazards associated with landfill gas production at the former landfill, Mitigation Measures 4.G-2f, 4.G-2g, and 4.G-2-2h set forth requirements for design of underground vaults and structures, such as those that would be constructed as part of site infrastructure development, to prevent buildup of potentially volatile landfill gas.

Major Issues Addressed in the Final EIR

Adequacy of Waste Characterization in the EIR

A number of comments on the Draft EIR questioned whether the waste characterization of the former landfill discussed in the Draft EIR was adequate, and requested that additional studies be completed. Draft EIR comments also questioned whether characterization of contamination within the former railyard (OU-1, OU-2) was adequate.

The purpose of the studies conducted to characterize waste in the former landfill and used in the EIR, was to (1) address the potential for materials within the landfill to contaminate groundwater or migrate offsite, (2) identify potential pathways of exposure, and (3) ultimately provide a basis for designing the required landfill cap, along with a leachate control system to prevent any increases in leachate that would exceed any regulatory thresholds, and a landfill gas collection and control system. The purpose of the studies conducted to characterize the contaminants within OU-1 and OU-2 was to provide a basis for analysis of human health risks for any future land uses that may be approved by the City, along with preparation or remedial action plans to achieve risk-based remediation goals set by the regulatory agencies.

Based on (1) these recognized purposes, (2) the programmatic nature of the Baylands EIR, (3) CEQA's requirements for subsequent environmental review, and (4) the planning and the remediation review processes set forth in the EIR including the regulatory authority of DTSC and the RWQCB along with requirements for subsequent project-specific CEQA review, City staff and the EIR consultants determined that the existing landfill and site contamination studies prepared to date were adequate to characterize existing conditions for use in the Baylands EIR.

In 2005, CDM was retained by the City to review the adequacy of existing characterization studies of the former landfill and railyard. CDM concluded that these studies had been prepared in accordance with industry standards, and therefore were adequate for use in the Baylands EIR. CDM undertook additional review of these studies (and its 2005 report) in 2013, and again found that these past environmental studies were adequate for use in the Draft EIR.

Dr. G. Fred Lee's report[1], is cited in many comments on the Draft EIR as indicating the existing hazardous materials studies prepared for the Baylands are lacking. On page 22 of that report, Dr. Lee states that the "2005 CDM assessment of the degree of human health and ecological risk associated with the contamination at the Baylands area has been conducted in accord with normal hazardous chemical site investigations used today by consulting firms employed by site owners and regulatory agencies." Dr. Lee's primary criticisms are targeted at the limitations of existing environmental science and technology to identify hazardous chemicals, as well as at concerns with the adequacy of existing regulations.

[1] G. Fred Lee & Associates, Inc., "Draft Report on the Adequacy of the Investigation/Remediation of the Brisbane Baylands UPC Property Contamination Relative to Development of this Property," 19 October 2010.

In response to comments received on the Draft EIR, the City retained Susan Mearns, Ph.D., to once again review the characterization studies cited in the Draft EIR, and all Draft EIR comments critiquing those studies or critiquing the discussion of hazardous materials in the Draft EIR. Dr. Mearns concluded that each of the studies cited in the Draft EIR were prepared consistent with industry standards at the time they were prepared. While these studies were prepared at different times, for different areas of the site, for different purposes, and with different methodologies, she determined that together these studies paint an accurate overall picture of onsite contamination within the Baylands that is adequate for use in the Baylands EIR, recognizing that both the land use planning and site remediation processes are in their early stages.

Review Process and Responsibilities for Site Remediation and Title 27 Landfill Closure

A number of comments on the Draft EIR questioned the review process and responsibilities for site remediation and Title 27 landfill closure.

DTSC has the regulatory authority to oversee remediation of OU-1. The RWQCB has the regulatory authority to oversee remediation of OU-2. Regulatory authority for Title 27 closure of the former landfill rests with the RWQCB and the San Mateo County Health System in its role as the local enforcement agency (LEA) on behalf of CalRecycle (formerly the California Integrated Waste Management Board). Responsibilities of DTSC, RWQCB, and San Mateo County Health System for site remediation and Title 27 landfill closure include:

- Reviewing existing studies to determine whether any additional characterization studies are needed for site remediation or Title 27 landfill closure;
- Setting risk-based cleanup goals for the land uses approved by the City of Brisbane;
- Reviewing and approving plans for site remediation and Title 27 landfill closure;
- Undertaking project-level CEQA review for the remediation of OU-1 and OU-2, as well as the Title 27 closure of the former landfill;
- Overseeing the physical remediation of OU-1 and OU-2, as well as the Title 27 closure of the former landfill;
- Certifying completion of site remediation and Title 27 landfill closure; and
- Undertaking such post-remediation and Title 27 landfill closure activities as are necessary to ensure public health.

While the City of Brisbane maintains land use authority over the Baylands, it does not set remediation standards, nor does it determine specific technologies to be employed or to approve Remedial Action Plans (RAPs) or plans for Title 27 landfill closure. Mitigation Measure 4.G-2a sets forth the relationship between the City's planning review of land use within the Baylands and the regulatory agencies' review process for site remediation and Title 27 landfill closure.

The key determination made in the Draft EIR regarding the relationship between the City's planning review and the regulatory agencies' remediation review processes is that, while sufficient information is available for the City to make a General Plan/Concept Plan land use decision, there is *not* sufficient information to support adoption of a specific plan at this time. Thus, EIR Mitigation

Measure 4.G-2a sets forth the following relationship between the City's planning review and the regulatory agencies' remediation review processes.

- **Identify appropriate lands uses within the Baylands (General Plan/Concept Plan).** Following certification of the Final EIR for proposed Baylands development, the City would determine the appropriate types, intensities, and location of lands uses within the Baylands at the General Plan/Concept Plan level.
- **Complete plans for Title 27 landfill closure and Remedial Action Plans for OU-1 and OU-2.** Based on the land uses determined by the City to be appropriate for the Baylands, Remedial Action Plans and Title 27 landfill closure plans would be prepared and submitted to the RWQCB and DTSC. Review by those regulatory agencies would then be undertaken and the plans revised as needed to the satisfaction of the RWQCB and DTSC, leading to their approval.
- **Prepare and adopt development regulations for the Baylands (Specific Plan).** Only after completion of Title 27 landfill closure and remedial action plans for OU-1 and OU-2, would the City consider adoption of a specific plan for the Baylands. Subsequent environmental documentation under CEQA would be required for adoption of a specific plan by the City.
- **Undertake Title 27 landfill closure and remediation of OU-1 and OU-2.** Following approval of landfill closure and remedial action plans, Title 27 landfill closure and physical remediation of the Baylands would be undertaken. Issuance of grading permits by the City as required for such landfill closure and remediation will likely be needed.
- **Site-specific development plans and development within the Baylands.** Remedial actions required for the former Brisbane Landfill, OU-1 and OU-2 must be completed prior to site development within those areas.

Risk-Based Remediation Standards

A number of Draft EIR comments indicated a misunderstanding of risk-based remediation standards and the use of human health risk assessments by the RWQCB and DTSC to set those standards for OU-1 and OU-2.

Rather than applying a single standard for each potential contaminant to all sites regardless of their intended use, risk-based cleanup goals are site-specific cleanup standards based on site-specific information including the types and concentrations of the contamination present, the future intended use of the property (and resulting human health risks based on this use), the expected receptor populations that may be exposed to the impacted media during project construction and operation, and the anticipated potential ingestion pathways. For example, if the intended future use of a property is an office, risk based cleanup goals would be calculated for construction workers, office workers, and landscape/maintenance workers. If the intended future use of a property is residential (as would occur in the DSP/DSP-V scenarios), risk based cleanup goals would be calculated for construction workers and residents. Because the range of potential ingestion pathways and the time over which exposure to contaminants is greater for residential uses than for commercial/industrial uses, human health risks for residential uses are greater and remediation standards are more stringent than for commercial industrial uses.

Determinations as to the human health risks associated with any particular contaminated site are analyzed in a "human health risk assessment," which evaluates the potential adverse health impacts receptor populations may experience. Human health risk assessments are prepared as part of the remedial action plan preparation process, and are intended to ensure that sufficient analyses have been completed to properly evaluate human health risks based on a property's future intended use, and to develop risk-based cleanup goals to protect the health of future site users. Human health risk assessments are prepared following federal (USEPA) and State (DTSC) guidance, and would be reviewed and approved by the regulatory agency or agencies responsible for remediation (e.g., DTSC, RWQCB).

Liability in Relation to Potential Hazards

Several comments expressed concern that the City would incur liability for approving development within the former landfill or within OU-1 and OU-2.

The property owner holds the environmental liability under the federal Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, 42 U.S.C.A. § 9601 *et seq.* (CERCLA). In addition, the Baylands is subject to the regulatory oversight of DTSC and the RWQCB pursuant to Corrective Action Orders enforceable by State law, and non-compliance is punishable by substantive monetary fines. The City has no liability in relation to hazardous materials remediation and Title 27 landfill closure.

Potential for Cross-Contamination and Cumulative Effects of Multiple Toxins

Several Draft EIR comments requested discussion of "cross-contamination." It appears that these comments were expressing concern that site remediation or pile driving for building foundation piers within the former landfill could result in the spread of contamination. Additional comments requested discussion regarding the cumulative effects of multiple toxins within the Project site.

Any drilling of piers for building foundations within the landfill will be required to comply with the requirements of the RWQCB, and to be conducted within non-permeable casings to avoid permitting the movement of leachates or other contaminants into the groundwater basin. The human health risk assessments that will be prepared for the project site will address risks associated with each of the toxins present within the site, and will account for potential interactions between toxins.

Planning Considerations

As described above, the City's primary role in the remediation of onsite contamination and Title 27 landfill closure is to define the land uses upon for which DTSC and the RWQCB will set risk-based cleanup standards and requirements for Title 27 landfill closure. The residential uses proposed in the DSP/DSP-V scenarios would result in greater potential exposure of people to onsite contaminants than would office or commercial uses where people spend less time on the site and have minimal contact with ground surfaces and result in more stringent cleanup requirements being imposed by regulatory agencies. Similarly, active recreational areas, such as parks and ball

fields would result in greater potential exposure of people to onsite contaminants than would open space areas not designed for human activities.

In the event it was determined through the regulatory process that it would be infeasible to remediate the site to accommodate a particular land use or land uses approved by the City, the land use implications would need to be re-evaluated by the City.

Geology and Seismicity

The majority of the Project Site has been heavily modified over the last 100 years, and the native soils have been covered with rubble, solid waste, and imported fill. Originally part of San Francisco Bay, the area that now makes up the Brisbane Baylands was transformed into its present-day condition through progressive filling of tidal marshlands and the resulting eastern advancement of the shoreline to its present location east of US Highway 101. In general, Bayshore Boulevard traces the early Bay shoreline. In the early 1900s, the Southern Pacific Railroad constructed railroad tracks across the Bay. Following the 1906 San Francisco earthquake, the area west of this rail corridor was filled in, primarily with demolition rubble. Icehouse Hill is the only portion of the Project Site with native soils that overlie bedrock.

Geologic and Seismic Setting

Soils

The soil types range from sandy clay to gravel with sand and range in thickness from 6 to 40 feet. The majority of fill was composed of silty clayey sand and concrete matrix, along with rubble and solid waste within the former landfill. Underlying these fill materials is a layer of very soft to soft, compressible marine clay, known as Bay Mud. The thickness of the Bay Mud layer ranges from zero to about 50 feet, and generally increases in thickness toward the southern portion of the site.

Seismicity

The Project Site, along with the entire San Francisco Bay Area, is dominated seismically by the active San Andreas fault system. Seismic movement is distributed across a complex system of faults, which include the San Andreas, San Gregorio, Hayward, Rogers Creek, and Calaveras faults, which are all considered active or potentially active and capable of producing significant intensities and durations of groundshaking at the site. Historically, the area has been subject to intense seismic activity, and it will likely be subjected to a high degree of groundshaking in the future from earthquakes generated on active faults in the Bay Area.

Scientists have concluded that there is a 66-percent probability of at least one magnitude 6.7 or greater earthquake striking the San Francisco Bay Area before 2036. The intensity of groundshaking at a particular location can vary depending on the overall magnitude of the earthquake, distance from a site to the fault, and type of geologic materials present at the site. The Baylands is underlain by soils that could cause substantial amplification of groundshaking.

Potential for Slope Failure

The Baylands EIR reviewed existing landslide inventory maps, and confirmed that no landslides are mapped within the Project Site. The associated landslide hazard for the former landfill area is nil to very low because surface gradients are very gentle. Along the southwestern boundary of the former railyard area, moderate to locally steep relief is associated with bedrock outcrops in the vicinity of Icehouse Hill, near the Kinder Morgan Energy Tank Farm; however, no landslides are documented. The west side of Icehouse Hill has had some noted rock fall which the City has addressed through placement of concrete k-rail barriers to prevent falling rocks and soil from reaching Bayshore Boulevard.

Ground Settlement

The potential for ground settlement onsite occurs primarily within the former landfill, where ongoing decomposition of waste material causes settlement as well as consolidation of the underlying Bay Mud.

Expansive Soils and Corrosivity

Bay mud soils exhibit "shrink-swell" behavior, in which soils expand when wet, and contract when drying. Because Bay Mud and other clay-rich deposits are located primarily beneath the groundwater level, the have a relatively low corresponding potential for shrink-swell. However, the depth of these deposits in the former railyard area is somewhat poorly constrained, and in one boring near Icehouse Hill, Bay Mud is located above the groundwater table, suggesting a possible higher shrink-swell potential.

Corrosive subsurface soils may exist in places within the Project Site, and are likely along Bayshore Boulevard, where Bay Mud is present beneath the fill. Landfill waste can also have corrosive properties depending on the chemistry of the leachate. Corrosive soils could have a detrimental effect on concrete and metals. Depending on the degree of corrosivity of subsurface soils, concrete and reinforcing steel in concrete structures and bare-metal structures exposed to these soils could deteriorate, eventually leading to structural failures, unless properly designed to resist such corrosion.

Erosion

The Project Site is mainly covered with undocumented fill materials, and is at risk of soil erosion. Icehouse Hill is the only portion of the Project Site with native soils that overlie bedrock. Typically, the soil erosion potential is reduced once the soil is graded and covered with concrete, structures, asphalt, or vegetated with landscaping. The area with an increased risk of soil erosion includes the former landfill area, where steeper slopes, exposed/unvegetated soil, and low-lying areas that direct runoff (e.g., unlined drainage ditches, swales, and channels).

Liquefaction

The sandy alluvial saturated sediment underlying the Young Bay Mud at the Project Site is relatively dense and cohesive and has the potential to resist liquefaction. Saturated artificial fill and younger sandy deposits within and overlying Young Bay Mud, on the other hand, may be susceptible to liquefaction. However, various geotechnical investigations at the Project Site have confirmed the

presence of liquefaction potential in subsurface materials. A 2008 preliminary liquefaction susceptibility analysis of the former railyard area concluded that sandy layers in historic fill and sand within native deposits beneath the area are susceptible to liquefaction and capable of producing up to 8 inches of liquefaction-related settlement.

Potential Impacts

The Project Site would place a substantial number of structures and people in an area expected to experience at least one major earthquake within the next 20 years on a site whose soils would tend to amplify groundshaking in such an earthquake. Geotechnical engineering methods for building design, underground utilities, and roadways (including bridge crossings) in accordance with California Building Code (CBC) requirements have been used throughout the Bay Area in areas where similar challenges of development on thick deposits of Bay Mud and imported fills have been encountered. In addition, impacts from a major seismic event would be further reduced by carrying out the site-specific analyses required by the CBC, and meeting CBC earthquake loading specifications for every structure. This approach of preparing site-specific investigations is standard practice within the geotechnical engineering industry and required by Chapter 18, Section 1803 of the CBC.

Recommended Mitigation Measures

The geotechnical report required by Mitigation Measure 4.E-2a would provide site-specific construction requirements addressing grading activities; fill placement; soil corrosivity/expansion/ erosion; soils compaction; foundation construction; drainage control; and avoidance of settlement, liquefaction, differential settlement, and seismic hazards. The report would also include stability analyses of final design cut and fill slopes, including requirements to avoid slope failure(s). Final grading plans and associated development elements would be required to be designed and constructed in accordance with the specifications of the final design-level geotechnical investigations, and would be reviewed by the City Engineer prior to the issuance of building permits.

In general, deep foundation systems where piles are drilled down into bedrock would be required for most Project Site structures. The site-specific investigations would be used to determine the specific design of the foundation systems required for each structure in its exact proposed location, including specific requirements for construction of deep foundations for structures proposed within the former landfill area. The results of the site-specific investigations would include specifications to ensure that anticipated seismic groundshaking risk hazards are minimized.

Because strong groundshaking could potentially compromise the stability of the final landfill cap that is required by California Code of Regulations, Title 27, pursuant to RWQCB Order 01-041, the final clay cap material over the former landfill must be maintained. If the cap should be breached by any means (differential settlement, construction, plantings, etc.), adequate restorative measures are required to maintain the integrity of the cap. In addition, the landfill owner is required to comply with Title 27 Section 21130(c), which requires the operator to amend emergency response plans in the event that post-closure land use and/or structures on the site change. This requirement is reflected in Mitigation Measure 4.E-2b, which addresses recovery from damage to future structures

and to the landfill itself that may be caused by future earthquakes by requiring a Post-Earthquake Inspection and Corrective Action Plan (Plan) for the site-specific development projects within the former landfill portion of the Project Site to be prepared and implemented in accordance with Title 27 landfill closure requirements as approved by the RWQCB and the San Mateo County Department of Environmental Health prior to issuance of a building permit.

Major Issues Addressed in the Final EIR

Adequacy of the Characterization of Soils and Geologic Conditions within the Baylands

Several comments on the Draft EIR asserted that the EIR did not account for site-specific soils conditions and thereby understated the extent of seismic hazards within the Baylands.

The analysis of seismic and geologic hazards for the Baylands EIR was based on a series of soils and geologic studies prepared to evaluate regional seismicity, as well as conditions within the Baylands Project Site. The EIR provides an overall description of onsite conditions and discloses the hazards that future development projects within the Baylands will face. Because no site-specific development projects are proposed at this time, the EIR cannot evaluate the site-specific soils conditions at any particular development site within the Baylands. Instead, the Brisbane Baylands EIR has represents an early, overall evaluation of proposed Baylands development in relation to soils and geologic hazards intended to direct the planning and design of future site-specific developments. The EIR establishes mitigation requirements future developers must address *before* they undertake detailed site planning, engineering, and design. The EIR establishes mitigation requirements for more detailed site-specific investigations for each future proposed development within the Baylands that will address soils and geologic conditions at the specific location of and surrounding each proposed building within the Baylands.

Planning Considerations

In making land use recommendations for the Baylands, it should be recognized that while soil settlement can be minimized through various engineering techniques, it cannot be completely eliminated. Limited settlement can be more easily be accommodated in open space and low density suburban settings wherein buildings are anchored on bedrock while adjacent ground areas devoted to landscaping or open space can settle and be re-contoured over time as needed. More intense urban development where buildings abut other fixed surfaces like sidewalks is less tolerant of settlement. In these cases, the design solution involves anchoring not only the buildings, but also adjacent sidewalks and roadways to bedrock in order to eliminate differential settlement.

It is further suggested that the Planning Commission recognize the extent of soils and geologic hazards present within the Baylands, as well as the availability of engineering design solutions required by the California Building Code and Title 27 to ensure the safety of future development. While a major earthquake in the Bay Area is likely within the next 20-30 years, and onsite soils within the Baylands could significantly amplify groundshaking during such an earthquake, the requirement for site-specific analyses for each proposed building within the Baylands, combined with construction pursuant to the requirements the California Building Code and Title 27 would ensure the safety of future development.

Hydrology and Water Quality

The Baylands receives stormwater runoff from large upstream areas, resulting in the potential for flooding that could increase in time due to sea level rise. Because of the Project Site's location in relation to the Brisbane Lagoon and San Francisco Bay, water quality considerations are important in reviewing proposed development.

Existing Hydrologic Conditions

Drainage Features

The primary surface water features within the Baylands are the open channel portion of Visitacion Creek that receives flows from Visitacion Valley via a brick arch and timber box system, and Brisbane Lagoon, which receives flows from Guadalupe Creek. Visitacion Creek receives runoff from over 1,000 acres with an outfall just north of the lagoon. Brisbane Lagoon receives runoff from approximately 2,150 acres. Both of these systems drain under US Highway 101 through box culverts into San Francisco Bay.

Water Quality

Surface water quality data has been collected from various locations within the Baylands, including stormwater outfalls, surface seeps along the waterways, and in receiving waters at Brisbane Lagoon since 2002. Four indicator water quality parameters are being monitored, including pH, total suspended solids, specific conductance (a measure of how well water can conduct an electrical current), and oil and grease. Most of the pH values for the stormwater sampling locations are well within normal ranges, while a few samples exceed the maximum contaminant level and United States EPA Parameter Benchmarks. Total suspended solids concentrations generally exceed the U.S. EPA Parameter Benchmark, and the specific conductance data generally exceeds its maximum contaminant level, which would be expected given connectivity and tidal influence of the southern part of San Francisco Bay.

Total suspended solids have been reported to be an issue in the past at the Project Site. An assessment of sediment sources for the lagoon identified the Baylands as a significant source of sediment. Following implementation of stormwater best management practices in 2004, there is a noticeable decreasing trend in total suspended solids. Oil and grease appear to be a more localized water quality issue.

Flooding

Flood Insurance Rate Maps prepared by FEMA for San Mateo County in 2013 show only areas along Visitacion Creek and between Bayshore Boulevard and Industrial Way within the 100-year flood hazard area. An analysis completed for the Brisbane Storm Drainage Master Plan in 2003 identifies additional low-lying areas that may be flooded during a 100-year storm event between Bayshore Boulevard and the railroad tracks, along with lands along Bayshore Boulevard.

Tidal Influences and Sea Level Rise

Both Visitacion Creek and Brisbane Lagoon are directly connected to San Francisco Bay, and are influenced by tidal conditions on the Bay. Historically, flooding in areas affected by tides was evaluated based on the assumption that the probability of an infrequent high tide coinciding with an infrequent storm event would not warrant combining the two events. However, the City's Storm Drainage Master Plan correlated peak discharge and tidal records in the San Francisco Bay and indicated that storm surges, driven by the low atmospheric pressures and strong onshore winds, make significantly higher than average tides likely during extreme wet weather conditions.

Tidal conditions can restrict outflow along Visitacion Creek from the Levinson Overflow Area (the off-channel detention basin located at the northwest corner of Main Street and Bayshore Boulevard), and higher tides can contribute to flooding along Bayshore Boulevard. A potential future rise in sea level could exacerbate this condition. According to maps compiled by BCDC, a projected rise in sea level of 16 inches would not affect the Project Site outside of Brisbane Lagoon. However, a projected sea level rise of 55 inches would inundate areas near the Roundhouse and along Visitacion Creek under current topographic conditions.

Potential Impacts

Water Quality

Onsite development activities would expose surface soils to runoff from initial demolition and site clearing until grading, excavation, and remediation activities are completed and ground cover (landscaping, hardscape, paving, buildings) is established. If not managed properly, runoff from exposed ground would cause erosion and increased sedimentation and pollutants in stormwater. The potential for chemical releases is present at most construction sites given the types of materials used, including fuels, oils, paints, and solvents. Because of contaminants within surface soils within the Baylands, erosion could also result in release of those contaminants. Once released, these substances could be transported to the Bay in stormwater runoff, causing an incremental reduction in water quality.

The construction of some of buildings, utilities, and infrastructure may require excavation to depths that would encounter shallow groundwater, and require temporary pumping to enable construction. Although groundwater is being remediated, the extracted groundwater could contain constituents that, without proper handling procedures, could expose workers to adverse effects or result in water quality degradation. Such dewatering activities would be subject to site-specific NPDES permit requirements that prohibit discharge of contaminated groundwater. In addition, General Construction permit requirements also contain measures to protect water quality.

Following construction, new development would result in greater vehicular use of roadways, which would lead to the accumulation and release of petroleum hydrocarbons, lubricants, sediments, and metals (generated by the wear of automobile parts). Nonpoint source pollutants would be washed by rainwater from rooftops and landscaped areas into onsite and local drainage networks or infiltrate into the ground. Potential nonpoint source pollutants include products used in landscaping (e.g., pesticides, herbicides and fertilizers); oil, grease, and heavy metals from automobiles; and petroleum hydrocarbons from fuels.

Flooding

The capacity of the existing stormwater system is currently exceeded during large storm events in which runoff floods low-lying areas within the Baylands. Under current conditions, substantial improvements would be required to accommodate the 100-year peak storm event within drainage systems and streets with tidal flow and 100 years of estimated sea level rise. While the CPP and CPP-V scenarios would result in a lesser increase in stormwater runoff than would the DSP and DSP-V scenarios, each scenario would still exceed the capacity of the existing system.

According to the conceptual grading plan for the Project Site (see Appendix B of the EIR), development of the Baylands would re-grade the low-lying areas by adding fill materials so that the site would be more resilient to flooding and sea level rise. The mounded elevation of the former landfill has already raised the area out of the projected 55-inch sea level rise flood zone. Site grading would also provide additional soil to be imported to the former railyard area to protect the upland portions of the site from flooding and sea level rise. Lower-lying areas are proposed as part of the site's open space network, along with substantial landscaped areas to provide areas for stormwater filtration under each of the development scenario. In addition, as required by Mitigation Measure 4.H-8, development would require compliance with BCDC's Bay Plan policies related to sea level rise.

Recommended Mitigation Measures

To address water quality issues, the EIR (Mitigation Measures 4.G-2d, 4.H-1a, and 4.H-1c) require that site-specific development projects comply with NPDES General Construction Permit, the statewide General Permit for Discharges of Storm Water Associated with Construction Activities and shall prepare and implement a Stormwater Pollution Prevention Plan. Site-specific development projects will also be required to comply with the City's Regional Stormwater Permit Order No. 2011-0083 Provision C.3. These provisions require implementation of an Erosion and Sediment Control Plan and Final Stormwater Management Plan in accordance with the most recent NPDES C.3 requirements to be reviewed and approved by the City Engineer. These plans would detail best management practices to be employed to mitigate water quality impacts during and after site construction. The Stormwater Management Plan would provide operations and maintenance guidelines to mitigate potential water quality degradation of runoff from all portions of the completed development, and are required to clearly identify the funding sources for required ongoing maintenance.

Mitigation Measure 4.H-1b requires compliance with any site-specific NPDES permit requirements for dewatering activities, as administered by the RWQCB. Discharge of the groundwater generated during dewatering to the sanitary sewer or storm drain system would be permitted with authorization of and required permits from the applicable regulatory agencies, including the Bayshore Sanitary District and/or the RWQCB.

Mitigation Measure 4.H-5 requires implementation of an integrated pest management plan, subject to City review and approval, to set forth a preventative, long-term, low toxicity program to control pests. The plan is required to set forth guidelines for landscape and building maintenance with the emphasis on avoiding the use of pesticides while controlling pests within the Baylands.

Mitigation Measures 4.H-4a, 4.H-4b, and 4.H-4c require systemwide drainage improvements to accommodate increased runoff in accordance with City requirements and correct known existing deficiencies. These measures require that storm drainage collection facilities be sized to convey the peak flow rate from a 25-year storm event entirely within the underground piping system, and that the 100-year peak storm event be accommodated within the piping system and streets such that building finished floor elevations are located a minimum of 1-foot above the 100-year storm event water elevation with tidal flow and 100 years of estimated sea level rise. Mitigation Measure 4.H-4c specifically requires conveyance improvements to existing Visitacion Creek that would extend it further west of Tunnel Road to the Roundhouse area as approved by the City and in accordance with Army Corps of Engineers and California Department of Fish and Wildlife requirements. Improvements to tidal portions of Visitacion Creek would be made in accordance with requirements stipulated in permits from the BCDC. Specific requirements to address BCDC Sea Level Rise Risk Assessment requirements are set forth in Mitigation Measure 4.H-8.

Major Issues Addressed in the Final EIR

Remediation of Groundwater to Drinking Water Standards

Several comments on the Draft EIR stated that remediation of groundwater within the Baylands should be to drinking water standards.

The EIR noted that responsibility for setting groundwater remediation standards lies with the Regional Water Quality Control Board (RWQCB), rather than with the City of Brisbane. Although groundwater underlying the Baylands is not used for drinking water, evidence from past remedial actions by the RWQCB suggests that the RWQCB might require remediation of groundwater contamination to drinking water standards. In response to contamination from the Kinder Morgan Tank Farm the RWQCB established specific groundwater cleanup standards for onsite and offsite groundwater that was impacted by petroleum fuel hydrocarbons released from the tank farm. Although groundwater was neither used nor planned to be used as a source of drinking water, the RWQCB determined that the potential for future groundwater use in the vicinity should not be precluded. As a result, the RWQCB established water quality objectives for Tank Farm groundwater remediation to include drinking water standards, which are the more stringent of United States Environmental Protection Agency and State of California primary maximum contaminant levels.

Protection of Lagoon Water Quality

A number of comments on the Draft EIR expressed concern for water quality within the lagoon, and requested water quality studies of the lagoon, both in regard to current conditions and because the Brisbane Baylands Specific Plan prepared by the applicant for the DSP/DSP-V scenarios indicated that recreational activities would be permitted within the lagoon.

The water quality of the lagoon at the project baseline (2010) baseline is an existing condition. As has been noted previously, the EIR evaluates the environmental impacts of the project. There is no basis in CEQA for the project to mitigate for pre-existing conditions. It is anticipated that site remediation will result in improved surface and groundwater discharges from the site to the lagoon.

As noted in the Final EIR, the combination of mitigation measures aimed at restoring riparian habitat adjacent to the lagoon and prohibitions on construction activities encroaching into the lagoon would prevent expansion of existing recreational uses of the lagoon. Mitigation Measures 4.H-1a, 4.H-1b, 4.H-1c, and 4.H-5 also set forth requirements to prevent sediments and contaminants from entering the lagoon during and after site remediation and construction activities.

Planning Considerations

In considering the impacts of potential flooding within the Baylands, the EIR has identified the need not only to protect future uses from flooding during a 100-year storm event, but also to recognize that the effects of 100 years of projected sea level rise will increase flood hazards within the site. Site grading for the four development scenarios is designed to raise ground levels within the former railyard to provide flood protection, and to facilitate access between the western and eastern portions of the site by providing similar building pad elevations.

In planning the future development of the site, the City has the opportunity to recognize sea level rise uncertainty, and require best available design features for resiliency and integrate buffer areas to help protect development from future rise in the level of the Bay.

Next Steps:

Following this hearing, the Planning Commission will continue its series of public hearings:

October 13, 2015: Traffic and Circulation, Noise

October 22, 2015: Air Quality, Greenhouse Gas Emissions, Energy Resources

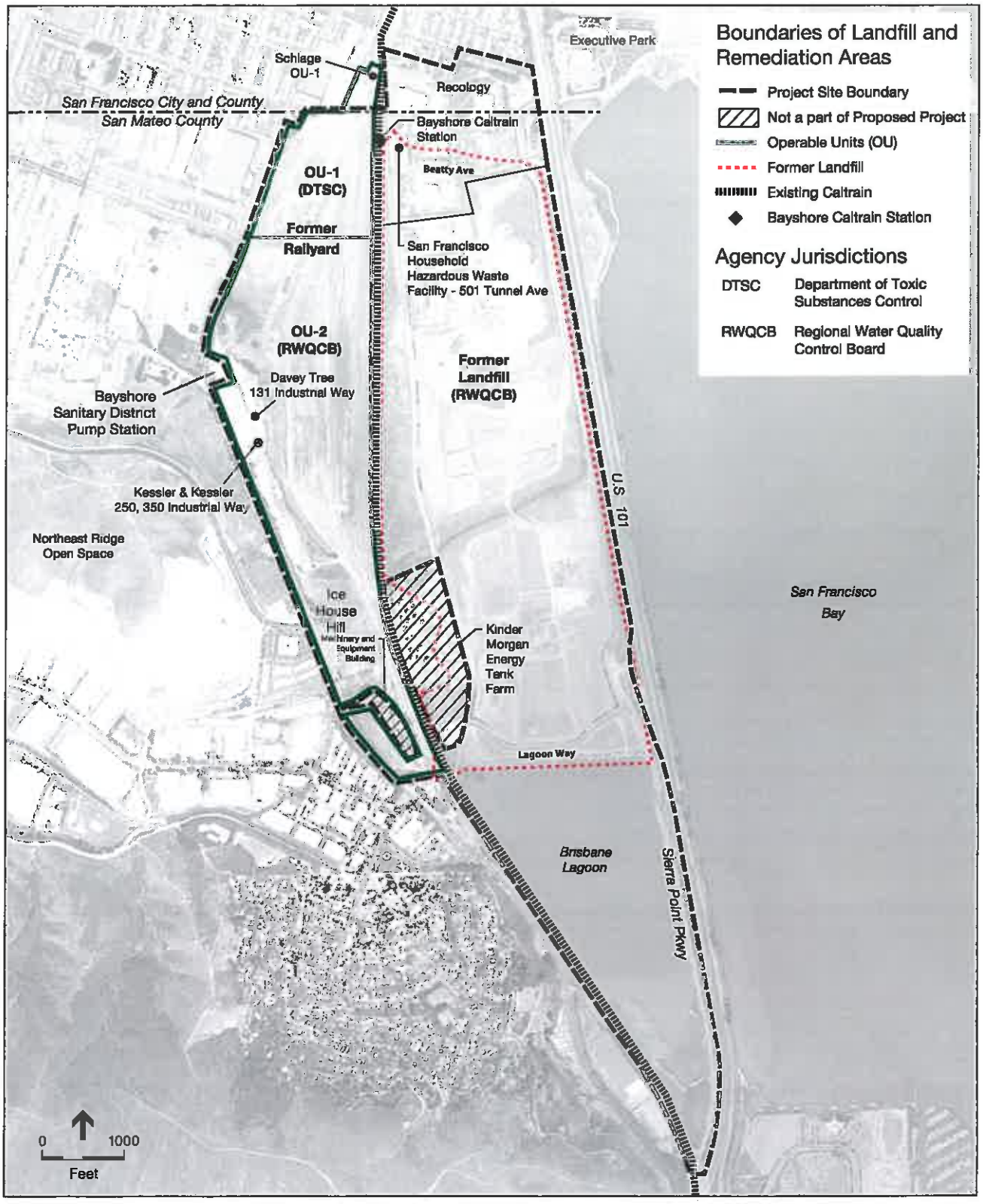
October 29, 2015: Public Services and Facilities, Recreation, Utilities and Service Systems, Water Supply

November 4, 2015: Aesthetics, Land Use and Planning Policy, Population and Housing, Alternatives

November 12, 2015: Applicant and Community Group Presentations

Attachments

1. Remediation Areas
2. Flood Areas
3. Projected Sea Level Rise



SOURCE: BKF 2011

Brisbane Baylands . 206069

Attachment 1: Draft EIR Figure 4.G-1
Former Landfill Site and Former Railyard Site (Remediation Areas)

D. 1. 20.

SOURCE: ESA, 2012; FEMA, 2012

Brisbane Baylands . 206069

Attachment 2: Draft EIR Figure 4.H-3
100-Year Flood Zones

D.1.21

SOURCE: Pacific Institute, 2012

Brisbane Baylands . 206069

Attachment 3: Draft EIR Figure 4.H-4
Projected Sea Level Rise

D.1.22.