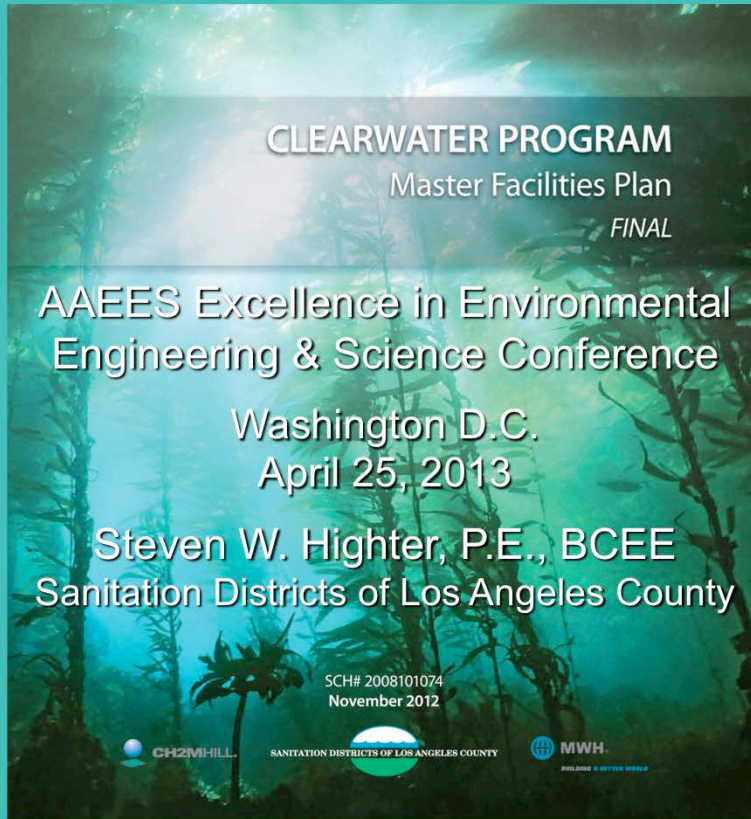


Clearwater Program – *Beyond Tunnel Vision*






CLEARWATER PROGRAM
Master Facilities Plan
FINAL

AAEES Excellence in Environmental
Engineering & Science Conference

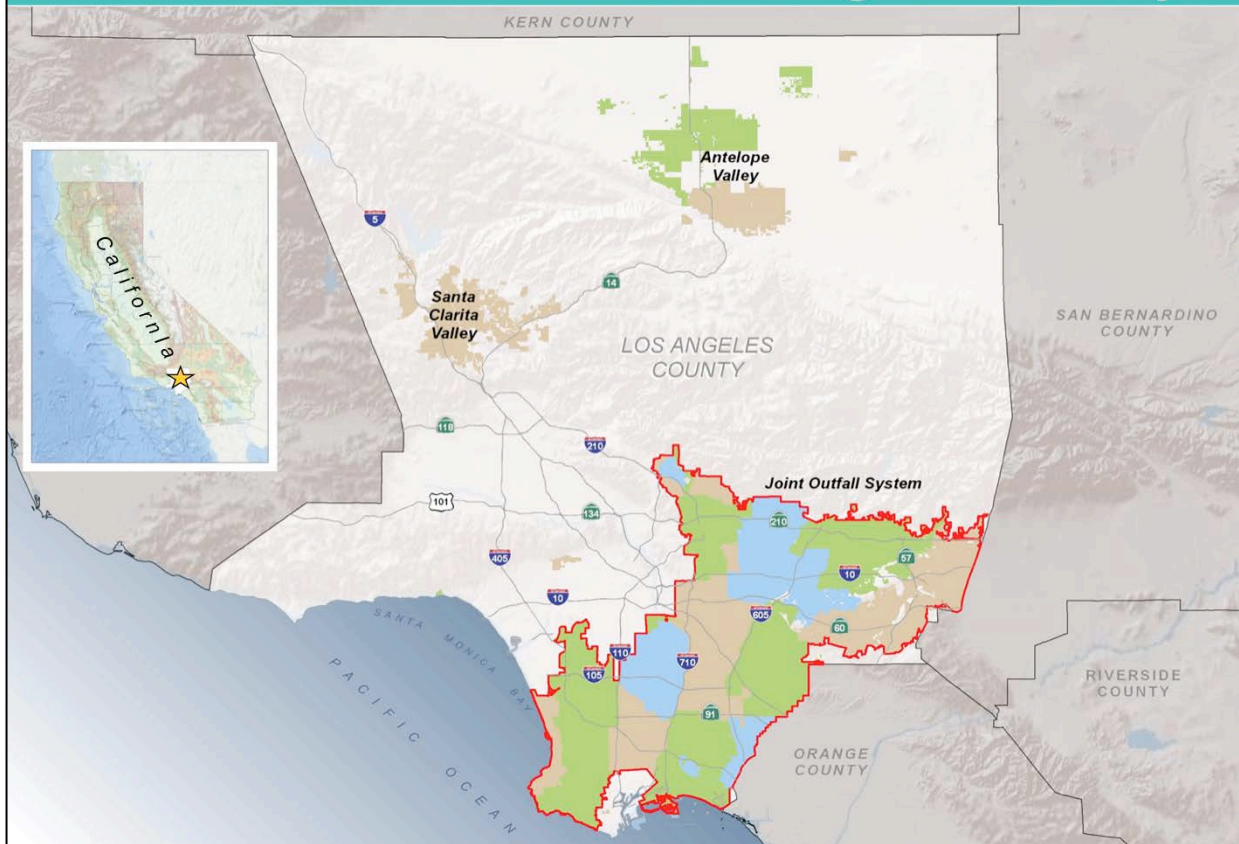
Washington D.C.
April 25, 2013

Steven W. Highter, P.E., BCEE
Sanitation Districts of Los Angeles County

SCH# 2008101074
November 2012

 CH2MHILL.  SANITATION DISTRICTS OF LOS ANGELES COUNTY  MWH
BUILDING A BETTER WORLD

Sanitation Districts of Los Angeles County



Joint Outfall System (JOS)



Agency Scoping & Public Outreach



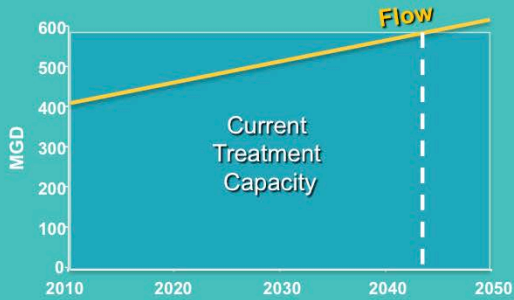
Sanitation Districts of LA County
(CEQA Lead Agency)



U.S. Army Corps of Engineers
(NEPA Lead Agency)



Clearwater Program Objectives



System Capacity



System Reliability



Emerging Reuse Opportunities



Water Quality Requirements

Wastewater Conveyance System



Wastewater Treatment System

Plant Expansion at one WRP
Process Optimization at four WRPs



San Jose Creek WRP



Long Beach WRP



Pomona WRP



Los Coyotes WRP

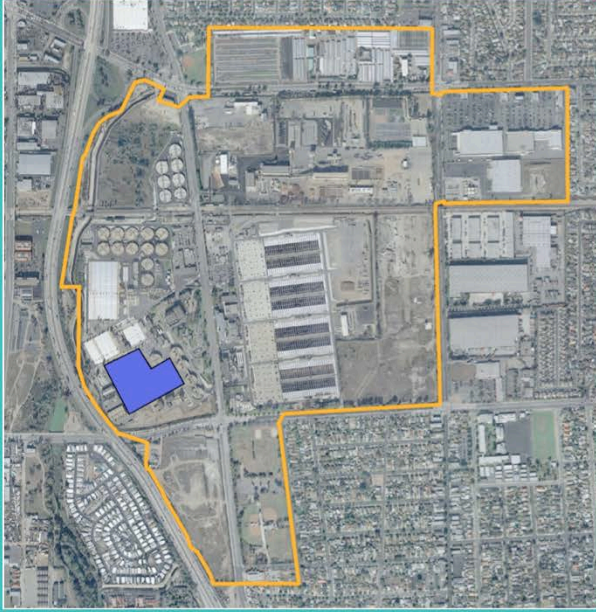
WRP Effluent Management

Beneficial Reuse at Over 700 Sites



Solids Processing

Centralized processing at JWPCP and 6 new digesters

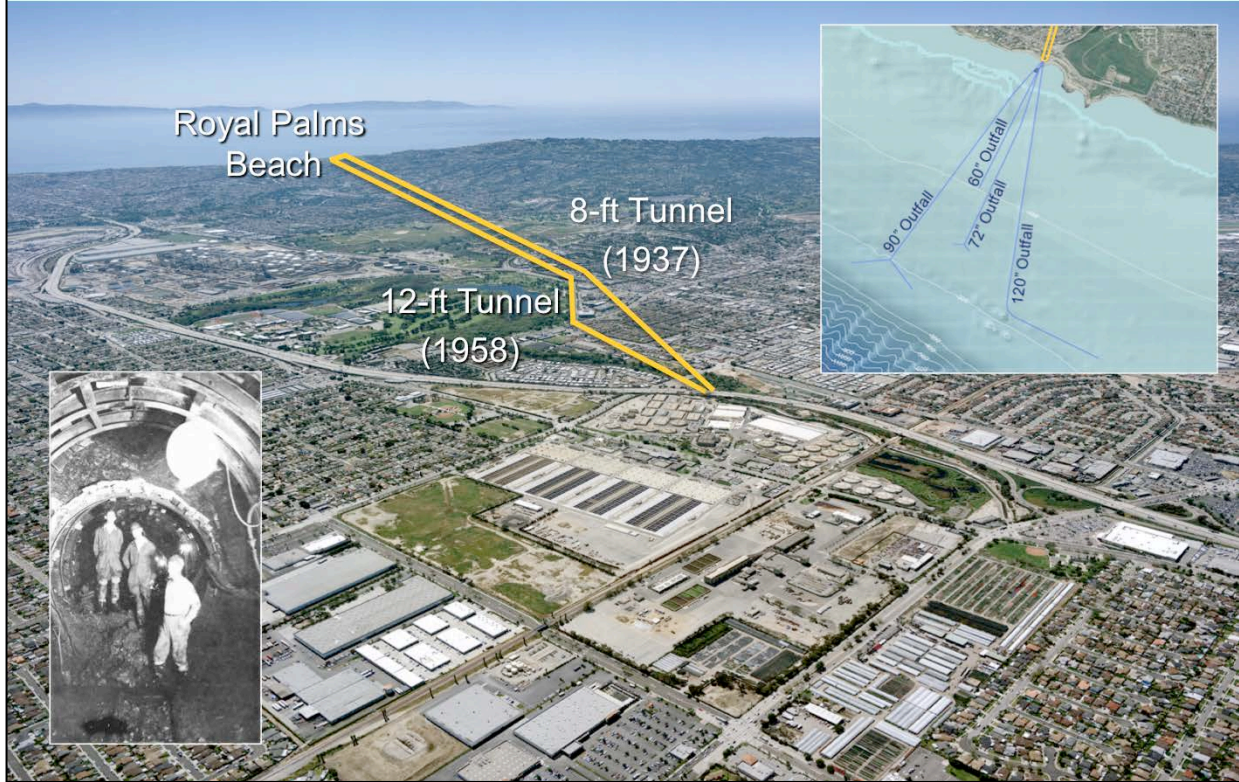


Biosolids Management

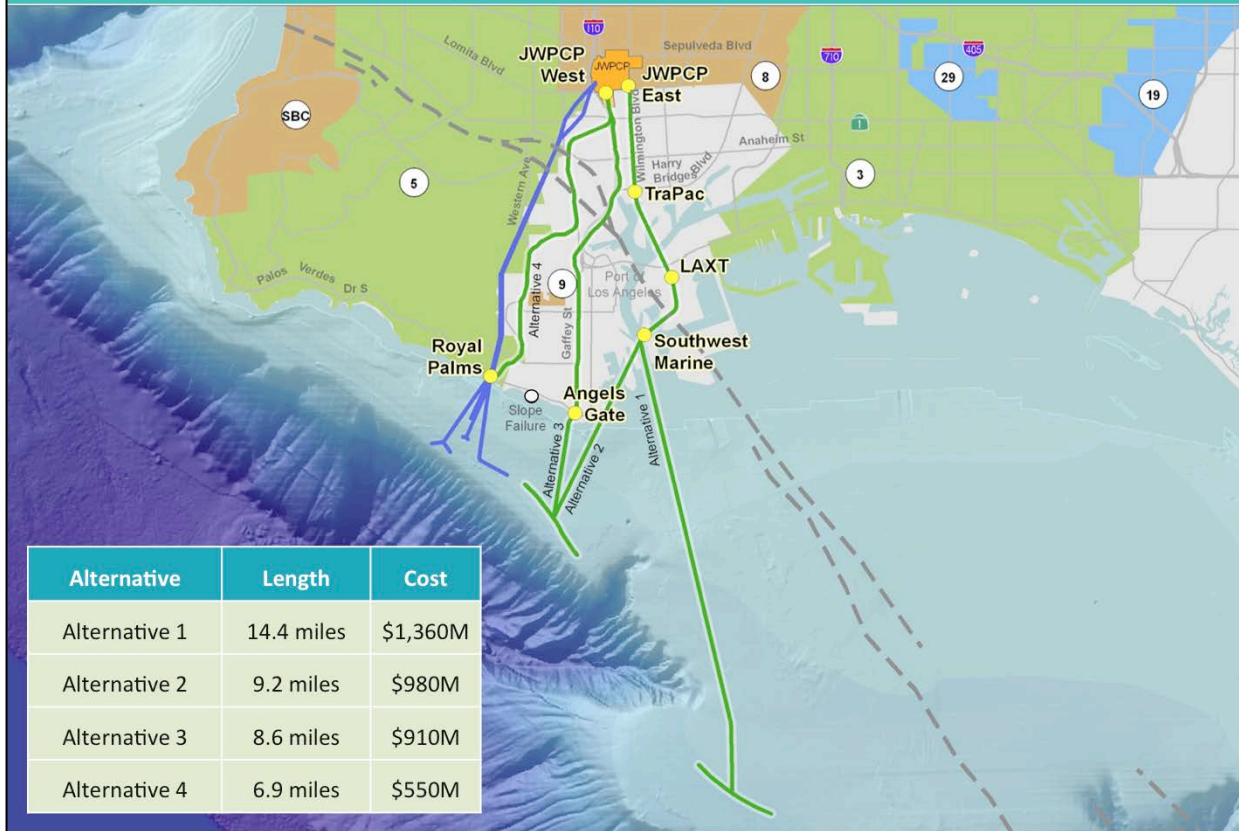
Diverse disposal options and beneficial uses



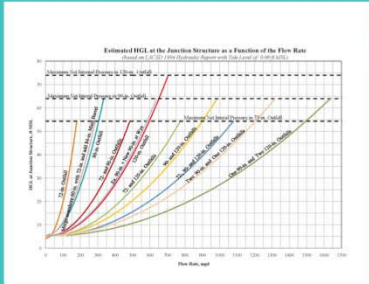
JWPCP Effluent Management Existing Ocean Discharge System



Project Alternatives



Preliminary Engineering



Hydraulic Analysis



Concrete/Metal Coring



Laboratory Analysis

Preliminary Engineering



Seismic Redundancy

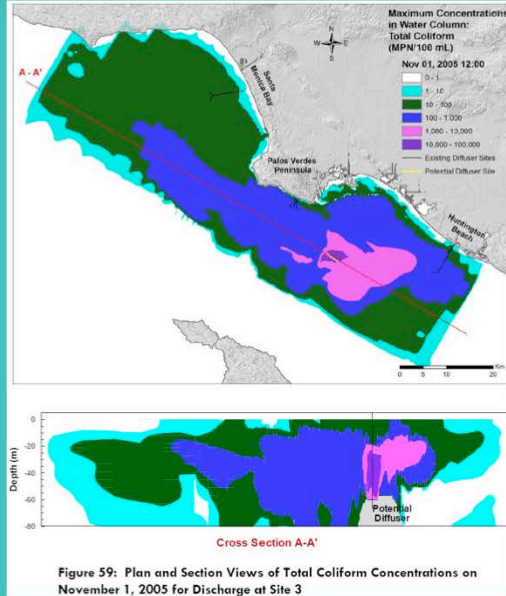


Figure 59: Plan and Section Views of Total Coliform Concentrations on November 1, 2005 for Discharge at Site 3

Ocean Modeling

Evaluation Process

FOUR FEASIBLE ALTERNATIVES



- Environmental Impacts
- Public Input
- Operational Considerations
- Constructability
- Long-Term Uncertainty
- Cost Effectiveness



RECOMMENDED PROJECT

Recommended Project



- Alternative 4 was the highest ranked alternative because it would be lowest in cost, would have the least environmental impacts, and would be safest to construct.
- Alternative 4 goes beneath Figueroa Street, Harbor Regional Park, North Gaffey Street, Capitol Drive, and Western Avenue (through Dodson Avenue) to Royal Palms Beach.
- [CLICK]
- NOTE: Where the tunnel passes Rancho LPG, it is 600 feet west of the two large butane tanks and 100 feet deep.
- NOTE: Alternative 4 has only two shaft sites, the shortest overall tunneling distance, the least amount of construction air emissions, the fewest number of truck trips, the least

JWPCP West Shaft Site

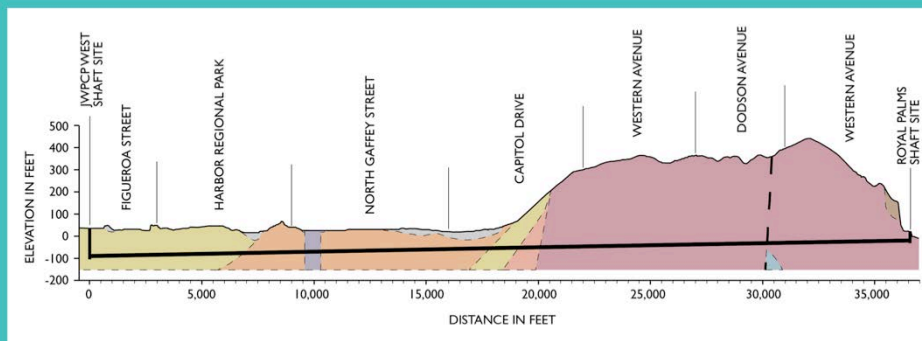
Working Shaft Site

- At JWPCP near Lomita Boulevard, Figueroa Street and the I-110
- Shaft diameter of 40 to 60 feet
- Shaft depth of 140 feet
- Shaft construction for 10 to 12 months
- Tunnel construction for 4 years



- Construction for the Alternative 4 tunnel would originate at the JWPCP West Shaft Site, which would be on Districts' property near the corner of Lomita Blvd and Figueroa St. Throughout the tunneling project, this working shaft site would serve as the entry point for all construction equipment and materials and the exit point for all excavated soil and rock. [CLICK]
- NOTE: An average of 30 trucks (65 max) during shaft construction and an average of 57 trucks (111 max) during tunnel construction.

Tunnel Alignment



- Constructed underground with a tunnel boring machine (TBM)
- Constructed of pre-fabricated steel-reinforced concrete segments with watertight gaskets
- External diameter of 20 to 22 feet
- Internal diameter of 18 feet

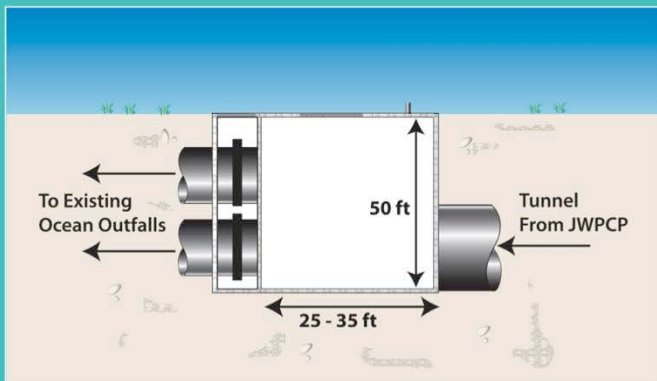


- Instead of open trenching, which is highly disruptive to traffic and businesses, a tunnel boring machine (TBM) would be utilized. Beginning at the JWPCP West shaft site on the far left, the 18-ft diameter tunnel would run underground for about 7 miles to Royal Palms Beach on the far right. The TBM would operate at subsurface depths ranging from 70 to 450 feet.
- (Beneath Western Avenue, the tunnel would vary between 240 and 450 feet below ground surface.) [CLICK]

Royal Palms Shaft Site

Exit Shaft Site

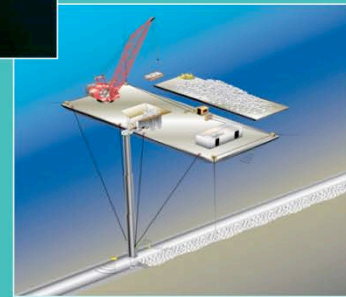
- At Royal Palms Beach near the access road off of West Paseo Del Mar
- Shaft diameter of 25 to 35 feet
- Shaft depth of approximately 50 feet
- Shaft construction for 6 to 9 months
- Underground manifold structure interconnection work for approximately 1.5 years



Existing Ocean Outfalls Rehabilitation



- Rehabilitation on 72-inch, 90-inch, and 120-inch outfalls
 - Re-Ballasting
 - Joint Repairs
 - Cathodic Protection
- Ocean depths of 20 to 50 feet
- Construction for approximately 9 months



Environmental Impacts

Resources Evaluated

- Aesthetic
- Air Quality
- Biological
- Cultural
- Geology/Soils/Mineral
- Greenhouse Gas Emissions
- Hazards/Hazardous Materials
- Hydrology
- Land Use
- Marine Environment
- Noise/Vibration
- Public Services
- Recreation
- Transportation and Traffic
- Utilities/Service Systems/Energy
- Cumulative/Growth-Inducing
- Employment/Housing/Socioeconomics/Environmental Justice



Environmental Impacts

Significant Unavoidable Impacts

- Aesthetic
- Air Quality
- Cultural
- Greenhouse Gas Emissions



Clean-diesel tunnel locomotive



Construction barrier



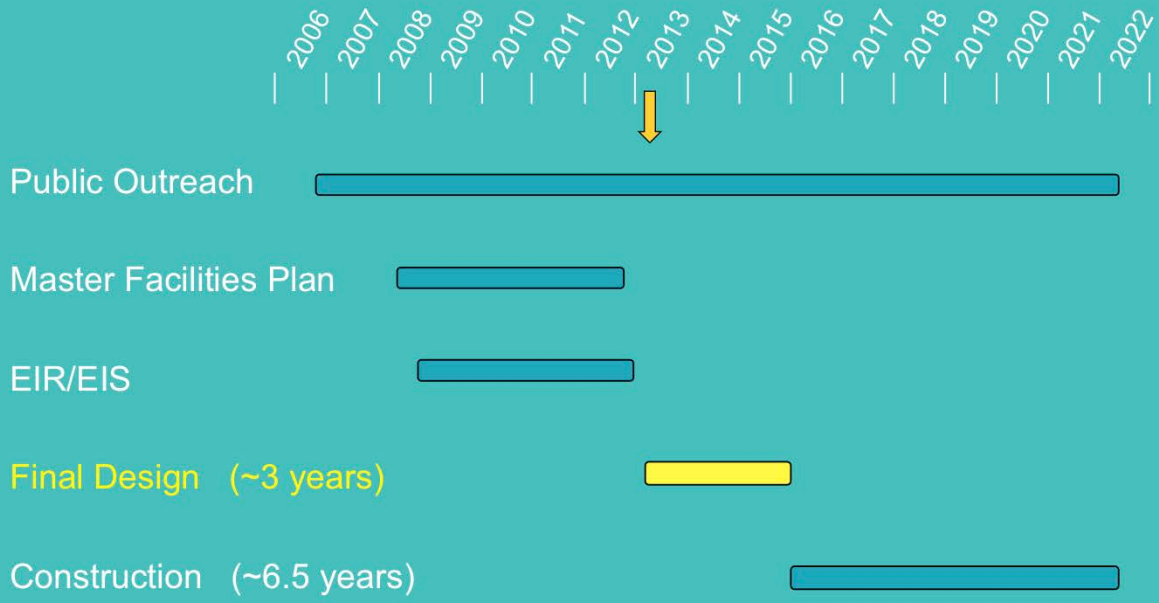
Diesel particulate matter traps

Rate Impacts

Project Element	Project Costs (2011 Dollars)	Upgrade (2011 Dollars)	Expansion (2011 Dollars)
JWPCP West Shaft Site	\$33,000,000	\$24,750,000	\$8,250,000
Tunnel	\$478,000,000	\$358,500,000	\$119,500,000
Royal Palms Shaft Site	\$24,000,000	\$18,000,000	\$6,000,000
Existing Ocean Outfalls Rehabilitation	\$15,000,000	\$15,000,000	\$0
Total Capital Costs	\$550,000,000	\$416,250,000	\$133,750,000
Equivalent Annual Capital Cost	\$37,000,000		

JOS Service Charge Rate Impacts	Per Sewage Unit
Current Average Annual Service Charge (2011 Dollars)	\$146
Estimated Annual Service Charge Increase (2021 Dollars)	\$20

Project Schedule





Questions?

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