Notice of Special Meeting

District Projects Tour
Tuesday, October 16, 2018
8:30 a.m.
Central Area Service Center
2149 Union Street
Oakland, California

At the call of President Lesa R. McIntosh, a Special Meeting of the Board of Directors of the East Bay Municipal Utility District has been set for 8:30 a.m. on Tuesday, October 16, 2018 at the EBMUD Central Area Service Center, 2149 Union Street, Oakland, California.

District staff will provide the Board with an overview of EBMUD facilities, infrastructure and pipeline projects and an inspection tour of the following District facilities/projects, consistent with the attached timeline:

- Evelyn Pipeline Project, Evelyn St. (between Santa Fe Ave. and Gilman St.) Albany, CA
- San Pablo Water Treatment Plant, 300 Berkeley Park Blvd., Kensington, CA
- Orinda Water Treatment Plant, 190 Camino Pablo, Orinda, CA

The Board will be taking no action at this meeting.

Dated: October 11, 2018

Rischa S. Cole
Secretary of the District
# October 16, 2018 District Projects Tour Timeline

<table>
<thead>
<tr>
<th>Meeting Opens</th>
<th>8:30 am - 9:25 am</th>
</tr>
</thead>
</table>
| **Central Area Service Center**  
(2149 Union Street, Oakland, CA) |  |
| • Open Meeting  
• Agenda and Tour Overview  
• District Systems/Facilities Overview | Lesa McIntosh  
Alex Coate  
Clifford Chan |

<table>
<thead>
<tr>
<th>Site Tours</th>
<th>9:30 am - 12:45 pm</th>
</tr>
</thead>
</table>
| **Drive along Wildcat Aqueduct to Evelyn Pipeline Project – Pipe Rebuild**  
(Claremont Avenue, Oakland to Evelyn Street, Albany, CA) |  |
| • Evelyn Pipeline Project - Pipe Rebuild  
(between Santa Fe Avenue and Gilman Street, Albany, CA) | Various Staff  
10:00 am – 10:30 am |
| **Drive to San Pablo Water Treatment Plant** |  |
| • San Pablo Water Treatment Plant  
(300 Berkeley Park Blvd.  
Kensington, CA) | Jimi Yoloye or designee  
10:45 am – 11:30 am |
| **Drive to Orinda Water Treatment Plant** |  |
| • Orinda Water Treatment Plant  
(190 Camino Pablo Orinda, CA) | OMD WTP Sup  
12:00 pm – 12:45 pm |
| **Drive to Central Area Service Center** |  |
| 12:45 pm – 1:15 pm |

<table>
<thead>
<tr>
<th>Meeting Closes</th>
<th>1:15 pm - 2:30 pm</th>
</tr>
</thead>
</table>
| **Central Area Service Center**  
(2149 Union Street, Oakland, CA) |  |
| • Recap of Tour  
• Public Comment  
• Board Comments  
• Next Steps  
• Adjourn | Alex Coate  
Alex Coate  
Lesa McIntosh |
DATE: October 11, 2018

MEMO TO: Board of Directors

FROM: Alexander R. Coate, General Manager

SUBJECT: Tour of District Projects – October 16, 2018

A Special Meeting of the Board of Directors is scheduled for Tuesday, October 16, 2018. Board members will tour several District projects and receive information on the District’s infrastructure priorities. Below is a list of topics that will be reviewed with the Board during the tour. A tour map and background materials are attached.

- Tour Route Map
- Water System Overview
- Service Yard and Trench Soils Locations
- Wildcat Aqueduct Improvement Phase 1 Berkeley
- Wildcat Aqueduct Improvement Phase 2 El Cerrito
- Pipeline Rebuild Evelyn Cluster
- Community Impacts of Pipeline Construction
- FY19 Current and Planned Pipeline Rebuild Projects
- San Pablo Clearwell and Rate Control Station Replacement Project
- Open-Cut Reservoir Locations
- Orinda Water Treatment Plant Background
- Orinda Water Treatment Plant Disinfection Improvements Project

ARC:ccc:rk

Attachments

I:\SEC 2018 Board Related Items\Committee 2018\101618 Board Tour\OMD - Board Tour.docx
Central Area Service Center
- Central Area Service Center, 2149 Union Street, Oakland

Wildcat Aqueduct Project
- Drive alignment on Stuart and Ellsworth Streets

Evelyn Pipeline Project
- Evelyn Street, Albany (between Santa Fe Avenue and Gilman Street)

San Pablo Clearwell
- San Pablo Water Treatment Plant, 300 Berkeley Park Boulevard, Kensington

Orinda Water Treatment Plant
- 190 Camino Pablo, Orinda

Central Area Service Center
- Central Area Service Center, 2149 Union Street, Oakland
WATER SYSTEM OVERVIEW

Raw Water System
- 2 Upcountry Reservoirs (Pardee and Camanche)
- 5 Local Reservoirs (Briones, San Pablo, Upper San Leandro, Chabot, Lafayette)
- Freeport Regional Water Project (Sacramento River)

Water Treatment System
- 3 Inline WTPs (Orinda, Lafayette, Walnut Creek)
- 3 Conventional WTPs (Sobrante, Upper San Leandro, San Pablo)

Distribution System
- 4,200 miles of distribution pipeline
- 122 pressure zones
- 164 drinking water reservoirs
- 135 pumping plants
- 100 regulators and rate control stations
SERVICE YARD AND TRENCH SOILS SITE SUMMARY

Service Yards
Central Area Service Center – Oakland
North Area Service Center – Richmond
South Area Service Center – San Lorenzo
East Area Service Center – Walnut Creek
Castenada Area Service Center – San Ramon

Trench Soils Locations
Briones – Orinda
Miller Road – Castro Valley
Amador – San Ramon
District Ward:
- Ward 4

Scope of Work:
- 1.0 mile of new 48-inch mortar lined and coated welded steel transmission pipeline in the City of Berkeley
- 750 feet of 6- to 12-inch pipeline relocations
- Estimated construction cost: $11,900,000

Purpose:
- Improve capacity of the existing Wildcat Aqueduct as recommended in the West of Hills Master Plan
- Provide redundancy for a critical transmission pipeline

Status
- Installed connection tee and valves on existing Wildcat Aqueduct at Bancroft Way in January 2018 to reduce impacts during construction.
- In design

Schedule:
- Status: 90% design in October 2018
- Construction by District forces: January to June 2019
- Contract Award: March 2019
- Construction: April 2019 to October 2020
- In-Service Date: September 2020

Community Outreach and Mitigations
- CEQA – Board certified EIR in 2013
- Revised addendum to EIR approved in 2016
- Noise, vibration, traffic, tree protection migration measures are being implemented
- Community meetings conducted and planned prior to construction
District Ward:
- Ward 4

Scope of Work:
- 2.6 miles of new 36-inch mortar lined and coated welded steel transmission pipeline in the City of El Cerrito
- Estimated construction cost: $20,400,000

Purpose:
- Improve capacity of the existing Wildcat Aqueduct as recommended in the West of Hills Master Plan
- Provide redundancy for a critical transmission pipeline

Status
- In design

Schedule:
- Status: 90% design in October 2019
- Contract Award: April 2020
- Construction: May 2020 to April 2022
- In-Service Date: March 2022

Community Outreach and Mitigations
- CEOA – Board certified EIR in 2013
- Revised addendum to EIR approved in 2016
- Noise, vibration, traffic, tree protection migration measures are being implemented
- Community meetings conducted and planned prior to construction
District Ward:
• Ward 4

Scope of Work:
• Install 14,745 feet of new 6- and 8-inch iPVC with restrained fittings in Albany and Berkeley
• Services: 526; Hydrants: 11; Connections: 24
• Pipe Risk Grade: 75% D and F
• Estimated construction cost: $6,500,000

Purpose:
• Replace failing cast iron pipeline, 67 main breaks have occurred on these pipes since 1990.

Proposed Innovations:
• Construct pipe using iPVC – a structurally enhanced version of typical PVC - and use ductile iron restrained joint fittings.
• iPVC can withstand ground deformation that may occur during earthquakes or landslides (observed by District staff at Cornell University’s Large-Scale Testing Facility, June 2018).

Status:
• In construction. Over 7,000 feet installed to date. Expect to complete December 2018.

Preliminary Findings:
• iPVC pipe is more robust during handling, installation, and operation when compared to conventional PVC. iPVC has performed well and passed all required pressure and water quality testing as part of the construction process.
• Self-restrained ductile iron fittings improve productivity due to elimination of concrete thrust blocks.

Performance Indicators Tracked:
• Cost per foot by project phase: Construction, Construction Support, Project Support and Documentation, and Paving
• Productivity: mainline labor hours per foot, production per crew day, service transfers per day, hydrant installs per day
• Community Impacts: neighborhood presence and construction duration per 500 feet.
Community Impacts of Pipeline Construction

**Typical Activities**

- **Start up activities**
  - Place signs
  - Locate and mark existing utilities
  - Order and deliver materials to jobsite
  - Confirm alignment (potholing and sawcutting)
  - Mobilize mainline crew and equipment

- **Mainline construction activities**
  - Construct pipeline
  - Backfill, temporary paving, compaction testing
  - Pressure testing
  - Disinfect new main
  - Construct hydrants, new connections, and kills
  - Transfer customers to new main

- **Close out activities**
  - Complete punchlist
  - Clean up jobsite
  - Demobilize mainline crew and equipment

- **Final street restoration**
  - Concrete
  - Paving and striping
San Pablo Clearwell - Vital Infrastructure for West of Hills

The 5.4 MG San Pablo Clearwell was constructed in 1922 in conjunction with the San Pablo Water Treatment Plant. The clearwell is an open-cut reservoir that is operated as a distribution system storage reservoir – it is a critical facility that is in use 365 days a year. In addition, when the plant is in service, the clearwell serves as the tail end of the treatment process.

The clearwell has reached the end of its useful life: the concrete roof is structurally unsafe, the lining is at risk of failure, the roof has leaks, and the reservoir is poorly ventilated. The clearwell will be replaced with two 3.5 MG prestressed concrete tanks, partially buried in the same location as the existing clearwell. The construction will include a large valve vault and associated piping for operational control.

San Pablo Rate Control Station - Gravity Fed from Orinda WTP

The San Pablo Rate Control Station (RCS) is another key component in the west of hills distribution system. Potable water is conveyed via gravity from the Orinda WTP through the Claremont Tunnel, through the Wildcat Aqueduct, and to the San Pablo RCS. The San Pablo RCS feeds the clearwell and provides water to the Central pressure zone, which serves the cities of Albany, Berkeley, El Cerrito, Kensington, Oakland, and Richmond.

The mechanical piping in the San Pablo RCS is undersized for its task, resulting in cavitation that can damage the facility over time. There are several other facility deficiencies, including corrosion, vault leakage, and safety issues. The RCS will be replaced with a more robust mechanical system with better access for maintenance.

Transmission Main Replacements - Ensuring Another Hundred Years of Reliable Service

The project will also take on the replacement of old, undersized transmission mains. The onsite distribution system is a patchwork of pipeline additions and repairs executed over one hundred years of operation. This project presents an opportunity to abandon or demolish approximately 3,700 feet of distribution pipelines. The project will install approximately 1,400 feet of large diameter steel pipe to ensure service to the area for the next hundred years.
Project Facts at a Glance

Scope of Work
- Estimated Construction Cost: $45,000,000

Schedule
- Status: Out to Bid
- Construction: 2019 – 2021

Community Outreach and Mitigations
The project has been developed to minimize impacts to community. The contractor will keep all suitable materials onsite through the use of onsite stockpiling. Demolished materials like concrete and asphalt will be recycled and used onsite. This will significantly reduce the number of truck trips required to off haul materials from the site. Community outreach is planned for 2019.
OPEN-CUT RESERVOIR SUMMARY

Berkeley
Claremont Reservoir

Castro Valley
Almond Reservoir

Danville
Danville Reservoir

El Sobrante
Argyle No. 2 Reservoir
Sobrante Clearwell

Kensington
San Pablo Clearwell

Lafayette
Leland Reservoir

Moraga
Fay Hill Reservoir
Moraga Reservoir

Oakland
39th Avenue Reservoir
Central Reservoir
Dunsmuir Reservoir
USL Clearwell

Pinole
Maloney Reservoir

Richmond
North Reservoir

San Ramon
Watson Reservoir
Background

The Orinda WTP is the District's largest WTP, capable of treating up to 200 MGD. High-quality water from Pardee Reservoir is transported approximately 90 miles to the WTP through the Mokelumne Aqueducts. Orinda WTP serves over 800,000 customers in the cities of Albany, Castro Valley, Crockett, El Cerrito, El Sobrante, Hercules, Kensington, Lafayette, Moraga, Oakland, Orinda, Piedmont, Richmond, Rodeo, San Leandro, San Lorenzo, San Pablo, and Selby.

1935: WTP placed in service with 8 sand filters and a capacity of 42 MGD.

1948: 12 additional filters added increasing the capacity to 105 MGD.

1961: New filter controllers and anthracite media installed increasing the capacity to 175 MGD.

1988: Orinda WTP designated a historical landmark.

2001: Department of Public Health grants peak instantaneous production rates up to 200 MGD.

Facts

Water from the WTP is pumped to customers in Orinda, Moraga, and Lafayette, or flows by gravity through the Claremont Tunnel to customers in the west-of-hills. The Claremont Tunnel has a capacity of 9 million gallons.

The WTP has 20 filters and each filter is 1,220 square feet with 12 inches of silica sand and 25 inches of anthracite.
Improve Disinfection - Reduce Disinfection By-Products
The Orinda Water Treatment Plant (WTP) is the District’s largest WTP, capable of treating up to 200 MGD and serving over 800,000 customers.

Unlike newer treatment plants, the Orinda WTP does not have a post-filter disinfection process. The Orinda WTP relies on free chlorine disinfection ahead of the filters to meet regulatory requirements for disinfection. While pre-chlorination effectively meets disinfection goals, this practice can result in more disinfection by-products (DBPs) when organic material in the raw water increases.

This multi-barrier Ultraviolet Disinfection-Chlorine Contact Basin (UV-CCB) system will move most of the required disinfection to after the filters, reducing contact with natural organic matter and resulting in a net reduction of DBPs.

The UV-CCB system will use UV light to inactivate bacteria and pathogens. A relatively small CCB will be constructed after the UV reactor to inactivate viruses. UV is most effective at pathogen inactivation, and chlorine is best at virus inactivation.

Improve Maintenance and Reliability of Orinda WTP
The project includes electrical and instrumentation upgrades for Los Altos Pumping Plant, which serves the cities of Orinda, Lafayette, and Moraga.

The project also includes new state of the art maintenance facilities to better maintain the Orinda WTP.

Construction Challenges
A number of site specific considerations make construction of this project uniquely challenging. Much of the work will be performed underground as deep as 60-feet.

Similar to the Orinda WTP Maintenance and Reliability Project, the District will shut down the Orinda WTP (requiring start-up of the San Pablo WTP) and will require careful planning for other distribution system mitigations.

Pilot Work
Pilot testing of UV technology is underway to help guide the equipment selection for the UV system and this pilot work is expected to be completed by March 2019.

UV System
The UV system will be built underground and will contain the UV reactors, control valves, header piping, and flow meters. The system will contain 6 total reactors.

UV Reactors
UV light irradiates water as it passes through the UV lamp vessel to inactivate any pathogens or bacteria remaining after filtration.
Project Facts at a Glance

**Scope of Work**
- Ultraviolet disinfection facility
- Chlorine contact basin (CCB)
- Standby power system
- New maintenance facility
- Electrical upgrade of Los Altos Pumping Plant
- Trenchless pipe techniques to minimize plant disruptions.

**Cost and Schedule**
- **Estimated construction cost:** $92,000,000
- **Current status:** 10% design level
- **50% design:** July 2019
- **Equipment procurement:** August 2019
- **90% design:** January 2020
- **Project bid:** August 2020
- **WTP outage:** Winter 2021-2022
- **In-service date:** January 2023

**Design Criteria**
The design criteria were selected to exceed regulatory inactivation levels at all times, and inactivate pathogens such as *Cryptosporidium* that are not susceptible to free chlorine disinfection.

**Regulatory Requirements**
- 1 log inactivation (90%) Giardia
- 3 log inactivation (99%) Virus

**Design Criteria (Normal Operations)**
- >2-log inactivation (>99%) giardia
- >3-log inactivation (>99.9%) Virus

**Orinda WTP**
- **Capacity:** 200 MGD
- **Average plant rate:** 115 MGD
- **Original construction:** 1935
- **Type:** In-line WTP
- **Raw water source:** Pardee and Briones Reservoirs
- **Cities served:** Lafayette, Orinda, Moraga, Oakland, San Lorenzo, San Leandro, Castro Valley, Piedmont, Selby, Crockett, Rodeo, Hercules, Pinole, El Sobrante, San Pablo, Richmond, El Cerrito, Kensington, and Albany.
- **Wards:** 1, 2, 3, 4, 5, 6, 7

**Community Outreach and Mitigations**
- Mostly underground construction
- Architectural continuity for above-grade structures
- Visual renderings per CEQA
- Community outreach planned in 2019
- CEQA completed prior to final design

**Orinda Site**
The new UV-CCB structure will be built under the location of the existing maintenance and groundskeepers buildings. The location was selected to reduce visual impacts, plant outages, and constructability challenges posed by exposing and rerouting utilities elsewhere on the plant.

**Underground Construction**
This perspective shows the facility largely constructed below grade to maintain gravity flow through the Orinda WTP. A maintenance support building will be constructed above the UV facility to house equipment and maintenance shops.