Oakland Central Estuary Plan

Infrastructure and Public Facilities

Existing Conditions Report

September 2009

Contents

Infrastructure and Public Facilities

The existing infrastructure and public facilities located in the Central Estuary Plan (CEP) plan area are described in the following sections. This summary is based upon Arup's review of the City's GIS mapping, interviews with the utility providers and reviews of their utility mapping. This summary should not be viewed as a definitive description of the existing infrastructure systems in the plan area, but rather a review of the existing conditions that are likely most pertinent to the planning study.

1 Utilities

The CEP plan area is bound to the east by the I-880 freeway, to the west by the Oakland Estuary, to the north by 16th Avenue and to the south by the East Creek Slough, at City of Oakland. The major existing land use at the plan area is industrial. Existing utilities, including storm drainage, sanitary sewer, water, electricity, gas and telecommunications are available to the plan area.

1.1 Storm Drainage

The storm drainage pattern at the site is generally defined by the topography and the surface drainage features. The majority of the plan area consists of industrial uses with impervious surfaces comprised of roof and pavement. The amount of rainfall that currently infiltrates into the ground is limited, and most rain runoff drains into the surface drainage features.

The City of Oakland is responsible for the operation and maintenance of the storm drainage gravity collection system in the plan area and NPDES compliance.

The City of Oakland's storm drain system was mostly constructed between 1920 and 1950. It consists of 370 miles of pipes, 16,000 structures (mostly inlets, manholes, and catch basins), 40 miles of creeks and 5 pump stations. The City of Oakland's watershed has fifteen main creeks with over thirty tributaries - over 40 miles of open creeks.

Storm drains in the City are not connected into one contiguous system, but rather are distributed throughout the City as small networks of private or public systems. According to the City of Oakland's Storm Drainage Design guidelines, there are three categories of drainage facilities within the City:

- Major facilities are waterways with tributary areas equal or larger than 25 square miles such as the San Leandro Creek and other major waterways that are primarily maintained by the Alameda County Flood Control and Water Conservation District.
- Primary facilities are waterways and drainage facilities with tributary areas between 50 acres and 25 square miles. These facilities mostly consist of creeks and larger improved waterways and drainage facilities. Many of these facilities are owned and maintained by the Alameda County Flood Control and Water Conservation District.
- Secondary facilities are drainage-facilities or waterways with tributary areas less than 50 acres. This includes majority of the City's drainage conduits.

The plan area is wholly located within the Alameda County Flood Control and Water Conservation District (ACFCWCD) Zone 12. The Zone 12 service area covers Oakland and Emeryville. Storm water collected from Oakland and Emeryville is directed to San Francisco Bay through the cities and ACFCWCD storm drainage facilities. Zone 12 is with area of 51,200 acres, 17 miles of natural creek, 4 miles of earth channel, 7 miles of concrete channel, 49 miles of underground pipe, 1 miles of improved channel, and four pump stations.

ACFCWCD works specifically to protect county citizens from flooding, and it is responsible to plan, design and inspect construction of flood control projects; maintain flood control infrastructure; assist in planning new developments to preserve the integrity of the flood control system; and preserve the natural environment through public outreach and enforcement of pollution control regulations governing our waterways.

The topography of the plan area is relatively flat with elevations typically ranging from 12' to 18', with localized higher elevations at roadway embankments and ramps. The lowest elevations within the plan area occur within the East Planning Area, according to the GIS information received from the City of Oakland. The offsite elevations east of I-880 freeway are higher than the elevations within the plan area. The plan area generally falls from east to west, hence storm water runoff generally flows from east to west toward the estuary.

The stretch of Oakland Estuary between Oak Street and High Street in Alameda is the artificial body of water created by a dredging project that extended the Oakland Estuary to San Leandro Bay in 1913; and the man-made Coast Guard Island was also formed during the dredging project. Most of the East Planning Area, south of High Street, is historical tidal marsh, before it was developed into the existing industrial area.

According to the City of Oakland's Storm Drainage Master Plan 2006, the plan area can be subdivided into five storm drainage catchment areas, and two among the five belong to major watersheds. The rest of the catchments are small in area and bounded within the plan area.

The two watersheds discharging through the plan area are 14th Avenue Creek, San Antonio and Damon Slough Watershed and Sausal Creek Watershed. San Antonio Creek is now commonly known as Oakland Estuary or just the Oakland Inner Harbor, which includes Lake Merritt.

14th Avenue Creek, San Antonio and Damon Slough Watershed includes 23rd Avenue Creek. 23rd Avenue Creek is an historical creek that has been filled, dewatered, and replaced with City of Oakland's underground storm drainage system. Its historical course runs along 23rd Avenue, bending within the plan area to run parallel to Livingston Street, before discharging into the estuary.

The Sausal Creek Watershed encompasses 2,656 acres. The headwaters of Sausal Creek arise in the Oakland Hills and the creek flows through the city, discharging into Oakland Estuary. Within the plan area, ACFCWCD's Line E, underground culverts, follow Sausal Creek's historical route along Fruitvale Avenue, and another City's underground pipe runs along 37th Avenue, before discharging into a settling basin next to the estuary.

The East Creek watershed is adjacent to the plan area to the south and is generally located outside of the plan area. The East Creek Watershed consists of various creeks which combine and drain into two flood-control channels, East Creek Slough and Damon Slough. Peralta, Courtland, and Seminary Creeks discharge into East Creek Slough, an engineered channel, adjacent to the southern boundary of the plan area.

There are eight known storm drainage systems that convey run-off from off-site sources into the plan area, as follows (from north to south):

- Embarcadero and 19th Avenue (3' x 2.5' culvert)
- 22nd Avenue (30"-dia.)
- Dennison Street (75"-dia.)
- 23rd Avenue (24"-dia.)
- 29th Avenue (30"-dia.)

- Fruitvale Avenue (13' x 8' culvert, ACFCWCD's Line E)
- 37th Avenue (36"-dia.)
- High Street (21"-dia.)

There are seven major underground storm drains with diameters larger than 24" within the plan area and all of them are City's facilities unless otherwise noted, as follows (with maximum pipe size shown, from north to south):

- Embarcadero and 19th Avenue (3' x 2.5' culvert)
- 22nd Avenue (23rd Avenue Creek historical course) (4.5'-dia.)
- Dennison Street (8' x 7'-9" culvert)
- 23rd Avenue (2'-3" x 2'-6" culvert)
- 29th Avenue (39"-dia.)
- Fruitvale Avenue (13' x 8' culvert, ACFCWCD's Line E)
- 37th Avenue (42"-dia.)

There are eight storm drain outfalls within the plan area that discharge storm drainage for catchments that extend larger than the plan area, as follows (from north to south):

- Embarcadero (3' x 2.5' culvert)
- 22nd Avenue (23rd Avenue Creek historical outfall location)(4.5'-dia.)
- Dennison Street (8' x 7'-9" culvert)
- East 7th Street (24"-dia.)
- 29th Avenue (60"-dia.)
- Fruitvale Avenue (Sausal Creek historical outfall location, ACFCWCD's Line E) (13' x 8' culvert)
- Alameda Avenue (Peralta and Courtland Creeks historical outfall locations) (42"-dia.)
- High Street (Peralta and Courtland Creeks historical outfall locations) (24"-dia.)

The remainder of the plan area is served by small storm drainage catchments within the site limit, in which run off is collected into storm drainage systems and discharges into the estuary. There are approximately eight additional outfalls into the estuary from the small storm drainage catchments, as listed below (from north to south):

- Livingston Street (12"-dia.)
- Diesel Street (12"-dia.)
- Between East 7th Street and 29th Avenue (16"-dia.)
- 29th Avenue (18"-dia.)
- Peterson Street (18"-dia.)
- Derby Avenue (21"-dia.)
- Lancaster Street (18"-dia.)
- Tidewater Avenue (30"-dia.)

The CEP plan area is described as having a moderate to low flooding risk, according to the federal Emergency Management Agency (FEMA) flood zoning classification system. Flood

insurance purchase is not required within the CEP plan area. The majority of the CEP plan area is mapped by the FEMA to be in Flood Zone C, which indicates areas of minimal flooding. A small area between Lancaster Street and Fruitvale Avenue is mapped as Flood Zone B, which indicates an area inundated by 500-year flooding; an area inundated by 100-year flooding with average depths of less than 1 foot or with drainage areas less than 1 square mile; or an area protected by levees from 100-year flooding.

The *City of Oakland's Storm Drain Master Plan* (CH2MHill, 2006) recommends replacing the underground culverts along Fruitvale Avenue and the underground pipes along 37th Avenue with larger size conduits to improve flow capacities. The Master Plan recommends upsizing the Fruitvale Avenue culverts to 8.5' by 8.5" and upsizing the 37th Avenue pipes to 60" diameter. The Master Plan further suggests the improvement of two storm drainage structures at the end of Embarcadero Cove and one at the intersection between Lesser Street and Oakport Street. Inlet grate improvement is also recommended at two locations near the intersection of Lesser and Oakport Streets. The recommended improvements in the master plan have not been funded by the City.

Rehabilitation of the City's aged storm drainage infrastructure is expected to be approximately one third of the City's underground conduits and most, if not all, underground drainage structures. Although there is no absolute guide to life cycle rehabilitation of storm drainage infrastructures, based on the age of the City's infrastructures, staff estimates that the rehabilitation assessment stated earlier is needed to maintain the City's 60 to 90 year old infrastructure.

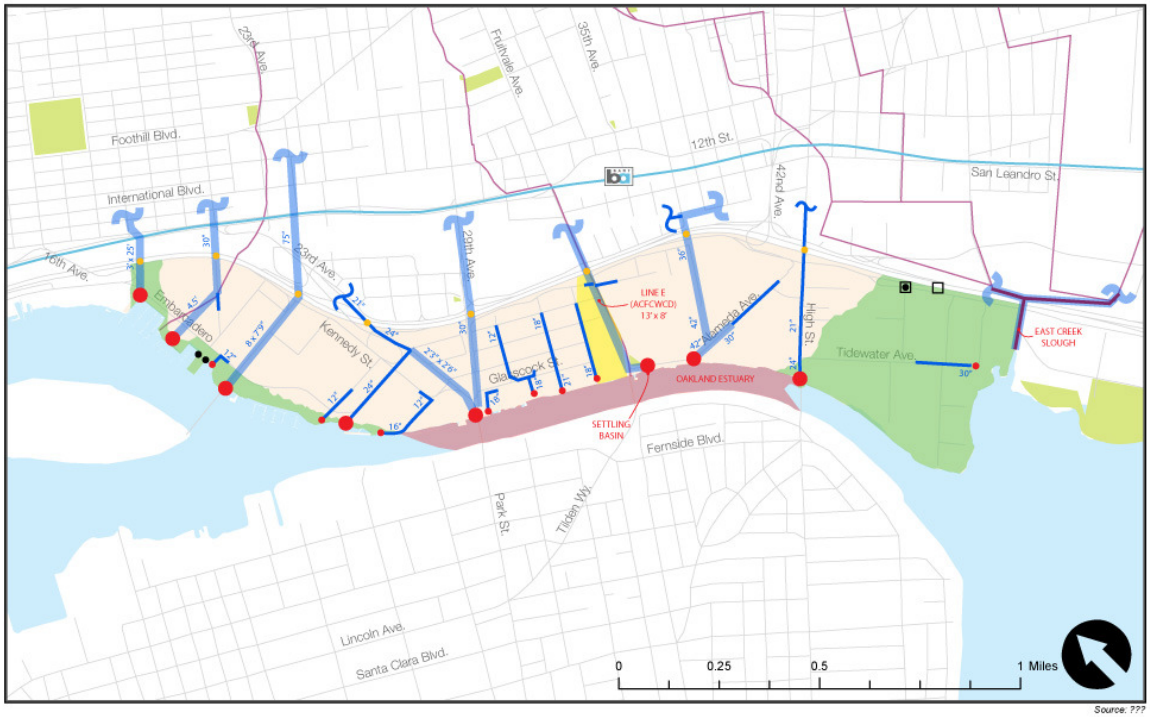
The Tidewater Industrial zone was included in a City of Oakland report titled, *Industrial District Strategy Support* (BKF, October 2008). The report noted that 30 percent of conduits and 100 percent of drainage structures within the Tidewater Industrial zone will need to be replaced as recommended by the Right-of-Way Management Division in the City's Community and Economic Development Agency (CEDA). Upgrades to the capacity of the system will also be required as indicated from the City of Oakland's Storm Drainage Master Plan 2004. Under provision C.3 of the City of Oakland's National Pollutant Discharge Elimination System (NPDES) permit, new development that impacts an area greater than 10,000 SF will need to implement storm water treatment measures, which will likely increase the perviousness of the plan area.

The City's storm water regulations are currently being changed. It is expected that a new NPDES permit called the Municipal Regional Permit (MRP) will be adopted by the Water Board during the summer of 2009. Key new provisions in the MRP may include the following:

- Stringent requirements may require100% trash abatement in 10 to 15 years. Construction of trash screens and installation of in-drain trash units may be required.
- Low Impact Development (LID): All new development will require bio-based storm water treatment. Certain new types development (gas stations, car parking lots, etc.) greater than 5,000 square feet in area, and all new development above 10,000 square feet in area must meet numerical standards for storm water treatment.

The City of Oakland's Storm Drainage GIS database does not include information pertaining to pipe sizes, manholes, and outfalls. Figure 1 presents the CEP plan area's storm drainage system.

Figure 1: Storm Drainage System



Source: ???

Figure 1: Storm Drainage System **April 16, 2009**

- Historical Tidal Marsh
- FEMA Floodzone B
- Artificial Body of Water
- Park
- Major Storm Drain Lines
- Major Storm Drain Lines >24"
- Creek
- Outfall (for Catchment Beyond Project Area)
- Storm Drain Connection Points
- Outfall (for Catchment Solely Within Project Area)
- Poor Condition Drainage Structure
- Non-Compliance Inlet Grate

1.1.1 Clean Water Act

Under Section 303(d) of the 1972 Clean Water Act, states, territories and authorized tribes are required to develop a list of water quality limited segments. These waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for water on the lists and develop action plans, called as Total Maximum Daily Loads (TMDL), to improve water quality.

Two segments of the Oakland Inner Harbor, aka. Oakland Estuary, are listed on the 2006 State Water Resource Control Board's Section 303(d) List of Impaired Waterbodies. Sausal Creek and Damon Slough have been recently added to the 2009 list as impaired waterbodies due to trash. Oakland Inner Harbor (Fruitvale Site, part of SF Bay, Central) segment was listed due to chlordane, chlordane (sediment), DDT, dieldrin, dioxin Compounds (including 2,3,7,8-TCDD), exotic species, furan compounds, mercury , PCBs (Polychlorinated biphenyls), PCBs (dioxin like), PBCs (sediment), sediment toxicity, and selenium. Oakland Inner Harbor (Pacific Dry-dock Yard 1 Site, part of SF Bay, Central) segment was listed due to chlordane, chlordane (sediment), copper (sediment), DDT, dieldrin, dioxin Compounds (including 2,3,7,8-TCDD), exotic species, furan compounds, lead (sediment), mercury, mercury (sediment), PAHs (Polycyclic Aromatic Hydrocarbons)(sediment), PCBs (Polychlorinated biphenyls), PCBs (dioxin like), PBCs (sediment),selenium, and zinc (sediment).

Potential sources of these contaminants include industrial and municipal point sources, resource extraction, atmospheric deposition, natural sources, ballast water, and agriculture (USEPA, 2006). The proposed TMDL completion dates shown on 303(d) list vary from 2006 to 2019 for the two segments of the Inner Oakland Harbor.

1.1.2 Summary of Storm Drainage

The CEP plan area is gently graded with storm water runoff generally flowing from east to west toward the estuary. Storm drainage facilities within the plan area belong to the City of Oakland, except the ACFCWCD's Line E along Fruitvale Avenue. The CEP plan area is described as having a moderate to low flooding risk, according to the federal Emergency Management Agency (FEMA) flood zoning classification system. Flood insurance purchase is not required within the CEP plan area. No evidence has been found to date that suggests that the existing storm drainage facilities within the CEP plan area suffer from capacity issues, with the exception of two major lines, along Fruitvale Avenue and 37th Avenue. The City of Oakland's Storm Drain Masterplan recommends that these facilities are upgraded. Rehabilitation of the City's aged storm drainage infrastructure is expected to be approximately one third of the City's underground conduits and most, if not all, underground drainage structures. Although there is no absolute guide to life cycle rehabilitation of storm drainage infrastructures, based on the age of the City's infrastructures, staff estimates that the rehabilitation assessment stated earlier is needed to maintain the City's 60 to 90 year old infrastructure. Design of new storm drainage sewers should follow the City of Oakland Storm Drain Design Guidelines (http://www.oaklandpw.com/Asset607.aspx).

The plan area consists predominantly of impermeable surfaces such as streets, parking lots, manufacturing yards and roof-tops. New development within the plan area will likely incorporate additional landscaped areas which will decrease the impermeability of the plan area and reduce the total runoff.

Two segments of the Oakland Estuary were already listed as impaired waterbodies in the 2006 303(d) List by the State Water Resources Control Board. Two additional creeks were listed as impaired waterbodies in 2009, i.e. Sausal Creek and Damon Slough. Any new development programs proposed for the project site should not provide any additional

sources of contaminants of concern. Due to the likely legislation requiring stringent trash requirements, structural trash treatment BMP's will likely be required.

1.2 Sanitary Sewer

The sanitary sewer service providers for the plan area are City of Oakland and East Bay Municipal Utility District (EBMUD). The City of Oakland owns and maintains sewer collection systems that discharge into EBMUD interceptor sewers. The sewerage is conveyed by the interceptor sewers to be treated at EBMUD's Main Wastewater Treatment Plant, located near the entrance of the San Francisco-Oakland Bay Bridge.

The plan area is within EBMUD's wastewater service district (known as Special District No.1, SD-1). SD-1 provides wastewater treatment and sewer services for domestic, commercial and industrial wastewater for the cities of Alameda, Albany, Berkeley, Emeryville, Oakland and Piedmont, and for the Stege Sanitary District, which includes El Cerrito, Kensington and parts of Richmond. The interceptor sewers flow to EBMUD's Main Wastewater Treatment Plant (MWWTP) in Oakland, near the San Francisco-Oakland Bay Bridge. The average annual daily dry weather flow collected and treated wastewater flow for SD-1 is approximately 80 million gallons per day (MGD). The peak wet weather flow is approximately 700 MGD.

The MWWTP has adequate primary treatment capacity for a peak flow of 320 MGD, and sufficient secondary treatment capacity for a peak flow of 168 MGD. Storage basins provide plant capacity for a short-term hydraulic peak flow of 415 MGD.

Effluent is disinfected prior to discharge using sodium hypochlorite. Treated effluent discharges into San Francisco Bay, one mile from the East Bay shoreline via a deep-water outfall.

EBMUD has noted that the MWWTP likely has sufficient spare secondary treatment capacity to accommodate the anticipated increased average dry weather flow from new development in the Oakland Estuary plan area. EBMUD does not expect that upgrades to the existing wastewater treatment facilities will be required as a result of increased average dry weather flow or a higher sewerage concentration in wet weather flows resulting from future sewer line rehabilitation.

The treatment plant generates electricity using biogas collected during the solids treatment processes. Approximately 70% of the treatment plant's power requirements are fulfilled by the electricity generated from biogas.

EBMUD has additional wet weather facilities (WWF's) that are designed to treat large volumes of sewage during significant wet weather events, with the intention of mitigating Combined Sewer Outfall (CSO) discharges of raw sewage into San Francisco Bay. During storm events, sewage will be stored at the storage facilities at wet weather facilities (WWF's) for primary settling and/or primary treatment, before either discharging into SF Bay directly through WWF's outfall or pump to MWWTP for further treatment.

The Oakport Wet Weather Facility (WWF) is located at 5597 Oakport Street, Oakland, at the southern boundary of the CEP plan area. The Oakport WWF has primary treatment capacity for a design flow of 158 MGD and a storage capacity of 3 MG. It provides treatment using sedimentation, chlorination, and dechlorination processes. Downstream of the South Interceptor, about 1.3 miles north of the plan area, is the San Antonio Creek WWF, located at 225 5th Avenue, Oakland. San Antonio Creek WWF has a primary treatment capacity for a design flow of 51 MGD and it provides treatment using screening, chlorination, and dechlorination processes.

1.2.1 NPDES Permits

EBMUD has two NPDES Permits related to sewer discharges: one for the Main Wastewater Treatment Plant (MWWTP) and another for the Wet Weather Facilities (WWF's). The City of Oakland has its own NPDES permit.

MWWTP NPDES Permit

The NPDES permit for MWWTP has been effective for the last five years, and will be renewed in the near future. The permit does not restrict the quantity of effluent discharging into San Francisco Bay, rather the permit has restrictions on the water quality constituent limits. A Cease and Desist Order (CDO) was issued by the San Francisco Bay Regional Water Quality Control Board (RWQCB), in conjunction with the NDPES permit, as an enforcement Order that provides EBMUD an identified time period and requires specific actions to comply with NPDES Permit requirements.

WWF NPDES Permit

The NPDES permit for WWF's was renewed in January 2009, with a stipulated order from EPA, and the Cease and Desist Order (CDO) from RWQCB. In January 2009, an agreement between the federal government (EPA and the Department of Justice), the State of California, RWQCB, and EBMUD was implemented, with the intent of improving the quality of wastewater discharges to San Francisco Bay.

EBMUD's three wet weather facilities currently handle excess sewage during storms when flows exceed the capacity of the district's main wastewater treatment plant. The excess flow is largely caused by storm water and groundwater leaking into the region's aging sanitary sewer pipes through improper connections that infiltrate and inflow storm water flow into the sanitary sewer system. Partially treated discharges from EBMUD's three wet weather facilities to the Bay will no longer be allowed under the new permits.

Stipulated order, issued on January 15, 2009, requires EBMUD to begin the studies and improvements needed to eliminate discharges from the wet weather facilities. Under the order, EBMUD is required to carry out programs that will reduce infiltration and inflow (I/I) of storm water and groundwater into sewer pipes during winter storms. Infiltration and inflow results from misconnections, cracks, and other imperfections in system pipes, joints and manholes, and can lead to a 10-fold increase in the volume of wastewater that reaches EBMUD's sewer interceptor pipes and wastewater treatment plant.

To reduce I/I, EBMUD recommends that new development rehabilitates existing sewer lines. Rehabilitation methods may include pipe replacement, lining, or pipe bursting.

City of Oakland's NPDES Permit

The City of Oakland has its own NPDES permit, along with a CDO from the RWQCB, to restrict the quantity of wastewater discharging into EBMUD collection system. The City's NPDES permit is up for renewal in March 16, 2009, and the effective period of the CDO is from 1993 to 2017.

1.2.2 EBMUD Sewer Interceptors

EBMUD's South Foothill Interceptor and South Interceptor are connected to Oakport WWF. The South Foothill Interceptor ends near Oakport WWF and connects to the South Interceptor. The South Interceptor continues to flow north until reaching the Main Wastewater Treatment Plant.

The South Interceptor is partially located within the plan area at the western boundary, next to the I-880 freeway. According to EBMUD, a 3,700 foot section of the South Interceptor between manholes S18 (near 4801 Oakport Street) and S21 (at the intersection East 8th Street / 36th Avenue intersection) will be relocated due to the ongoing seismic retrofit of I-

880. The relocated pipelines will be the same diameters as the existing pipes and will be located to the west of their current alignment to facilitate widening of the freeway.

The South Interceptor consists of reinforced concrete pipes ranging from 36" to 78" in diameter. EBMUD's Pumping Station H is located within the plan area near the intersection between Oakport Street and High Street.

1.2.3 City of Oakland's Sanitary Sewer Collection System

The plan area is served by City of Oakland's sanitary sewer collection system with pipe sizes ranging from 6" to 18". The plan area is located in Sub-basin 61-01, 61-02, 56-01 and a portion of 81-001. City of Oakland operates Tidewater sewer pump station located at the southern end of the site on Tidewater Avenue near High Street. The sanitary sewer effluent collected within the project site is conveyed to the EBMUD's South Interceptor.

A review of the GIS information received from the City of Oakland indicates the following sewer connections cross the eastern plan area boundary (from north to south):

- Embarcadero (12" dia.)
- 22nd Avenue (30" dia.)
- Livingston Street (12" dia.)
- Dennison Street (12" dia.)
- East 8th Street and 26th Avenue (2 – 8" dia.)
- 29th Avenue (12" dia.)
- Derby Avenue (18" dia.)
- Fruitvale Avenue (2 - 30" dia.)
- 33rd Avenue (8" dia.)
- 34th Avenue (18" and 24" dia.)
- 36th Avenue (18" dia.)
- 37th Avenue (8" dia.)
- 38th Avenue (8" dia.)
- High Street (2 – 24" dia.)
- 50th Avenue (21" dia.)
- Oakport Street (21" dia.)

There are no sewers within the plan area that cross the estuary into City of Alameda. The sewage collected within City of Alameda is transmitted by EBMUD's Alameda Interceptor which discharges into the South Interceptor at the intersection between Embarcadero and Alice Street in Oakland.

The sanitary sewer facilities located within the Tidewater Industrial zone are described in the *Industrial District Strategy* report. The report notes that approximately 80% of the total peak wet weather flow is the result of groundwater infiltration and rainfall-dependent inflow (I/I), with the remaining 20 percent consisting of sewage. This is likely the result of aging sewer infrastructure comprised of vitrified clay pipe (VCP). Should redevelopment within the plan area require the installation of new sewer laterals, these will reduce the sewer peak flow rate due to a significant reduction in I/I.

With the exception of the *Industrial District Strategy Support* report, Arup has not received any reports documenting the capacity and/or condition of the sewers within the CEP

planning boundary. The City of Oakland has verbally stated that it is not aware of any existing sewers within the plan area that are currently over capacity.

Future applicants need to provide proposed sewer discharge flow from the site and confirm with the City that it does not exceed the available sub-basin(s) allocation. If exceeded, then mitigation measures will be required. Mitigation measures will entail the following:

- Off-site sewer rehabilitation (infiltration/inflow reduction) project to offset the increase from the proposed project.
- Analysis and improvements of the on-site and local collection system to accommodate the proposed project.

Figure 2 presents the existing sanitary sewer system.

1.2.4 Summary of Sanitary Sewer

The sewerage collected from the plan area by the City's system is discharged into EBMUD's South Interceptor. There is no known existing capacity issue with the City's or EBMUD's sanitary sewer systems.

New development within the plan area will likely require installation of new sanitary sewer pipes, to reduce the flows generated by groundwater infiltration and rainfall-dependent inflow (I/I) during wet weather events. Design of new sanitary sewers should follow the City of Oakland Sanitary Sewer Design Guidelines (http://www.oaklandpw.com/Asset605.aspx).

The MWWTP likely has sufficient spare secondary treatment capacity of 88 MGD to accommodate the anticipated increased average dry weather flow from new development in the Oakland Estuary plan area.

Figure 2: Sanitary Sewer System

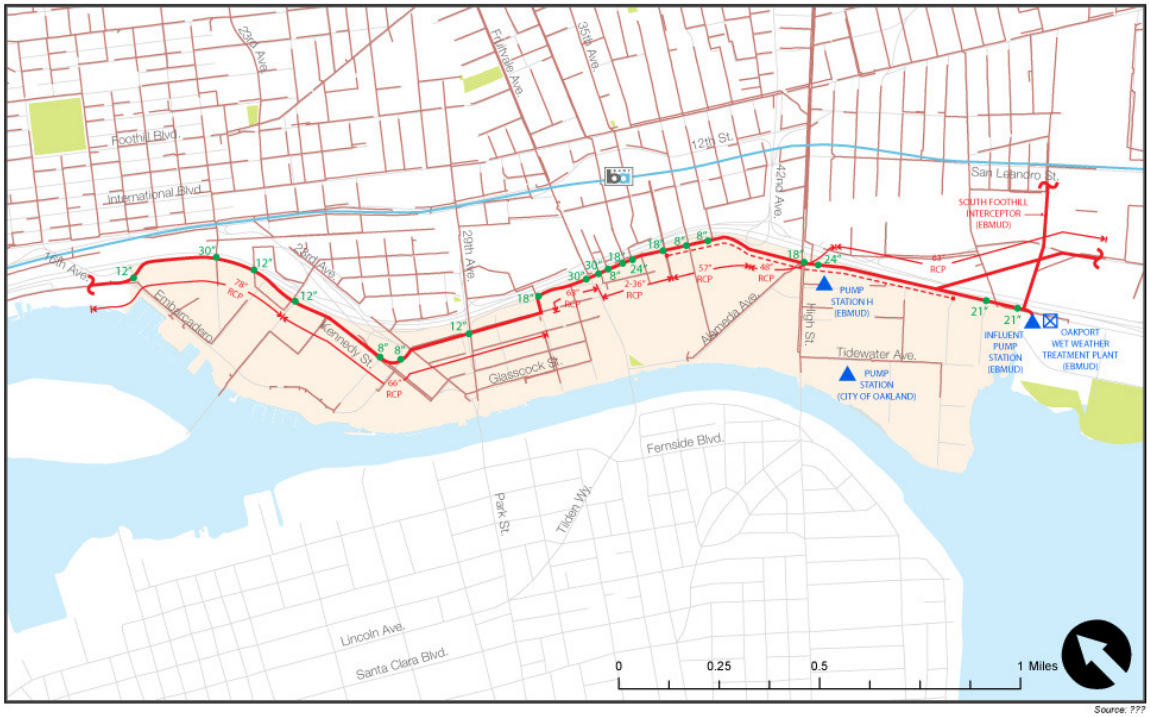


Figure 2: Sanitary Sewer System **April 16, 2009**

- South Interceptor (EBMUD)
- South Interceptor (EBMUD; Being Relocated)
- Sewer
- Pump Station
- Wet Weather Treatment Plant
- Sanitary Sewer Connection Points
- Park

1.3 Water

The water service provider for the plan area is the East Bay Municipal Utility District (EBMUD).

The Mokelumne River is the primary source of water used to serve the 1.3 million people in EBMUD's service area. The Mokelumne River water, fed by runoff from the Sierra Nevada, is collected in Pardee and Camanche Reservoirs, which have capacities of 198,000 and 417,000 Acre-Feet, respectively (measured from the top of the spillway crest elevation). Raw (untreated) water from Pardee and Camanche Reservoirs is transported through the Pardee Tunnel, the Mokelumne Aqueducts, and the Lafayette Aqueducts to the East Bay treatment plants and terminal reservoirs.

The secondary source of water is runoff from local watersheds at the five EBMUD's terminal reservoirs in the East Bay service area: Briones, Chabot, Lafayette, San Pablo, and Upper San Leandro reservoirs, with the following capacities, respectively, 60,500, 10,400, 4,300, 38,600 and 38,000 Acre-Feet. Briones, San Pablo, and Upper San Leandro reservoirs can supply water to EBMUD throughout the year, whereas Chabot and Lafayette reservoirs serve as emergency sources of supply.

Supplemental water supply is provided through storage capacity in groundwater aquifers. EBMUD has a plan to inject potable water from EBMUD's water distribution system through an existing well, located on property adjacent to the Oro Loma Sanitary District Wastewater Treatment Plant at 2600 Grant Avenue in San Lorenzo, into the South East Bay Plain Basin (SEBPB) in wet years for later recovery through extraction and use during a drought. The proposed annual injection rate into the existing well is 1,120 acre-feet and the maximum annual extraction capacity is 1,120 acre-feet with a short-term extraction rate of up to 2,240 acre-feet operated for a portion of drought year. The SEBPB is comprised of four main aquifer systems, including Newark, Centerville, Fremont, and Deep Aquifers.

Water generally flows from the north across I-880 freeway into the Oakland Estuary plan area. EBMUD has stated that the water system within the plan area is within Central pressure zone, which extends from Richmond to San Leandro, at approximate the same elevation. The water distribution within the pressure zone is served by gravity. The pressure zone has residual water pressure from 40 to 70 psi.

The plan area is serviced by 6” to 12” water mains. There is no water storage tank within the plan area. The closet water storage facility to the plan area is the Central Reservoir, located at 23rd Avenue just west of I-580, in Oakland.

Based on information from the EBMUD basemaps, the existing water system crosses into the plan area at the following 11 water connection points (starting from north to south):

- Embarcadero (12” dia.)
- 19th Avenue (8” dia.)
- Livingston Street (8” dia.)
- Dennison Street (12” dia.)
- 23rd Avenue (24” & 12” dia.)
- 29th Avenue (20” dia.)
- Derby Avenue (8” dia.)
- Fruitvale Avenue (12” dia.)
- 37th Avenue (8” dia.)

- High Street (12" dia.)
- Oakport Street (12" dia.)

Four water mains within the plan area cross the estuary into the City of Alameda, at the locations noted below (starting from north to south):

- Kennedy Street (24" dia.)
- 29th Avenue (16" dia.)
- Derby Avenue (20" dia.)
- High Street (12" dia.)

Two major water transmission mains (20" dia. and 24" dia.) that supply water to the City of Alameda are located within the CEP plan area. The water transmission mains do not have any water service connections within the plan area, but they are connected to other water distribution mains.

The 20" water transmission main runs along 29th Avenue, entering the plan area from the northeast by crossing the I-880 Freeway through the 29th Avenue Overpass. The 20" water main continues to run along 29th Avenue, inter-connects with the 24" water main at the intersection of 29th Avenue and Ford Street, reduces to a 16" diameter pipe and crosses the Tidal Canal via the Park Street Bridge.

The 24" diameter transmission main runs along 23rd Avenue, entering the plan area from the north by crossing the I-880 freeway, and branches into two 24" water mains at the intersection between 23rd Avenue and Ford Street.

One branch of the 24" diameter transmission main runs along Ford Street, Derby Avenue, crosses the Tidal Canal as a 20" pipe and continues along Broadway in Alameda at 24" diameter. The other branch of the 24" diameter transmission main runs toward the west along Kennedy Street, crosses the Tidal Canal into Alameda, runs east along Blanding Avenue reducing to 20" diameter, and connects with the 20" running along Park Street, to form a loop.

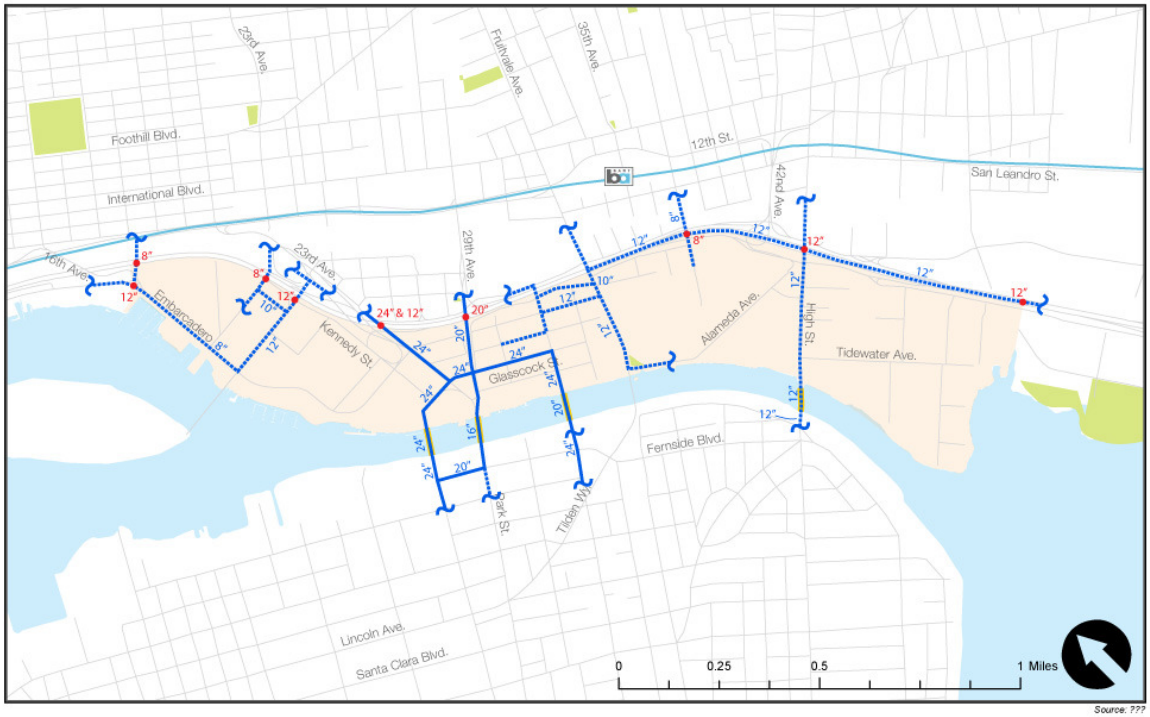
According to EBMUD, the City's CIP does not include any additional water infrastructure projects. Annual system maintenance is performed in streets that are scheduled for maintenance under the City of Oakland's street rehabilitation program. Approximately two percent of the City's streets are scheduled for maintenance annually.

Fire water for the fire hydrants within the plan area is supplied by potable water mains. Figure 3 presents the water system in the vicinity of the CEP plan area.

1.3.1 Summary of Water

The plan area is served by EBMUD's water distribution network. EBMUD has confirmed that the area is adequately served by the existing 6" – 12" diameter distribution facilities and that no know capacity issues exist. Two water transmission mains convey water to the City of Alameda through the plan area. New development within the plan area may increase water demand, which may necessitate a Water Supply Assessment to be performed, and may require upsizing of water distribution lines.

Figure 3: **Water System**



Source: ???

Figure 3: Water System **April 16, 2009**

- Major Water Transmission Main
- Water Main Crossing Estuary
- Water Connection Points
- Water Main <16"
- Park

1.4 Recycled Water

The plan area is wholly located within Water Reuse Zone A, as defined by EBMUD's Urban Water Management Plan 2005. EBMUD has no recycled water systems south of I-880 at this time. The nearest recycled water distribution pipeline is located at the intersection of 5th Avenue and 7th Street, north of the I-880 freeway, near Laney College. It conveys recycled water that is treated at EBMUD Main Wastewater Treatment Plant (MWWTP).

According to EBMUD, the plan area is a potential site to be supplied with recycled water treated by from the MWWTP. Tertiary treatment facilities at MWWTP can produce up to 2.5 MGD of recycled water that meets California Department of Health Services (CDHS) standards for "disinfected tertiary recycled water" as defined in Title 22. There would likely be sufficient available supply of recycled water from MWWTP to service the plan area given the existing recycled water usage of 0.7 MGD.

The East Bayshore Recycled Water Project (EBRWP) is a multi-phased project that distributes the recycled water from the MWWTP to customers in parts of Alameda, Albany, Berkeley, Emeryville, and Oakland. Two pump stations were constructed to transmit recycled water through transmission and distribution pipelines. Seven million gallons of recycled water storage is available at the MWWTP. Possible end uses for the recycled water include landscape irrigation, industrial uses, toilet flushing in office buildings, and possible wetlands restoration.

EBMUD plans to install a new recycled water facility near the Embarcadero area within the next five to ten years as part of the East Bayshore Recycled Water Project. There is no specific design project, or proposed alignment at this time.

The closest existing projects that are known to utilize recycled water are the Chuck Corica Golf Complex (formerly Alameda Golf Complex) and Harbor Bay Parkway in the City of Alameda, which both use recycled water for irrigation. The recycled water supply source is EBMUD's San Leandro Recycled Water Facility (SLRWF), which creates recycled water from the City of San Leandro's Water Pollution Control Plant. The recycled water distribution systems at City of Alameda do not have distribution capacity to provide future supply to the north, including the plan area.

During the calendar year 2004, EBMUD provided 8.5 MGD of secondary and tertiary treated recycled water for non-residential landscape irrigation and industrial uses including reuse at its Main Wastewater Treatment Plant. About 5.9 MGD of the recycled water, including secondary and tertiary treated water, is produced by the Main Wastewater Treatment Plant. In the 1993 updated Water Supply Management Program (WSMP), EBMUD set a goal to recycle 14 MGD by 2020.

1.4.1 Summary of Recycled Water

There is no existing recycled water service at the plan area. A new recycled water distribution system would be required to transmit recycled water treated by MWWTP to the plan area. A connection to the existing EBMUD recycled water distribution system would likely be made at. the nearest recycled water distribution pipeline, located at the intersection of 5th Avenue and 7th Street, north of the I-880 freeway, near Laney College.

1.5 Gas

The gas service provider for the plan area is Pacific Gas & Electric (PG&E). There are two major PG&E gas transmission lines running in the plan area.

The first gas transmission line, PG&E Gas Line 153, in 24"-diameter, enters the site from the north at the intersection of Embarcadero and 19th Avenue. It continues to run along

Embarcadero, Dennison Street, King Street, Frederick Street, Kennedy Street, East 7th Street, 29th Avenue, Chapman Street, Fruitvale Avenue, and Alameda Avenue. The line exits the plan area to the east at Alameda Avenue by crossing the I-880 freeway. It continues to run along Coliseum Way, turns west at 50th Avenue and re-enters the plan area from the east at the intersection of Oakport Street and 50th Avenue by crossing the I-880 freeway. It runs along Oakport Street for a short distance before exiting the plan area to the south.

The second gas transmission line, PG&E Gas Line 105N, in 24" to 30"-diameter, enters the site from the north at the same location as the first gas transmission main, but it takes a slight different route within the plan area. It runs along Embarcadero, Livingston Street, Cotton Street, Kennedy Street, East 7th Street and Fruitvale Avenue. It exits the plan area to the east at Fruitvale Avenue by crossing I-880 Freeway.

The gas distribution mains enter the project site from the east crossing under I-880 freeway at the following locations (from north to south):

- Dennison Street
- 23rd Avenue (6"-dia.)
- 29th Avenue (4" or 6"-dia.)
- Fruitvale Avenue (8"-dia.)
- 36th Avenue
- High Street (12"-dia.)

There are three gas distribution mains crossing the Oakland Estuary to City of Alameda at Dennison Street (4"-dia.), 29th Avenue (12"-dia.), and High Street (8"-dia.).

PG&E Oakland Service Center is located within the plan area at 4801 Oakport Street, near Lesser Street. PG&E Oakland Coliseum Substation is located east of the plan area near the intersection of 50th Avenue and I-880. PG&E Oakland Service Yard is located on Coliseum Way near 50th Avenue.

1.6 Electricity

The electricity service provider for the plan area is Pacific Gas & Electric (PG&E).

PG&E has both underground and overhead electrical facilities at the site. The underground electrical conduits enter the site at the following locations (from north to south), while most of them cross under I-880 freeway from the east, except at the first location:

- Embarcadero (3W 12kv U.G.)
- Intersection of 19th Avenue and Embarcadero (3W 12kv U.G.)
- 22nd Avenue (3W 12kv U.G.)
- 23rd Avenue (3W 12kv U.G.)
- 29th Avenue (3W 12kv U.G.)
- 34th Avenue (Two – 3W 12kv U.G.)
- High Street (9W 12kv. U.G.)
- 50th Avenue (12W 12kv U.G.)

One overhead electrical wire (6W 12kv) enters the site by crossing the East Creek Slough at the southern site boundary.

PG&E Oakland Service Center is located within the plan area at 4801 Oakport Street, near Lesser Street. PG&E's Oakland Coliseum Substation is located east of the plan area near the intersection of 50th Avenue and I-880. The PG&E Oakland Service Yard is located on Coliseum Way near 50th Avenue.

We are currently attempting to meet with PG&E to discuss their existing facilities. An overview of the existing power supply systems, major infrastructure on site, and capacity constraints will be discussed in the future updates of this report.

1.6.1 Summary of Electricity

Electricity service is available for the existing plan area. Future development may require installation of additional facilities, e.g. substations, transformers, switchgear, upgrading or relocation of existing cable/conduit.

1.7 Telecommunications

The telecommunications service providers for the plan area are AT&T and Comcast. The plan area is serviced by overhead telecom cables and underground cables in joint trenches. PG&E or AT&T owns the physical poles for installing overhead telecommunication cables. Comcast leases spaces from pole owner to install cables.

A joint trench enters the plan area by crossing I-880 freeway from the east into the site at Derby Avenue. The underground joint trench cables daylight at the intersection between Derby Avenue and Elwood Avenue and continue to run as overhead cables on utility poles.

Comcast has existing telecommunications infrastructures concentrated in the Central-West Planning Area. There are no Comcast facilities from 37th Avenue to the southern boundary of the site.

AT&T stated that there are no underground trenches within the plan area; and therefore, no utilities basemaps are provided by AT&T. AT&T's representative stated that information about any overhead facilities within the plan area can be obtained by performing a site survey. There has been no success in getting additional information regarding existing communications systems, major infrastructure on site, and capacity constraints from AT&T.

We are currently attempting to meet with the service providers to discuss their existing facilities. An overview of existing communications systems, major infrastructure on site, and capacity constraints will be discussed in the future updates of this report.

1.7.1 Summary of Telecommunications

Telecommunication service is available to a portion of the existing plan area. Future development may require the installation of new facilities to provide complete coverage for the plan area, and upgrading or relocation of existing facilities.

1.8 Petroleum and Oil Transmission Pipeline

According to the National Pipeline Mapping System (NPMS), an oil pipeline belonging to Shell Pipeline Company LP runs across the plan area. A major Kinder Morgan oil pipeline is located outside of the site to the east of I-880 freeway. Figure 4 presents the location of these pipelines.

The City of Oakland's storm water and sanitary basemaps further confirmed the NPMS information by showing two Shell 10"-diameter pipelines running across the site. One Shell pipeline enters the site from the southern boundary and runs along Oakport Street. The other Shell pipeline enters the site from the eastern boundary at 34th Avenue. The two

alignments merge at the intersection of East 8th Street and 34th Avenue, and run along 34th Avenue, Elwood Avenue, Derby Avenue, and Glascock Street to service the properties at 2933 Glascock Avenue, and 303 and 315 Derby Avenue, which was used by Shell Oil Company as a bulk fuel distribution terminal until 1980. The properties were developed into residential townhouses in 2003.

The two oil pipelines were likely abandoned after the closure of the fuel distribution terminal in 1980. Additional information has been requested from Shell Pipeline Company LP to confirm the alignments and activity status of the pipelines.

We believe that two Kinder Morgan pipelines (10" and 12" diameter) form the North Santa Fe Pacific Pipeline, LP (SFPP LP) pipeline which transports refined petroleum products from Richmond Terminal to Brisbane Terminal may be located east of I-880 freeway outside of the plan area The location of these pipes is to be confirmed.

1.8.1 Summary of Petroleum and Oil Transmission Pipeline

There are two Shell oil pipelines, most likely abandoned, running across the site. If these facilities are still being used, future development and roadway construction will likely need to take precautions to protect the pipelines during construction..

Figure 4: **Petroleum and Oil Transmission Pipeline**

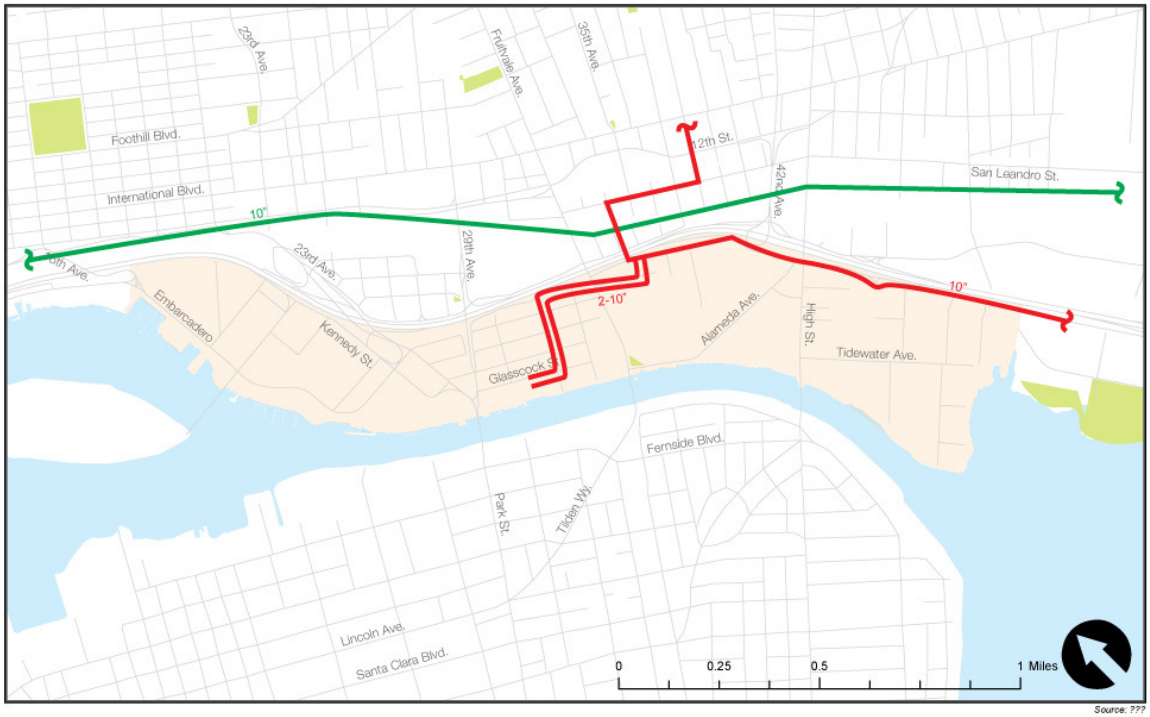


Figure 4: Petroleum and Oil Transmission Pipelines **April 16, 2009**

- Kinder Morgan Oil Pipeline
- Shell Oil Pipeline
- Park

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