Santa Clara Valley Water District
Board of Directors Meeting

District Headquarters Board Room
5700 Almaden Expressway
San Jose, CA 95118

4:00 P.M. SPECIAL MEETING AGENDA

Thursday, May 25, 2017
4:00 PM

District Mission: Provide Silicon Valley safe, clean water for a healthy life, enviornment and economy.

DISTRICT BOARD OF DIRECTORS

John L. Varela, Chair - District 1
Richard Santos, Vice Chair - District 3
Barbara Keegan - District 2
Linda J. LeZotte - District 4
Nai Hsueh - District 5
Tony Estremera - District 6
Gary Kremen - District 7

All public records relating to an open session item on this agenda, which are not exempt from disclosure pursuant to the California Public Records Act, that are distributed to a majority of the legislative body will be available for public inspection at the Office of the Clerk of the Board at the Santa Clara Valley Water District Headquarters Building, 5700 Almaden Expressway, San Jose, CA 95118, at the same time that the public records are distributed or made available to the legislative body. Santa Clara Valley Water District will make reasonable efforts to accommodate persons with disabilities wishing to attend Board of Directors' meeting. Please advise the Clerk of the Board Office of any special needs by calling (408) 265-2600.

NORMA CAMACHO
Interim Chief Executive Officer

MICHELE L. KING, CMC
Clerk of the Board
(408) 265-2600
Fax (408) 266-0271
www.valleywater.org

Note: The finalized Board Agenda, exception items and supplemental items will be posted prior to the meeting in accordance with the Brown Act.

Santa Clara Valley Water District
Board of Directors

4:00 P.M. SPECIAL MEETING
AGENDA

Thursday, May 25, 2017 | **4:00 PM** | **District Headquarters Board Room**

1. CALL TO ORDER:

1.1. Roll Call.

1.2. Pledge of Allegiance/National Anthem.

1.3. Orders of the Day.

1.4. Time Open for Public Comment on any Item not on the Agenda.
Notice to the public: This item is reserved for persons desiring to address the Board on any matter not on this agenda. Members of the public who wish to address the Board on any item not listed on the agenda should complete a Speaker Card and present it to the Clerk of the Board. The Board Chair will call individuals to the podium in turn. Speakers comments should be limited to three minutes or as set by the Chair. The law does not permit Board action on, or extended discussion of, any item not on the agenda except under special circumstances. If Board action is requested, the matter may be placed on a future agenda. All comments that require a response will be referred to staff for a reply in writing. The Board may take action on any item of business appearing on the posted agenda.

2. TIME CERTAIN:

4:00 PM

2.1. Workshop on Cost Estimation, Risk Assessment and Management, and Cost Control for the California WaterFix. 17-0311

Recommendation: Receive and discuss information on cost estimation, risk assessment and management, and cost control for the California WaterFix.

Manager: Garth Hall, 408-630-2750

Attachments: Attachment 1: Board Policy and CEO Interpretations
Attachment 2: Speaker Biographies
Attachment 3: PowerPoint, Project Overview
Attachment 4: PowerPoint, Cost and Risk

Est. Staff Time: 3 Hours

3. ADJOURN:

3.1. Clerk Review and Clarification of Board Requests.

3.2. Adjourn to Regular 1:00 p.m., on June 13, 2017, in the Santa Clara Valley Water District Headquarters Building Boardroom, 5700 Almaden Expressway, San Jose, California.

File No.: 17-0311

Agenda Date: 5/25/2017
Item No.: 2.1.

BOARD AGENDA MEMORANDUM

SUBJECT:
Workshop on Cost Estimation, Risk Assessment and Management, and Cost Control for the California WaterFix.

RECOMMENDATION:
Receive and discuss information on cost estimation, risk assessment and management, and cost control for the California WaterFix.

SUMMARY:
Santa Clara County relies on imported water to meet 55 percent, on average, of its water needs, with 40 percent conveyed through the Sacramento-San Joaquin Delta. This agenda item provides an opportunity for the Board and the public to receive information from consultants working on the proposed California WaterFix project, specifically on the planning efforts to restore the health of the Delta ecosystem and to ensure the long-term reliability of water supplies conveyed through the Delta. The presentations in this workshop are tailored to answer specific questions related to project cost estimation, risk assessment and management, and cost control - with reference to other large tunneling projects constructed in the US and elsewhere.

Guest Speakers (see Attachment 2 for speaker biographies):

Chuck Gardner, the program manager for the California WaterFix project, will give an overview of the project status and schedule and introduce three consultants working within the Design Construction Enterprise, a special purpose enterprise within the Department of Water Resources dedicated to design and, if approved, construction and implementation of the conveyance project.

John Bednarski PE, an Engineering Section Manager with Metropolitan Water District on loan to the Design Construction Enterprise (DCE), will provide an overview of the engineering aspects of the California WaterFix project, including conveyance system's physical components, current cost estimate, proposed organizational structure for the DCE, and the anticipated construction schedule. He will also provide a review of several large tunnel projects from around the world including their similarities to the WaterFix tunnels.

Patrick Pettiette with 5RMK, a project management and planning organization that provides cost estimates for mega-projects around the globe, will describe the scope and basis for the California

WaterFix cost estimate.

Robert Goodfellow with Aldea Services LLC, a tunnel and underground construction engineering firm that specializes in risk management, will describe a cost risk analysis for the design and construction of the California WaterFix.

BACKGROUND

Santa Clara County relies on imported water to meet, on average, 55 percent of its water needs, with 40 percent conveyed through the Sacramento-San Joaquin Delta by the State Water Project (SWP) and Central Valley Project (CVP), and 15% diverted upstream of the Delta by the San Francisco Public Utilities Commission's Hetch-Hetchy project.

The District's SWP and CVP water supplies, together, are a critical component of the District's water supply portfolio, providing the majority of water supply to the District's three drinking water treatment plants, recharging the county's local groundwater basins to ensure sustainable supplies, and protecting local surface water and groundwater reserves.

The District's imported water supplies are at risk from several factors including increased salinity intrusion due to climate change and sea level rise, and seismic threats to the fragile Delta levee system. The Delta ecosystem no longer supports healthy populations of several native fish species, a worrisome situation that has driven increasing regulatory restrictions on SWP and CVP operations to protect fish and water quality.

To reduce these risks, the District joined other public water agencies beginning in 2006 to support the State's planning efforts for the Bay Delta Conservation Plan, and is now evaluating the potential benefits and costs of the California WaterFix consistent with Board Policy and CEO direction (Attachment 1).

The California WaterFix would provide an alternative conveyance pathway for moving water from the north Delta to the existing pumping plants in the south Delta. The location of the proposed California WaterFix intakes in the north Delta would protect water supplies against increasing salinity due to climate change and projected sea level rise and allow improved flow patterns in the south Delta to protect fish. In addition, the proposed California WaterFix tunnels would be designed to withstand seismic events. Having an alternative conveyance pathway is expected to increase the operational flexibility of the SWP and CVP to address future risks and reduce impacts on protected fish species.

The District has not yet made a decision on whether to participate in the California WaterFix. Staff has presented over a dozen Board agenda items and special Board workshops since 2013 discussing different aspects of and perspectives on the proposed California WaterFix project. Today's presentations are designed to answer specific questions related to project cost estimation, risk assessment and management, and cost control, with reference to other large tunneling projects.

Board Members have asked questions regarding the specific cost allocation to the District, what happens if other participants default on payments, the costs and risks of not participating, and potential financing mechanisms. Staff intends to bring further information in response to these

questions to the Board later this summer.

FINANCIAL IMPACT:
There is no financial impact associated with this item.

CEQA:
The recommended action does not constitute a project under CEQA because it does not have a potential for resulting in direct or reasonably foreseeable indirect physical change in the environment.

ATTACHMENTS:
Attachment 1: Board Policy and CEO Direction
Attachment 2: Guest Speaker Biographies
Attachment 3: PowerPoint, Project Overview
Attachment 4: PowerPoint, Cost and Risk

UNCLASSIFIED MANAGER:
Garth Hall, 408-630-2750

Board Policy and CEO Interpretations
Related to the Imported Water Program

Board Governance Policy provides the following guidance for implementing the Imported Water Program

Global Policy

GP-1: The purpose of the Board, on behalf of the people of Santa Clara County, is to see to it that the District provides Silicon Valley safe, clean water for a healthy life, environment, and economy.

Ends Policies

E-2: There is a reliable, clean water supply for current and future generations

Strategies:

S 2.4. Develop water supplies designed to meet at least 100 percent of average annual water demand identified in the District's Urban Water Management Plan during non-drought years and at least 90 percent of average annual water demand in drought years.

S 2.5. Engage, educate, and advocate with federal, state, regional and local agencies, and the water retailers on the delivery of a reliable and clean water supply.

- E-2.1: Current and future water supply for municipalities, industries, agriculture and the environment is reliable.
  - E-2.1.3: Protect, maintain and develop imported water.

    Outcome Measures:

    OM 2.1.3.a. 100% of imported water identified in annual operations plan delivered to County to meet annual water needs.

    Strategies:

    S.2.1.3.1: Develop and maintain imported water contracts and water management partnerships.

    S.2.1.3.2: Aggressively pursue the Delta solution to achieve the coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem, all in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.

CEO Direction:

D 2.1.3.2.a. The District's desired outcome is a cost-effective, comprehensive, long-term solution for the Delta that meets the water supply, water supply reliability, and water quality needs of Santa Clara County while balancing other beneficial uses and providing a sustainable Delta ecosystem.

D 2.1.3.2.b. The District supports moving forward with environmental review and feasibility studies for a long-term Delta solution, including analyses of a dual Delta conveyance and a full range of isolated facility sizes.

D 2.1.3.2.c. Continuing to rely solely on existing through-Delta conveyance for the District's imported water supplies is not acceptable because of the instability of existing Delta levees, underlying seismic risks, increasing threats of altered hydrology and sea level rise due to climate change, and ongoing regulatory uncertainty and concerns over the environmental health of the Delta.

D.2.1.3.2.d. The long-term Delta solution should promote a resilient Delta ecosystem by basing all actions on sound science and addressing the full range of environmental stressors, including toxics, invasive species, and all watershed diverters.

Executive Limitations

EL-4: Financial planning for any fiscal year shall be aligned with the Board's Ends, not risk fiscal jeopardy, and be derived from a multi-year plan. With respect to the actual, ongoing financial condition and activities, the BAOs shall provide for the development of fiscal sustainability.

- EL-4.2: The Board Appointed Officer shall "spend in ways that are cost-efficient."
    - I-EL-4.2.a. Costs of the long-term Delta solution should be allocated equitably.
    - I-EL-4.2.b. The District favors a flexible approach to cost allocation that maximizes the opportunity for discretionary allocations of cost based on incremental benefits.

EL-5: With respect to purchasing and contract activities, use a fair, open and expeditious process and stay within the Board's authorized expenditures.

- EL-5.1: A BAO shall not make a single purchase, contract, 3rd party claim settlement of liability, or any other financial commitments in amounts greater than the following, unless authorized by the Board:
    - EL-5.1.6.: For Imported Water Management Contracts—No limit; the CEO will inform the Board on a timely basis of Imported Water Management Contracts executed.

- EL-5.3: A BAO shall not make a single purchase, contract, or any other financial commitment without a competitive procurement process, unless authorized by the Board or one of the following exemptions is applicable:

    - EL-5.3.3.: Financial commitments resulting from imported water management agreements, so long as the CEO informs the Board of the commitment on a timely basis.

EL-6: The BAOs shall protect and adequately maintain corporate assets.

- EL-6.5: Protect water rights and rights of way.

    - I-EL-6.5.b.: Meet all water contract terms and conditions, and take action as needed to protect and preserve water contract rights and benefits.

        I-EL-6.5.b.i.: Governance structures and operating agreements related to the long-term Delta solution must provide the ability to protect the value of the District's imported water assets, including water supply and banking contracts.

EL-7: The BAOs shall inform and support the Board in its work.

- EL-7.3.: Inform the Board of the intent to undertake negotiation of any imported water management agreement connected with proposed land development or involving a private or non-governmental party and keep the Board informed of imported water management activities on an ongoing basis.

    - I-EL-7.3.a.: Provide at least quarterly updates to the Board on imported water management activities, including forecasts of water transfers or other imported water management agreements, and provide confirmation of executed agreements within one month of completion.

- EL-7.4: Marshal for the Board as many employee and external points of view, issues and options as needed for fully informed Board choices.

    - I-EL-7.4.a.: Notify public of Board meetings, workshops, and committees.

CHARLES ROBERT GARDNER, JR.

PRESIDENT AND CEO OF HALLMARK GROUP, INC.

Mr. Gardner has over 30 years of program management, organizational leadership, and strategic planning experience. As a project turnaround specialist, Mr. Gardner has been brought in to direct capital projects struggling with funding, scheduling, and leadership challenges. His projects include a wide range of complex and politically sensitive programs that require creative collaboration with local and national government entities including influential public stakeholders.

Mr. Gardner's most recent project is the California WaterFix (formerly the Bay Delta Conservation Plan), a $14.9 B program to provide a more reliable water supply to over 25 million California residents. Brought on in 2009, he has led the effort to reorganize the program, resolving budget and schedule constraints. He has successfully managed the project through completion of the final Environmental Impact Report in December of 2016.

Since 1998, he has worked closely with public and private entities on innovative, large-scale projects that are significant to the state of California. Mr. Gardner applies his background in economics, construction, and extensive program management expertise to expedite complex and politically sensitive initiatives. Regardless of the subject matter, Mr. Gardner's deliverable-based approach requires accountability and collaboration of multiple stakeholders with sometimes competing agendas, enabling projects to move through seemingly intractable issues.

JOHN BEDNARSKI, P.E

SECTION MANAGER, METROPOLITAN WATER DISTRICT

Mr. Bednarski has more than 30 years of experience in the design and construction of heavy civil water infrastructure projects. John sucessfully directed Metropolitan's Program Management effort and Construction Management efforts for the $1.1 Billion Inland Feeder program, including the completion of the two Arrowhead Tunnels in San Bernardino, CA which were valued at $345M.

Currently, John oversees and manages the engineering aspects of Metropolitan's involvement in the California WaterFix and the Regional Recycled Water Program. He has served as an important resource to the California WaterFix Design and Construction Enterprise since 2011, collaborating on the preliminary engineering efforts and providing technical guidance that contributed to the completion of the final EIR/EIS in December of 2016. John has served as DWR's expert witness for testimony to the State Board for the Change in Point of Diversion Hearings related to the conceptual design of the Cal WaterFix facilities.

ROBERT GOODFELLOW, P.E.

Robert Goodfellow is a Senior Vice President for Aldea Services LLC. He is a licensed professional engineer in over a dozen US states.

Mr. Goodfellow has 25 years of experience in the tunneling industry and he currently serves on the Executive Committee for the American Underground Construction Association (UCA of SME) as the incoming Vice Chair.

He is an acknowledged industry expert in risk management and is co-author of the tunnel industry guidelines for risk management on tunnel projects.

Mr. Goodfellow is an invited lecturer at seminars held at the Colorado School of Mines and Colorado University where he presents a class in risk management for underground projects.

He has worked on major tunnel programs around the world, including risk assessment work on:

Alaskan Way Viaduct Replacement program, Seattle, WA
Catskill Water Tunnel Pressurization, New York , NY
Lake Mead Deep Pump Station, Las Vegas, NV
CA High Speed Rail, Northern Section, San Francisco, CA
Niagara Falls Tunnel, Niagara, ON
Mount Olympus Tunnel, San Diego,
Regional Water and Sewer program, Seattle, WA
Alto Maipo Hydroelectric Project, Santiago, Chile
Numerous CSO Tunnel Programs in Columbus, OH, Washington DC, Charleston, SC, and Cincinnati, OH.

Bio - Patrick L. Pettiette

For most of Pat's career, he has served as a senior executive and board member in a variety of domestic and international markets and venues. Today he serves as the President of 5RMK International, Inc., a U.S. based management consulting firm which has provided comprehensive project planning and management services for projects in Chile, Peru, Russia, Canada, Papua New Guinea, Mexico, Australia, and the U.S. The firm's client base includes ExxonMobil, Syncrude Canada, Wisconsin Energy, the California Department of Water Resources, Metropolitan Water District of Los Angeles and the Newmont, Goldcorp, Anglo American and Rio Tinto Mining Companies.

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Past and present board and executive management positions that Pat has held include:

- **LLC President** and Board Member of the Hanford Nuclear Site's Environmental Restoration Program
- **Infrastructure Group President** of Morrison-Knudsen
- **Executive Vice President of International and Corporate EVP** of Washington Group International
- Board member of the new Hong Kong Airport (Chep Lak Kok) development program
- Board Chairman of Denver's E-470 Highway Development Program
- Board Chairman of the Consortium developing US Military Force Sustainment and Protection Programs in Egypt, Saudi Arabia, Qatar and Kuwait
- Board member of the NATO, United Nations and Contractor Coalition chartered with the post-war reconstruction of Bosnia's power sector and Kosovo's resource sector
- Certified member of the American Arbitration Association's Panel of International Neutrals

Career Highlights

- Management and oversight of $20 billion in contracts (fixed priced and cost reimbursable) with a variety of domestic U.S. and international partners
- Significantly improving safety performance in all venues
- Managing 8,000 craft and professional staff in 16 countries
- Serving a variety of private and government sector clients in North and South America, Europe, the Middle East and Far East
- Managing diverse organizations which served the infrastructure, energy, oil & gas, defense and environmental cleanup markets.
- Consistently achieved and exceeded profit objectives for all projects and programs
- Operations experience complimented by business development and strategic planning engagement at the Project, Business Unit and Corporate Board level for

PROGRAM & PROJECT MANAGEMENT EXPERIENCE BY MARKET

2008 to Present – 5RMK, Inc. (Company President and COO)

- **"The Water Fix" (aka - Delta Habitat Conservation and Conveyance Program - $25 BB) –** *Executive Sponsor and Sr. Planning Manager*
- **ExxonMobil – RFE LNG – Eastern Siberia, Russia –** *Executive Sponsor and task leader for assessment and planning for the early works site development program of this $14BB grassroots LNG Program Development*
- **ExxonMobil – PNG/LNG – Papau New Guinea –** *Executive Sponsor of the FEED/Feasibility study for this $16BB grass roots LNG facility-*
- **Newmont, Rio Tinto, Anglo American and Fluor Mining and Metals –** Early works planning, site assessment alternatives surface water mitigation planning for four $5 to $6BB gold mining ventures in Chile and Peru
- **Wisconsin Energy, Covanta Energy, Cate Street Capital -** Subject Matter Expert and Expert witness representing four large US power producers in contractor litigations
- **Goldcorp – Penasquito Gold Mine Expansion** – Mexico – Project Planning Executive Sponsor

1985 to 2007 – Washington Group International/Morrison-Knudsen

NUCLEAR WASTE MANAGEMENT & ENVIRONMENTAL RESTORATION:

- **US Dept Energy Hanford Nuclear Reservation** – River Corridor Environmental Restoration – Richland, **Washington** – *LLC President, Program Manager and Board Member of Washington Closure Hanford LLC*
  Mr. Pettiette served as the chief executive officer and program manager of this limited liability company jointly held by Washington Group International (sponsor), Bechtel National Inc. and CH2M Hill whose purpose is execution of the $2.3 billion River Corridor Closure Project – a new DOE program which was to execute the Department's new "Accelerated Closure Process" covering over 400 square miles of the Hanford Nuclear Reservation.
- **US Dept Energy Yucca Mountain High Level Nuclear Waste Repository** – Las Vegas and **Nevada** Test Site – *VP Operations*
- **US Dept Energy Uranium Mill Tailings Remedial Action Project** – Environmental restoration and containment of Uranium Mill Tailings at 22 Sites Across the Western United States – *Vice President of Operations & Project Executive Sponsor*
- **US Army Corps Engineers & Region 10 EPA** Bunker Hill Lead Smelter Remediation – Wallace, **Idaho** – *Operations Manager*

INFRASTRUCURE PROGRAMS:

- **E-470 Highway Finance/Design/Build/Operate** – Denver, **Colorado** – *Board Chairman & Exec VP*
- **Prince Edward Island Bridge Finance/Design/Build/Operate** – **Canada** – *Board Chairman*
- **Oresund Crossing Sunken Tube Tunnel** – Copenhagen, **Denmark** – *Consortium Board Member*
- **I-895 Bridge Finance/Design/Build** – Richmond, **Virginia** – *Joint Venture Board Chairman & Exec VP Operations*
- **Chep Lap Kok Airport** Civil Works Construction – **Hong Kong** – *Consortium Board Member*
- **USAID Waste and Potable Water** Design/Build Projects – Cairo, Port Said, Ismailia and Aswan **Egypt** – *Exec VP Operations & Joint Venture Board Chairman*
- **Ping Lin Highway Tunnel** Construction Management – **Taiwan** – *Project Executive Sponsor*
- **Taipei Subway Tunnel and Station** Construction – Taipei, **Taiwan** – *VP Operations*

RESOURCE DEVELOPMENT - OIL & GAS AND MINING:

- **ExxonMobil Sakhalin Island Oil Field Development** – Sakhalin Island, **Russia** – *Exec VP Operations and Project Sponsor*
- **BP/ARCO McColl Superfund Site Restoration** – Riverside, California – *VP Operations*
- **AMOCO/Cyprus Minerals Thompson Creek Molybdenum Mine & Mill** Design/Build – Challis, **Idaho** – *Deputy Project Manager*
- **Chevron Resources Company** Phosphate Mine & Mill – Vernal, **Utah** – *Construction Manager*
- **NL Baroid** Bentonite Processing Facility – Lake Charles, **Louisiana** – *Project Engineer*

POST WAR RECONSTRUCTION AND FORCE SUSTAINMENT:

- **USAID Office of High Representative** – Power, Water and Mining Sector Reconstruction – **Bosnia** – *Consortium Board Member and Exec VP Operations*
- **United Nations Mission in Kosovo** – Treptca Lead Mining and Smelter Complex Restoration **– Kosovo** – *Consortium Board Member and Exec VP of Operations*
- **US Army Corps Engineers - Iraq and Afghanistan** - Power and Water Reconstruction and Force Sustainment Programs – *General Manager staffing and personnel deployment*
- **US Army Corps Engineers** Pacer Forge Airbase Construction, Operations and Maintenance @ 19 Airbases in **Egypt** – *Consortium Board Chairman and VP Operations*
- **US Army Corps Engineers** Force Pre-deployment Base – Doha, **Qatar** – *Exec VP Operations*
- **Saudi Defense Forces** Airbase Construction – Empty Quarter, **Saudi Arabia** – *Project Executive Sponsor*

EDUCATION:

B.S. Architecture – University of Texas

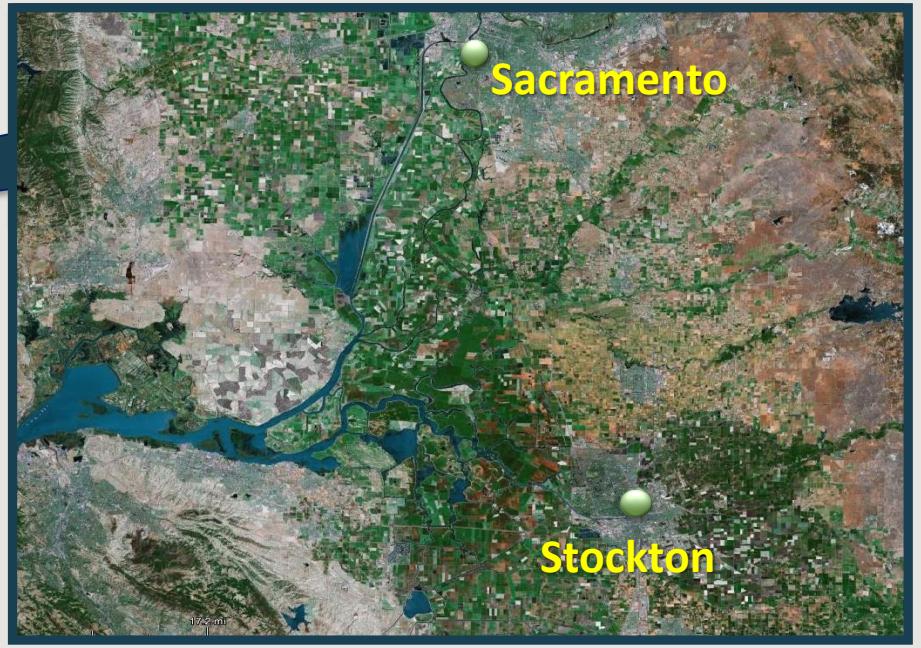
CALIFORNIA WATER FIX
RELIABLE. CLEAN. WATER.

PROJECT IMPLEMENTATION CONSIDERATIONS FOR THE CALIFORNIA WATERFIX

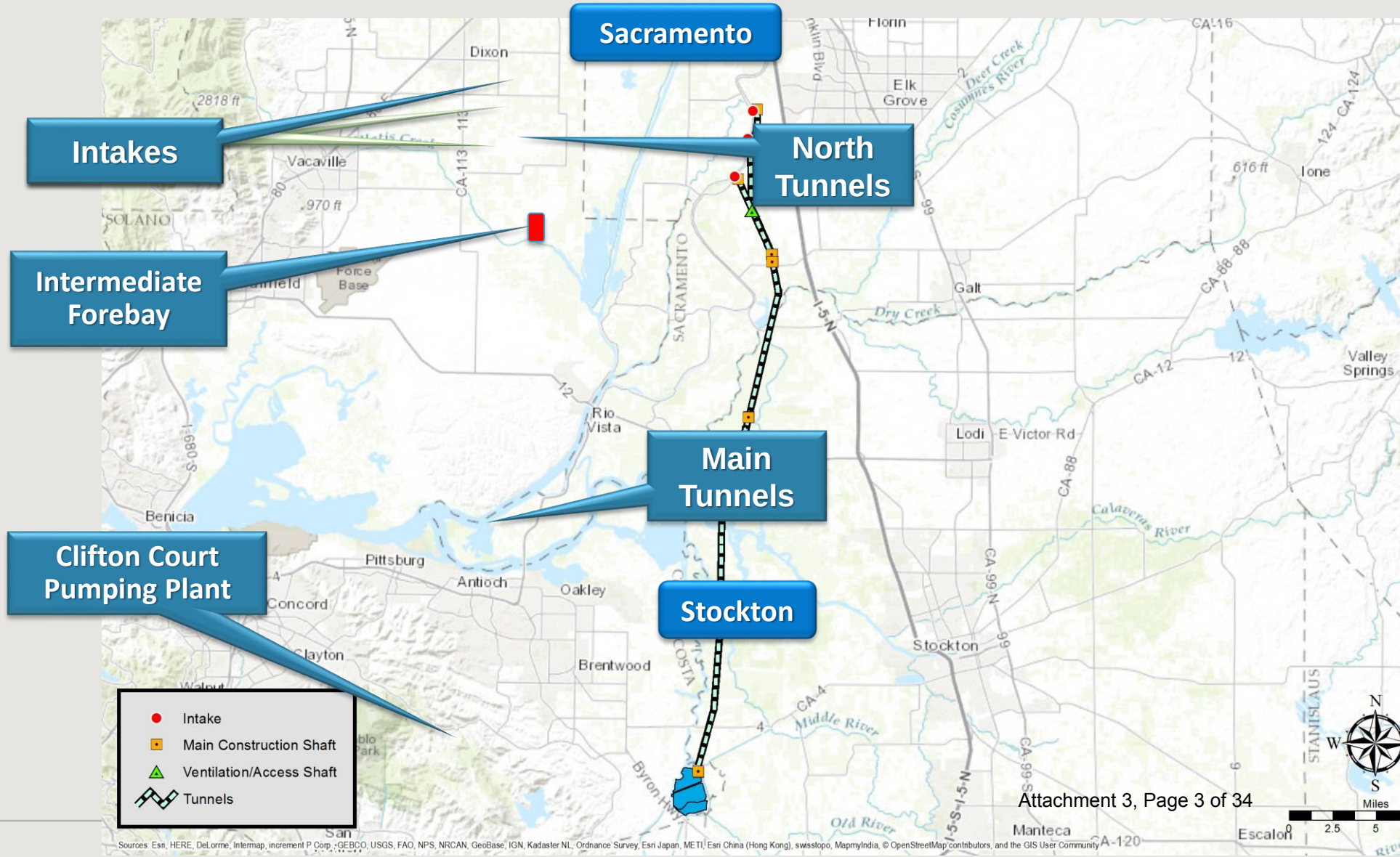
Santa Clara Valley Water District
May 25, 2017

PROJECT LOCATION

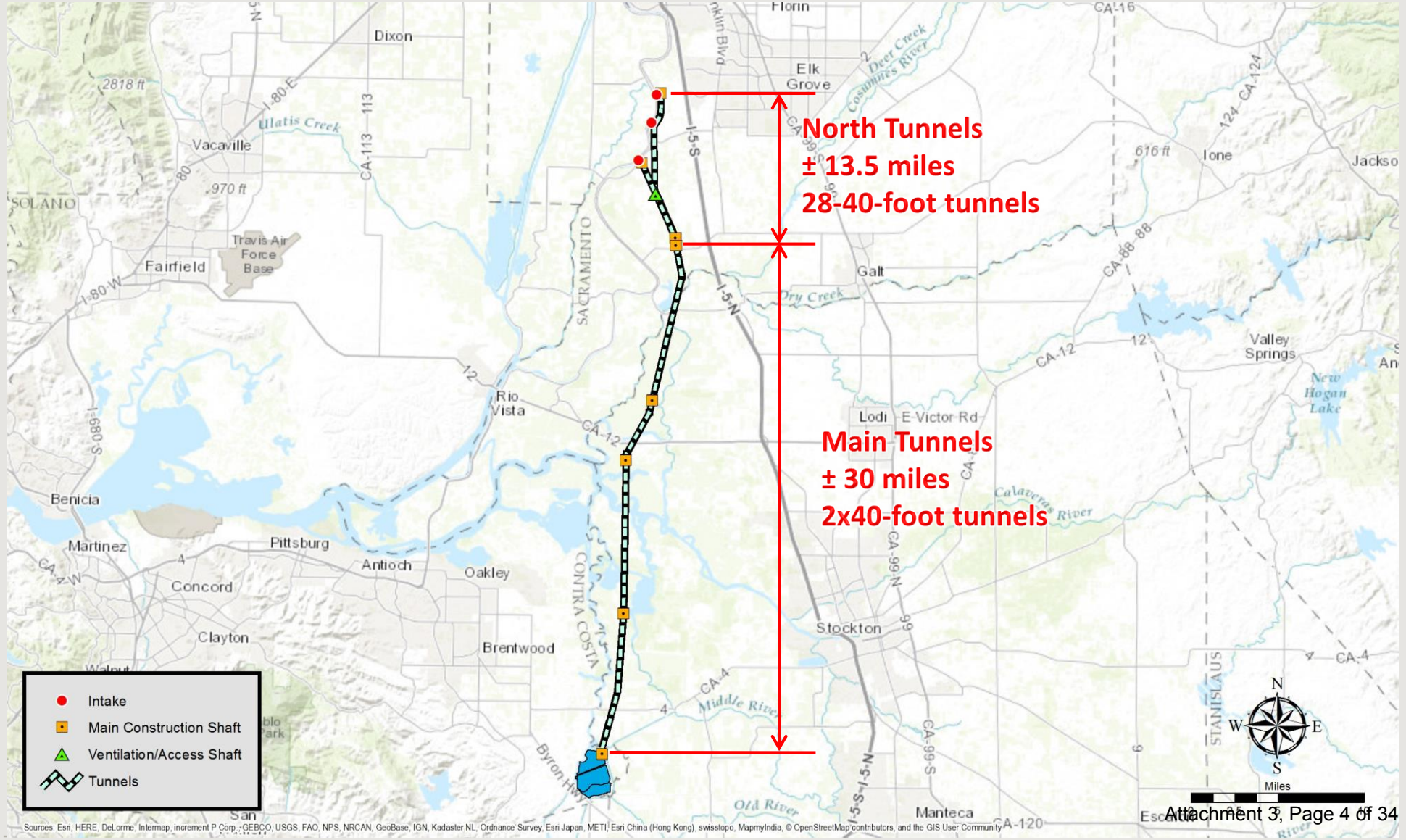
Bay Delta Region



CALIFORNIA WATER FIX- OVERALL PROGRAM



TUNNEL PORTIONS OF PROGRAM



MAIN TUNNELS

- 100 year life
- Twin bore main tunnels
- 150 ft below grade
- Concrete segmental liner
- Pressurized face Tunnel Boring Machine construction
- 45 ft excavated diameter
- 40 ft finished internal diameter

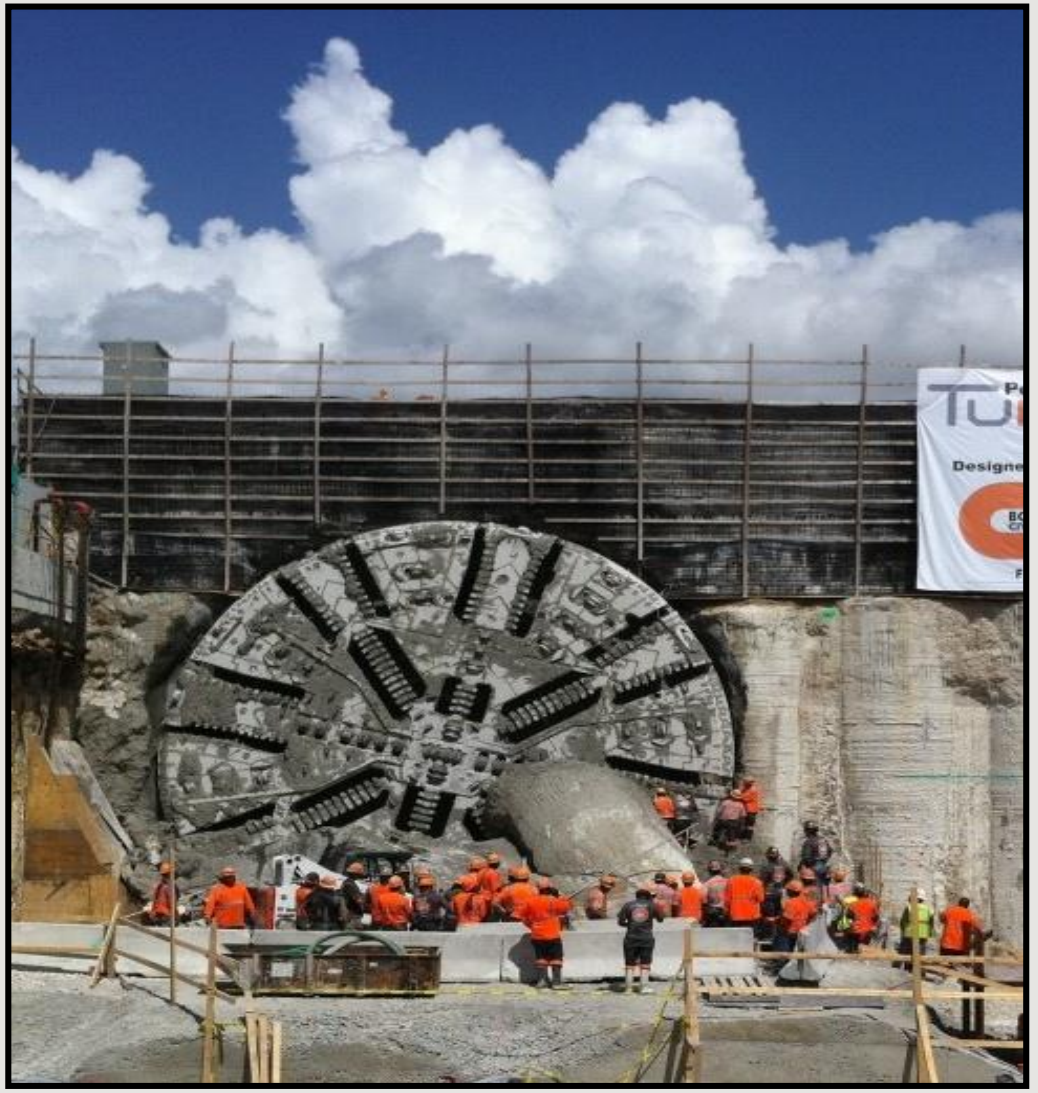
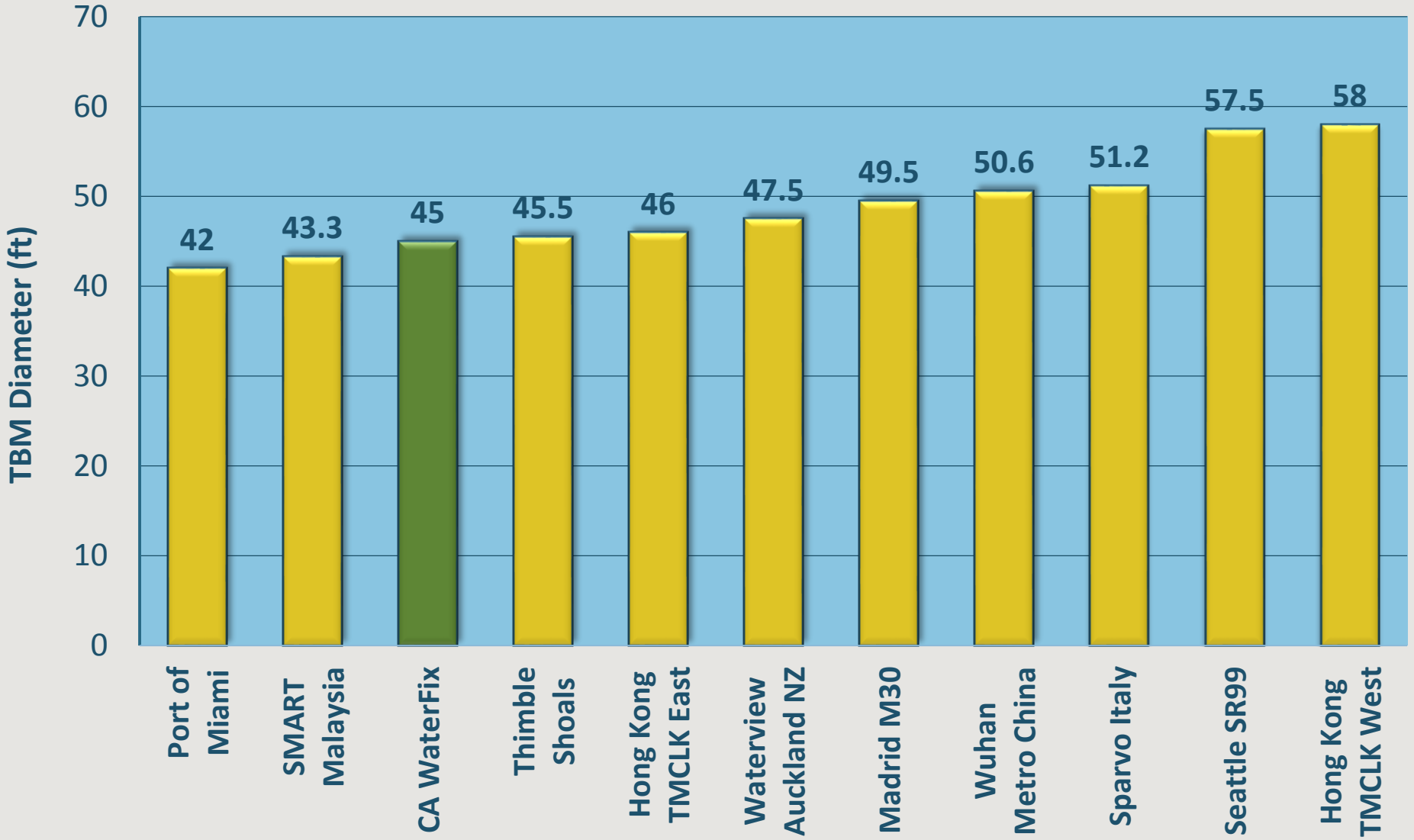
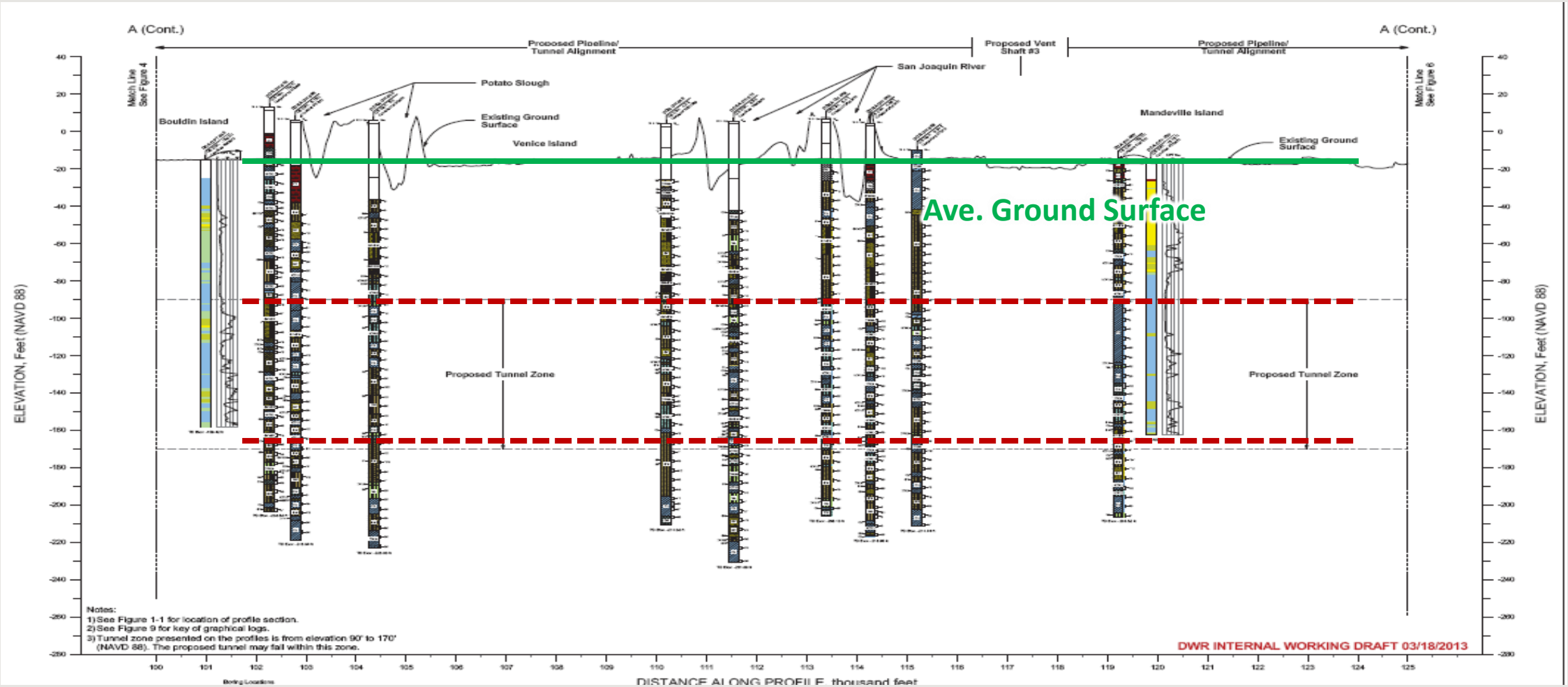


Photo Courtesy: Port of Miami Tunnel

LARGE DIAMETER
TUNNEL BORING MACHINE PROJECTS



GEOTECHNICAL PROFILE AT TUNNEL DEPTH



Note: Over 200 borings/CPTs completed

TYPICAL TUNNEL SEGMENTS

REUSABLE TUNNEL MATERIAL

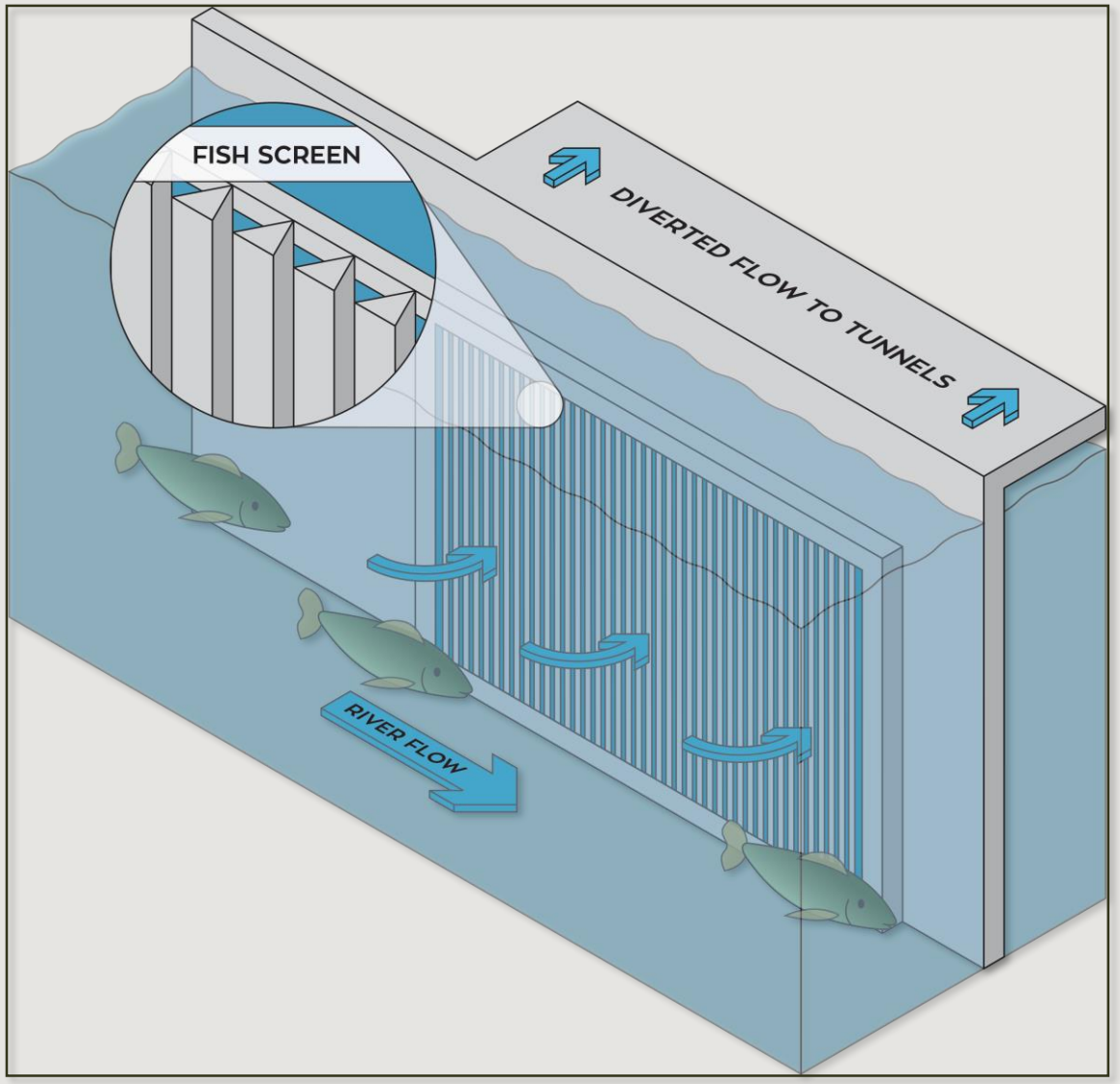
- Preliminary level of testing (DWR Report)
  - Sterile material
  - Suitable for engineering fill
- Stockpiles at 6-14 ft
- Existing restoration uses
  - SFPUC Bay Tunnel Bair Island
  - London Crossrail Wallasea Island

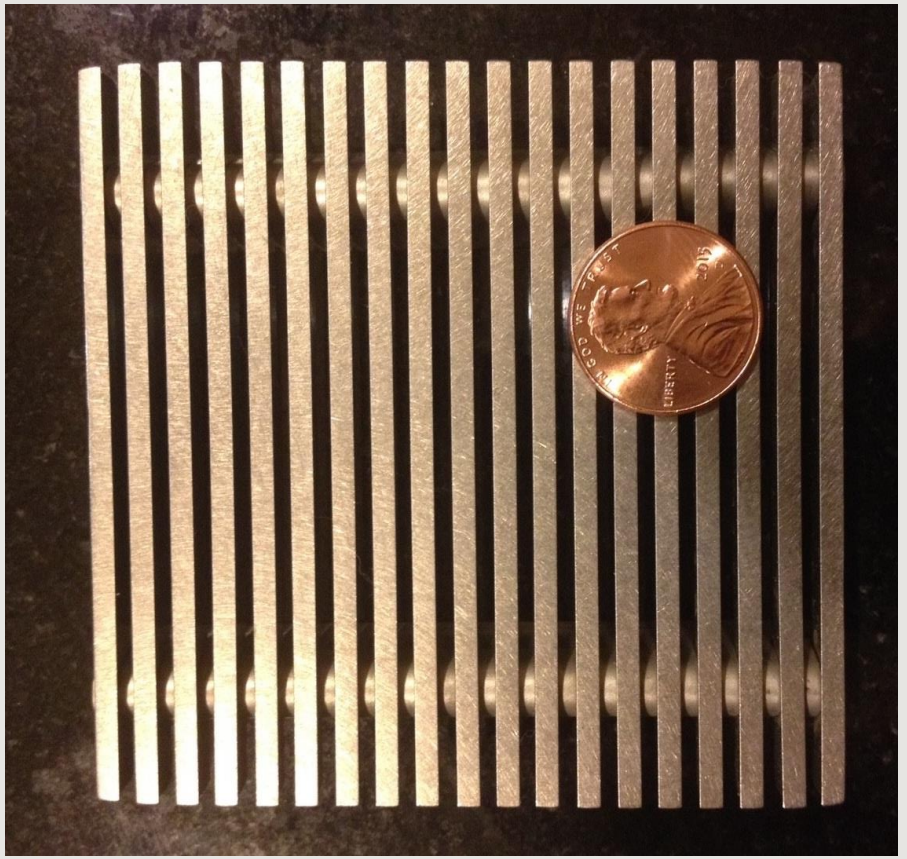
PROGRAM FACTS

- 700,000 tunnel segments
- 23 million cubic yards of excavated tunnel material
- 10-12 Tunnel Boring Machines operating simultaneously
- 195 Mega Watts of power required for Tunnel Boring Machines
- Existing levees protect project sites
- Limited highway access in Delta

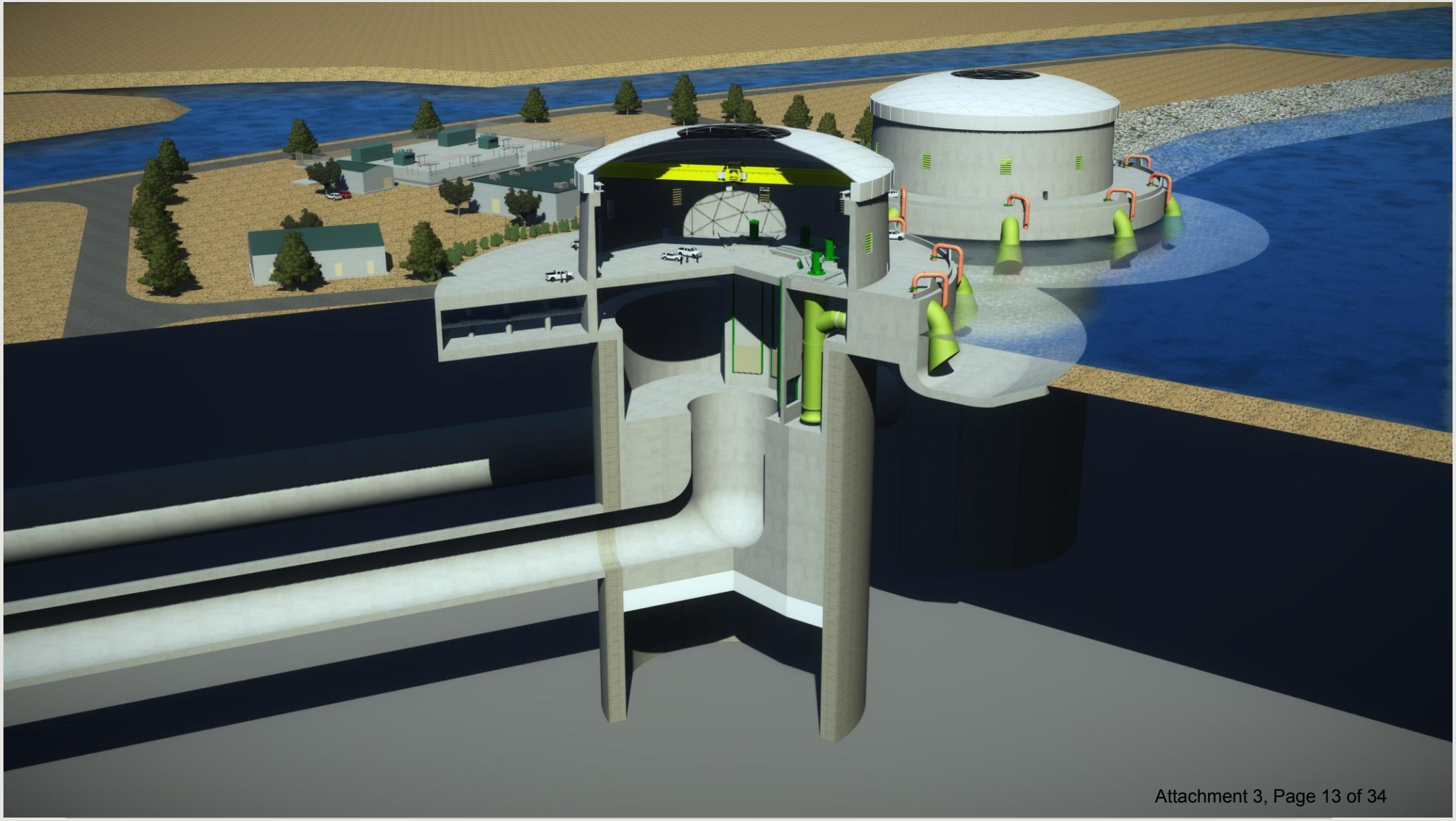
RIVER INTAKES

PROTECTING FISH





CLIFTON COURT PUMP PLANTS



PROGRAM ESTIMATES

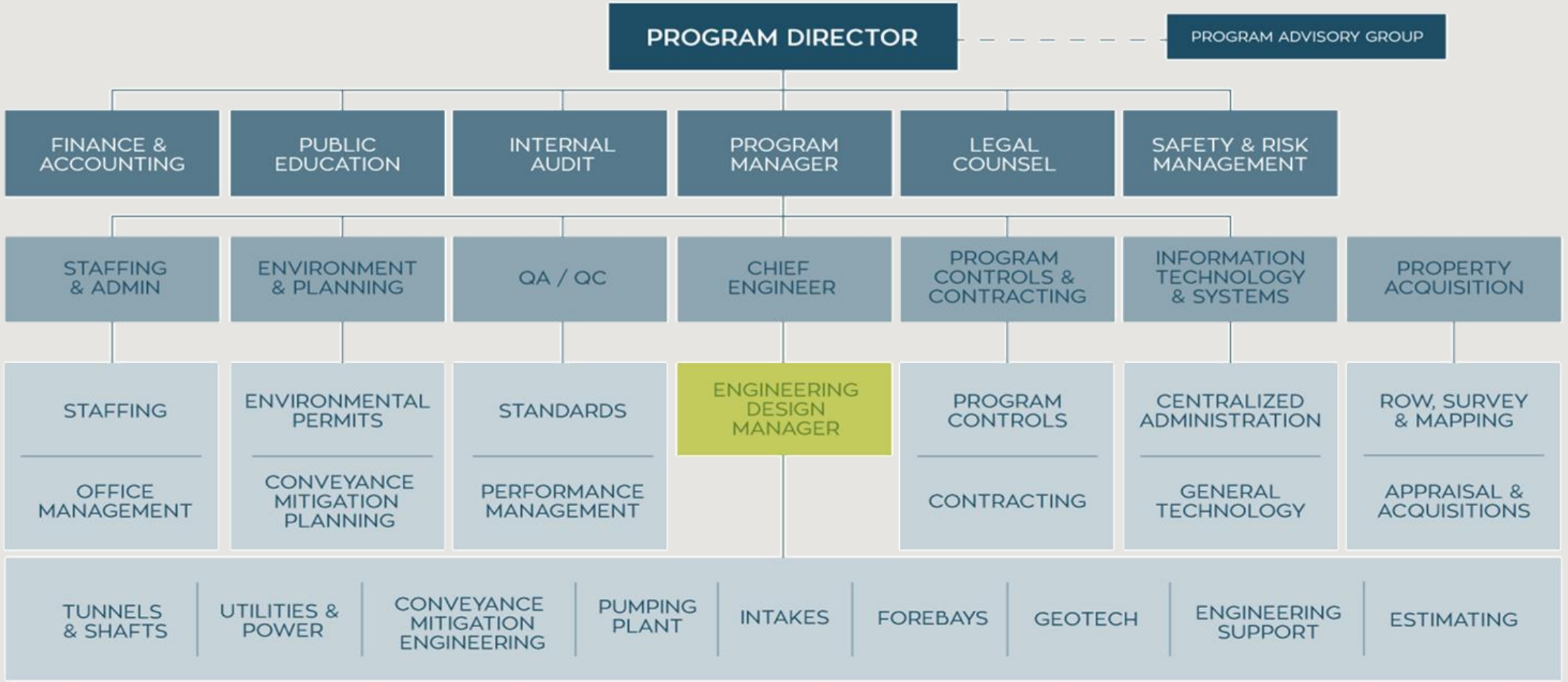
	Amount ($ billions)
Total	$ 14.94
PM/CM/Engineering	$ 1.91
Tunnels/shafts construction	$ 6.82
Remaining construction	$ 2.68
Land acquisition	$ 0.15
Contingency (approx. 36% for tunnels/shafts and remaining construction)	$ 3.38

Program Estimate developed in September 2015

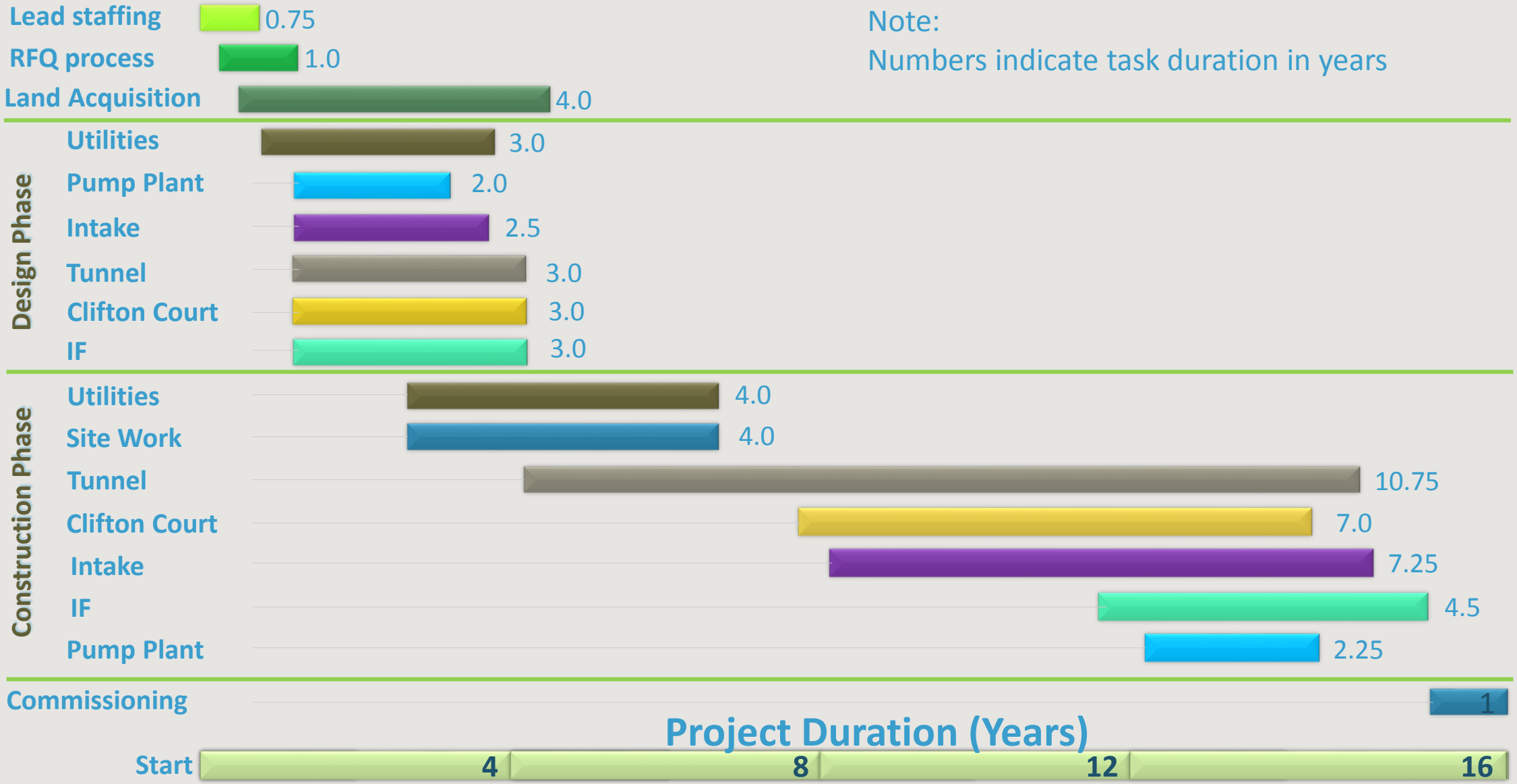
Program Estimate in 2014 Dollars

DESIGN AND CONSTRUCT ENTERPRISE

ORGANIZATIONAL STRUCTURE



DCE PROGRAM SCHEDULE



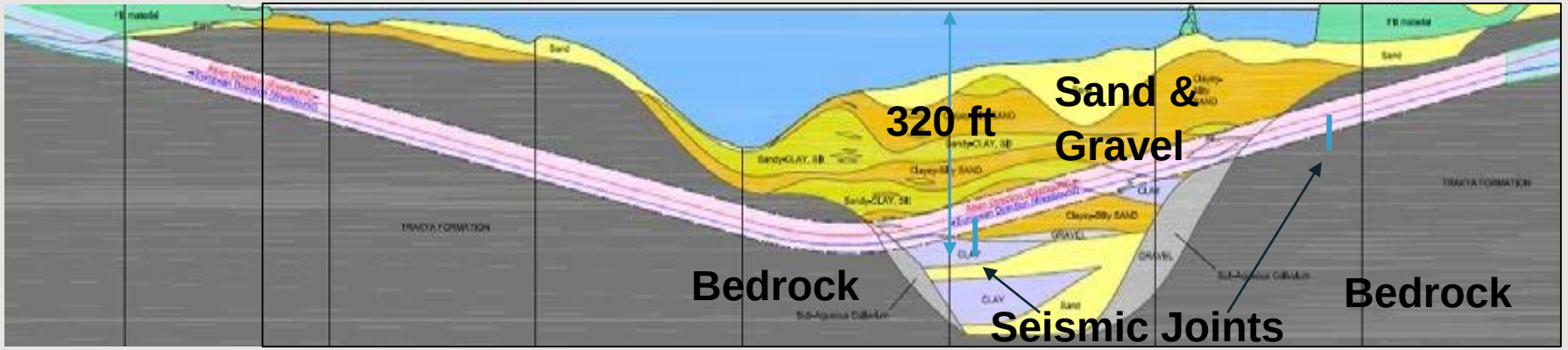
Note:
Numbers indicate task duration in years

REVIEW OF OTHER MEGA-TUNNEL PROJECTS

- The Eurasia Tunnel - Turkey
- Lee Tunnel - London
- Port of Miami Tunnel - Florida
- East Side Access - New York
- Blue Plains Tunnel Project - District of Columbia
- Bay Tunnel - San Francisco
- Willamette River Combined Sewer Outfall Program - Portland
- Gotthard Base Tunnel - Swiss Alps
- SR-99 Alaskan Way Replacement - Seattle

THE EURASIA TUNNEL – TURKEY

2.1 miles



THE EURASIA TUNNEL – TURKEY

Project Information

- Transportation Tunnel
  40 ft Internal Diameter (ID) x 2.1 miles
- 320 ft deep
- Completed Dec 2016
  - 3 months ahead of schedule
- Challenges
  - Complex geology, seismic deformations, and high groundwater pressure

PORT OF MIAMI TUNNEL - FLORIDA

PORT OF MIAMI TUNNEL

Project Information

- (2) 39 ft ID x 4,200 ft Long Transportation Tunnels
- 120 ft deep
- Completion May 2014
  - On schedule
  - Within budget
- Challenges
  - Porous coral and limestone required grouting, restricted access above tunnel due to shipping channel

BLUE PLAINS TUNNEL PROJECT
DISTRICT OF COLUMBIA

BLUE PLAINS TUNNEL PROJECT

Project Information

- 23 ft ID x 24,200 ft CSO Tunnel
- 160 ft deep
- Completed Dec 2015
  - 3 months ahead of schedule
  - Under budget
- Challenges
  - Large deep shafts, existing infrastructure above tunnel

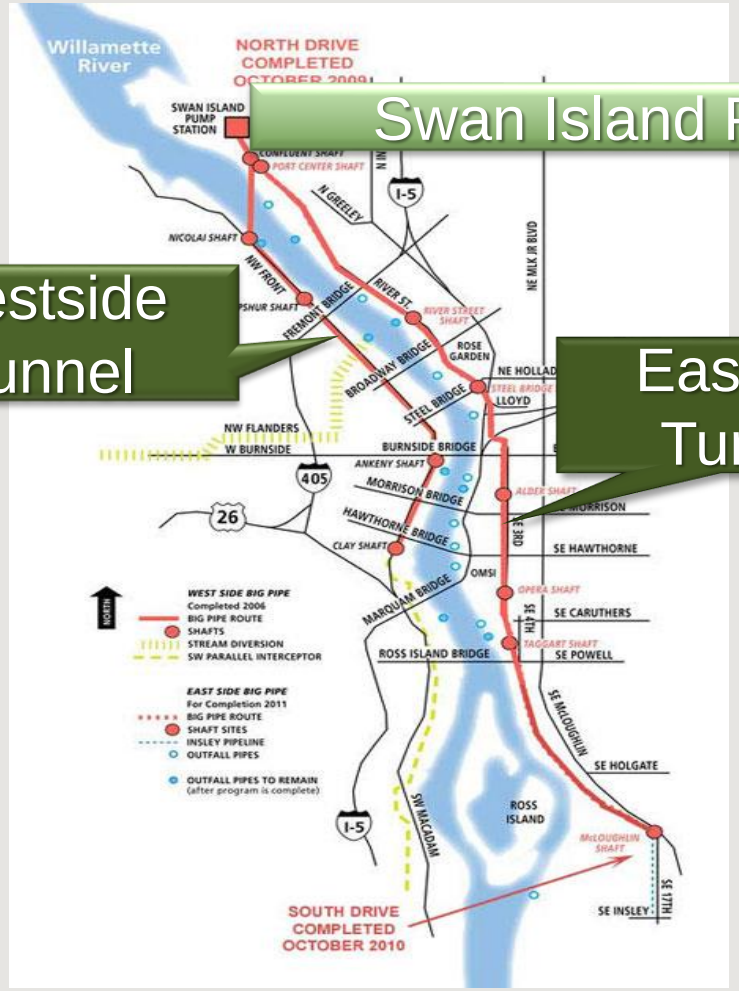
BAY TUNNEL – SAN FRANCISCO

BAY TUNNEL – SAN FRANCISCO

Project Information

- 15 ft ID x 5 mile water tunnel
- 110 ft deep
- Completed Oct, 2014
  - On schedule
  - Within budget
- Challenges
  - Long tunnel drive, no intermediate shafts, limited surface access, and high ground water pressure (3.5 bar)

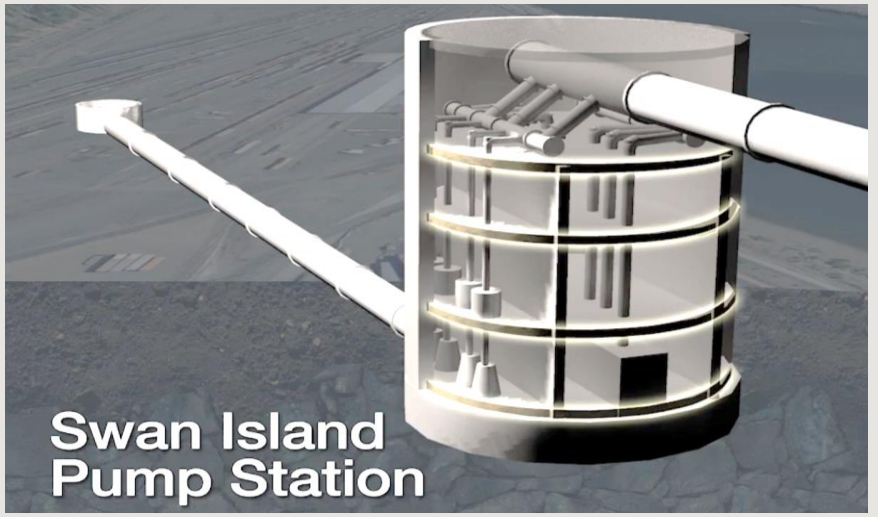
WILLAMETTE RIVER COMBINED SEWER OUTFALL PROGRAM – PORTLAND



Swan Island PS

Westside Tunnel

Eastside Tunnel



WILLAMETTE RIVER TUNNELS – PORTLAND

Project Information

- (1) 14 ft ID x 3.5 mile 120 ft deep and (1) 22 ft ID x 6 mile
- 150 ft deep CSO tunnels
- Cost Reimbursable Fixed Fee
- Construction Complete Feb 2012
  8 months ahead of schedule
- Construction value US $719 M, $65M under budget
- Challenges
  - Schedule, existing infrastructure, groundwater, Tunnel Boring Machine breakout, soil modification, and subcontract changes

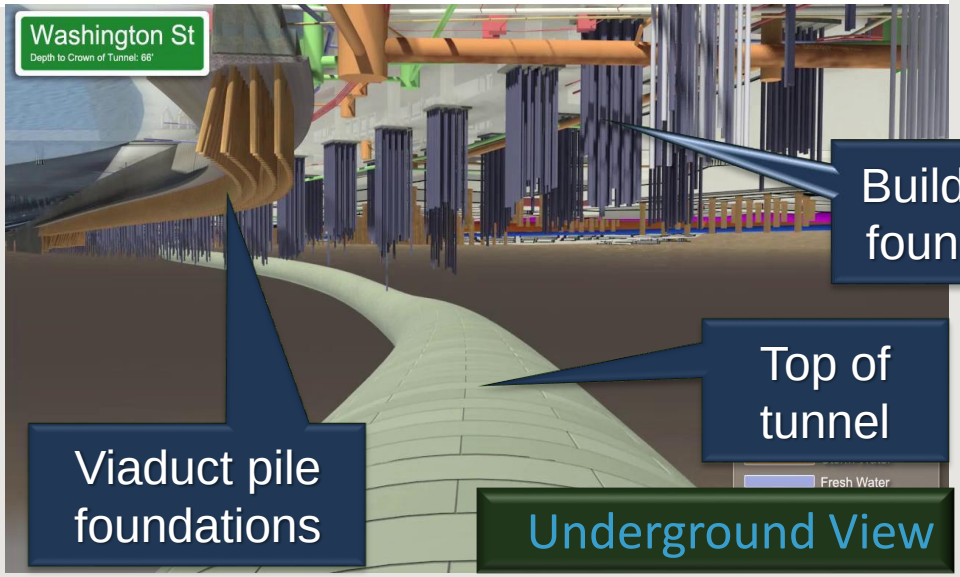
GOTTHARD BASE TUNNELS – SWISS ALPS

GOTTHARD BASE TUNNELS-SWISS ALPS

Project Information

- (2) 30 ft ID x 35 mile rail tunnel
- Up to 6,560 ft deep
- Completed June 2016 within schedule (17 years)
- Final construction cost $12.5B over budget by $0.8B
- Challenge: Safety, geology
- For the 2 main tunnels and the safety, ventilation and cross cuts, a total of 95 miles tunnel has been bored

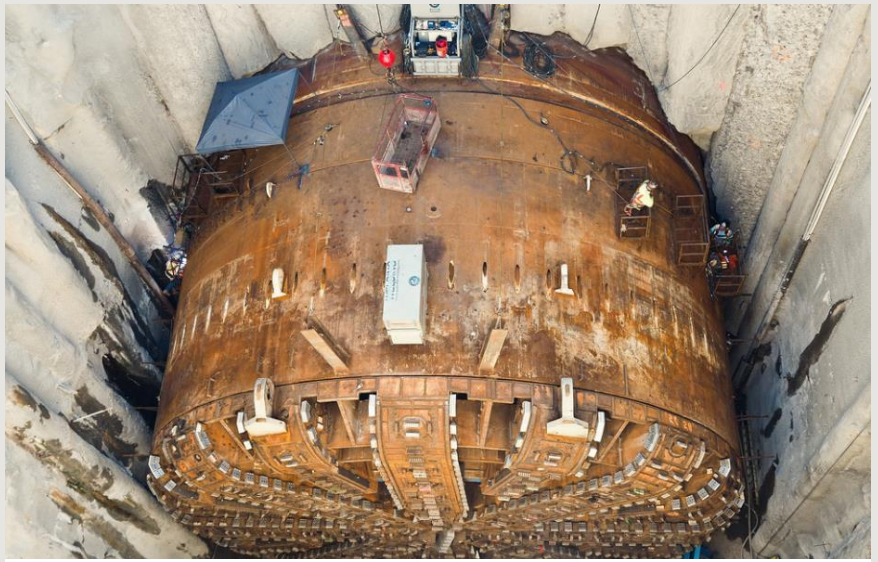
SR-99 ALASKAN WAY REPLACEMENT-SEATTLE



SR-99 ALASKAN WAY TUNNEL-SEATTLE

Project Information

- 53 ft ID x 2 mile transportation tunnel
- Construction schedule
  - Approximately 2 year delay
- Challenges
  - Equipment malfunction, existing pile foundations and other infrastructure, difficult ground



SEATTLE TUNNEL SUCCESS

Inside Tunnel, prior to roadway construction

Tunnel breakthrough April 4, 2017

LESSONS LEARNED

- Proactive risk management strategy at all stages
- Assign risk to appropriate party
- Select project delivery method to maximize project benefits
- Get construction input early
- Invest in good geotechnical program and GBR
- Must have strong owner involvement
- Co-locate project team
- Resolve Right-of-Way and property acquisition early
- Resolve utility issues early
- Identify long lead items early
- Proactively manage logistical issues
- Develop effective program communication strategy

QUESTIONS

The California Water Fix

The California WaterFix

April 2015 Construction Cost Estimate

Presented To:

Santa Clara Valley Water District℠

May 25, 2017

Today's Presentation

1. 5RMK Qualifications/experience
2. Scope of program
3. Cost summary
4. Basis of estimate
5. Intakes
6. Clifton Court pump plants
7. Tunnel reaches

1. 5RMK Qualifications

5RMK Is a project management and planning organization providing the following services to the infrastructure and resource development industries:

- Estimating, scheduling, project planning
- Permitting, siting assessments, environmental compliance
- Program & construction management
- Claims support, defense & dispute resolution

1. 5RMK Qualifications

DRAFT

2. Scope of 2015 Estimate

- New class 3 estimate as defined by the Association for The Advancement of Cost Engineering International
- New scope definition based on new quantity take-offs, crew definitions, equipment selections and productivities
- Scope of the Project:
  - 3 - 3000 CFS Intakes
  - 2 - 4500 CFS Clifton Court Pump Plants
  - 1 - Intermediate Forebay
  - 1 - Clifton Court modifications, include embankments, siphons, canals and control structures
  - Tunnels with shafts and safe havens
    - 1- 28 ft inside diameter x 2 mile long (reach 1)
    - 1 - 28 ft inside diameter x 4.8 mile long (reach 3)
    - 1 - 40 ft inside diameter x 6.8 mile long (reach 2)
    - 2 - 40 ft inside diameter x 30.1 mile long (reaches 4-7)

2. Scope of 2015 Estimate

Total constructed value includes:

- All craft labor costs
- Construction equipment operating and ownership cost
- All permanent material and supply cost
- Field offices, laydown and staging area development
- Personnel, material, equipment and other transport cost
- Construction supervision, administration and management

Cost does not include:

- Land Acquisition, Program Management, Construction Management, Engineering, or Contingency

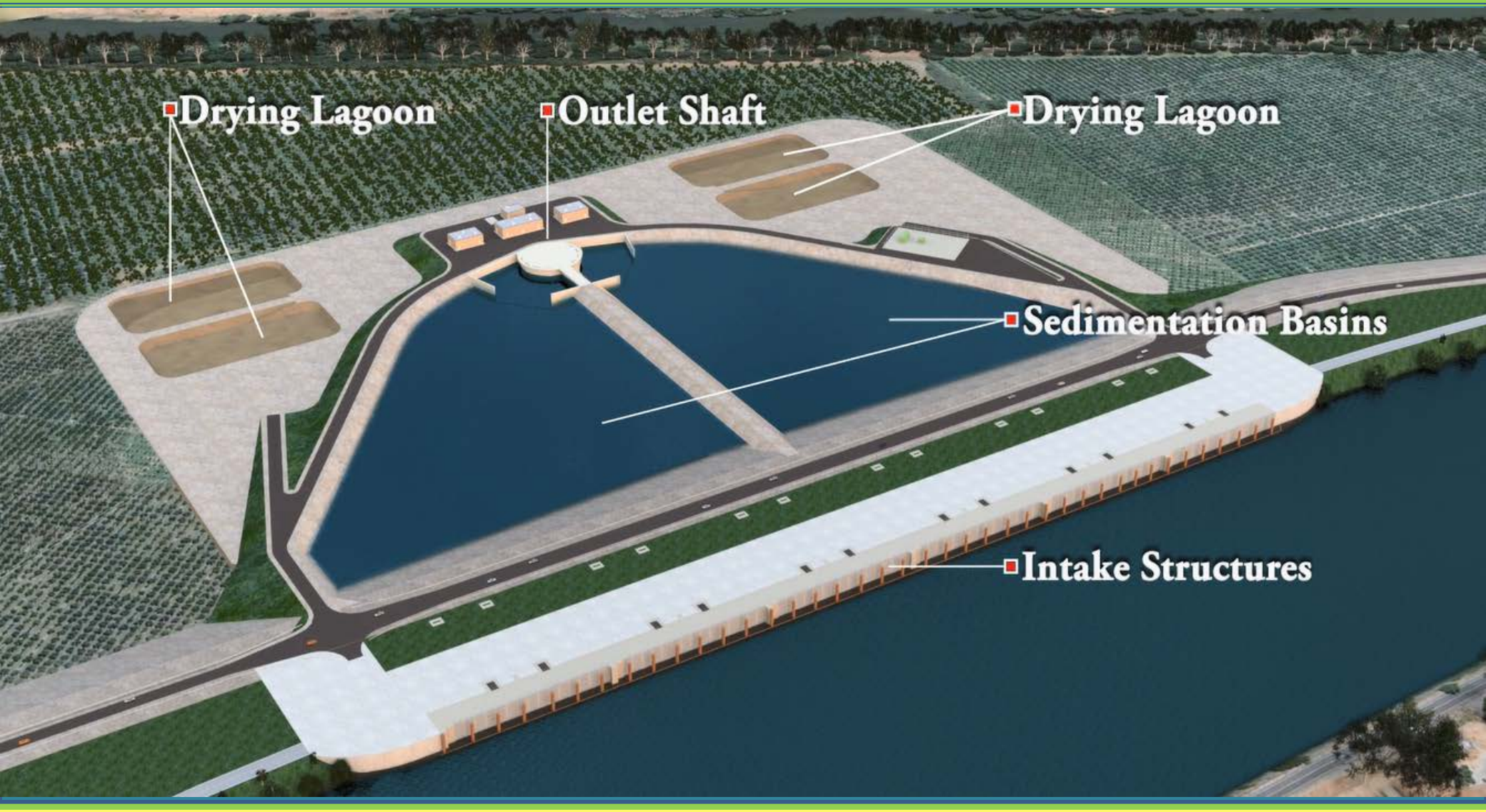
3. Construction Cost

CWF April 2015 Estimate Summary		
Contract		**Estimate**
Intakes 2,3, 5	$	1,082,880,306
Intermediate Forebay	$	159,579,782
Clifton Court Forebay	$	593,720,041
Clifton Court Pump Plant	$	446,577,237
Reach 7 Tunnels	$	1,538,449,966
Reach 6 Tunnels	$	1,559,673,985
Reach 5 Tunnels	$	899,619,545
Reach 4 Tunnels	$	1,603,383,401
Reach 1, 2, & 3 Tunnels	$	1,218,681,541
Communication Network, Scada	$	25,065,734
Access, Power Delivery & Utility Relocations	$	371,300,000
Construction Total	**$**	**9,498,931,538**

4. Basis of Estimate

- Based on April 1, 2015 Conceptual Engineering Report (CER)
- Detailed quantity takeoffs prepared from CER
- Wage & workmen's comp rates based on "prevailing rates" listed by California Department of Industrial Relations
- Equipment ownership and operating costs based on US Army Corps Engineers
- Vendor and subcontract costs based on independent supplier solicitations
- All costs data is in 2014 dollars
- Work shifts – surface facilities: 4 days per week, 10 hours per day
- Work shifts – tunnels: 5 days per week, (2)10 hours shifts per day
- Geotechnical data is limited – further investigations are planned
- Advance rate for 40' diameter tunnels – 31.1 to 34.1 ft/day
- Advance rate for 28' diameter tunnels - 34.5 ft/day (reach 1); 40.4 ft/day (reach 2)

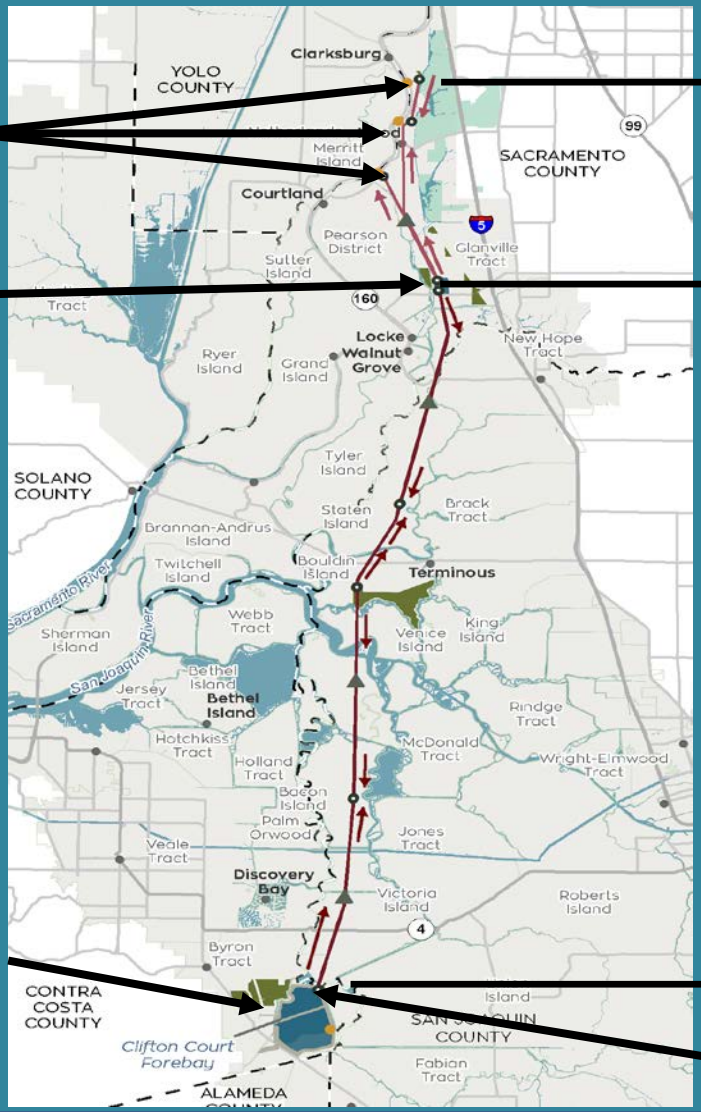
5. Intakes Overview



6. Clifton Court Pump Plants

Combined Surge Shaft and Pump Plants

7. Tunnel Reaches



Intakes

Intermediate Forebay

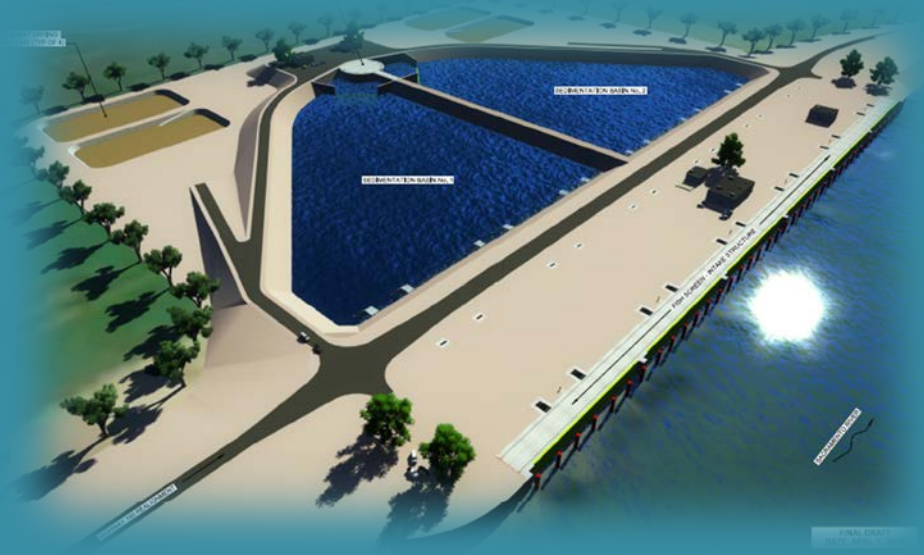
Clifton Court

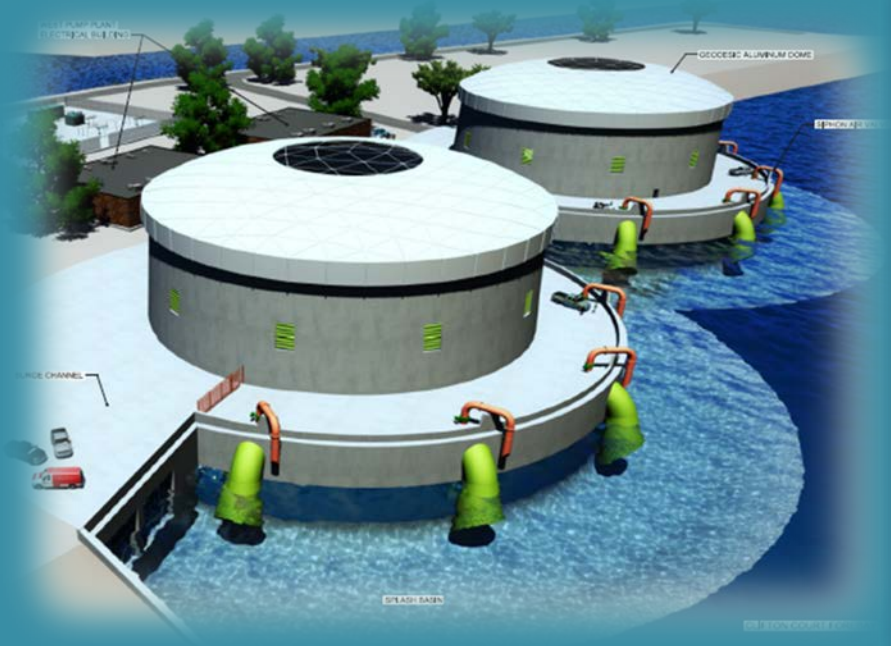
North Tunnel Reaches 1,2,3

Main Tunnel Reaches 4-7

Pump Plants

California WaterFix





ALDEA SERVICES

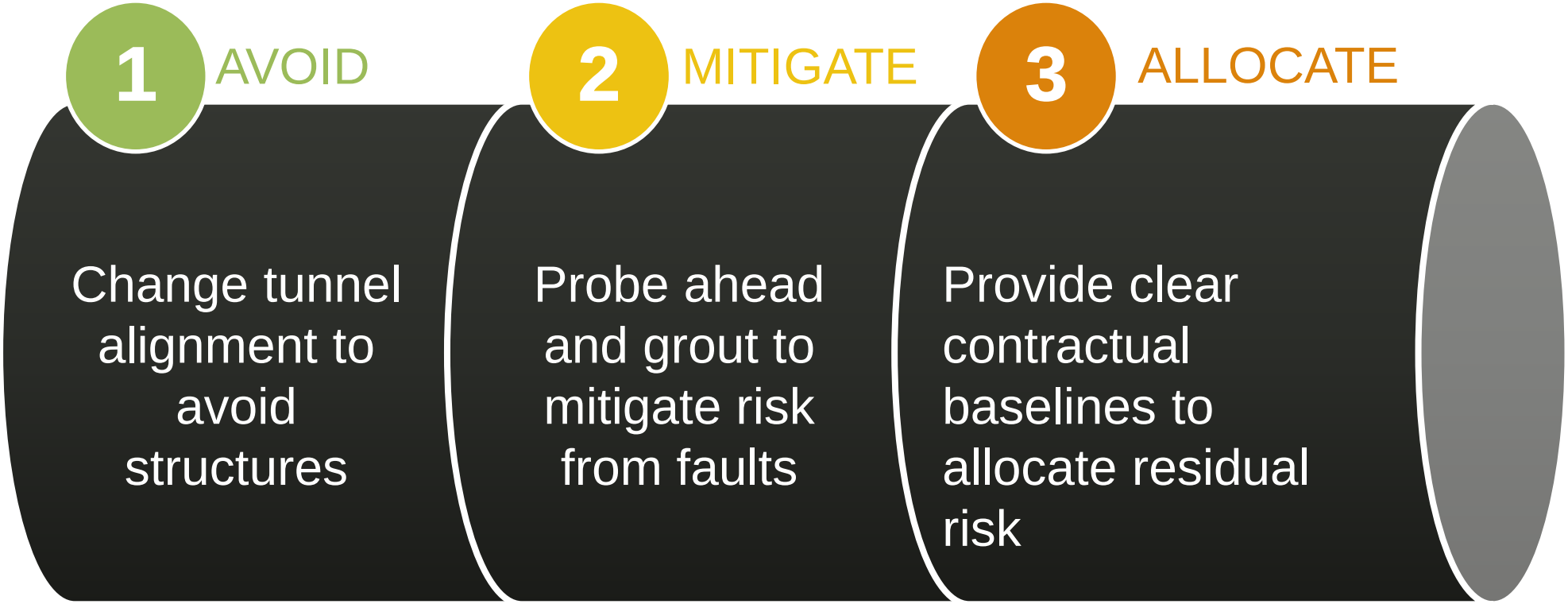
CALIFORNIA WATER FIX

RISK MANAGEMENT – DESIGN AND CONSTRUCTION

ALDEA SERVICES LLC
RELIABLE RESOURCES DELIVERED

Process of Risk Management

Three-Step Risk Management Process



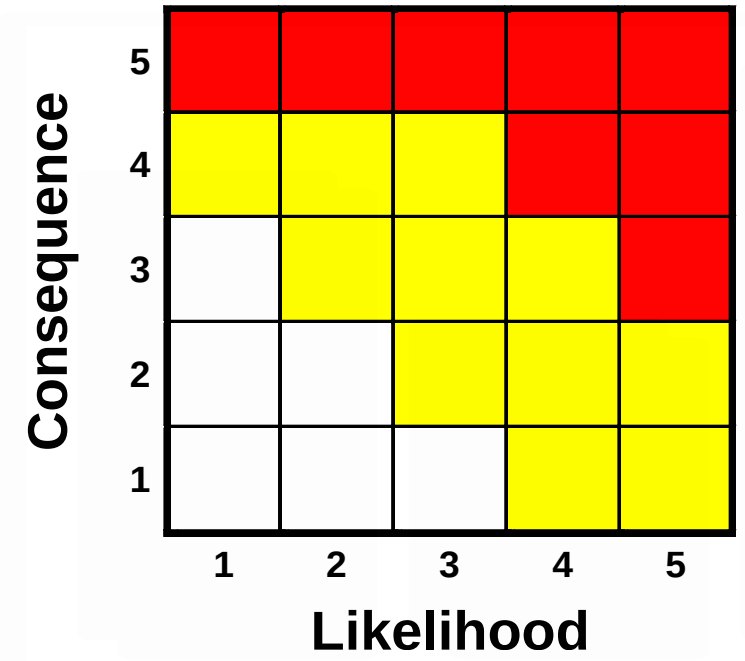
US Guidelines Exist for Risk Management on Tunnel Projects

- US Risk Management practice established by this document
- Published and available online by Underground Construction Association of Society for Mining, Metallurgy, and Exploration
- Emphasizes:
  - The importance of experience in project team
  - The use of Risk Registers as a risk management tool
  - Consistent risk management approach from early planning throughout life of project

Design and Construction Risks

Probability Rating	AKA
5	Probable
4	Likely
3	Possible
2	Unlikely
1	Improbable

Consequence



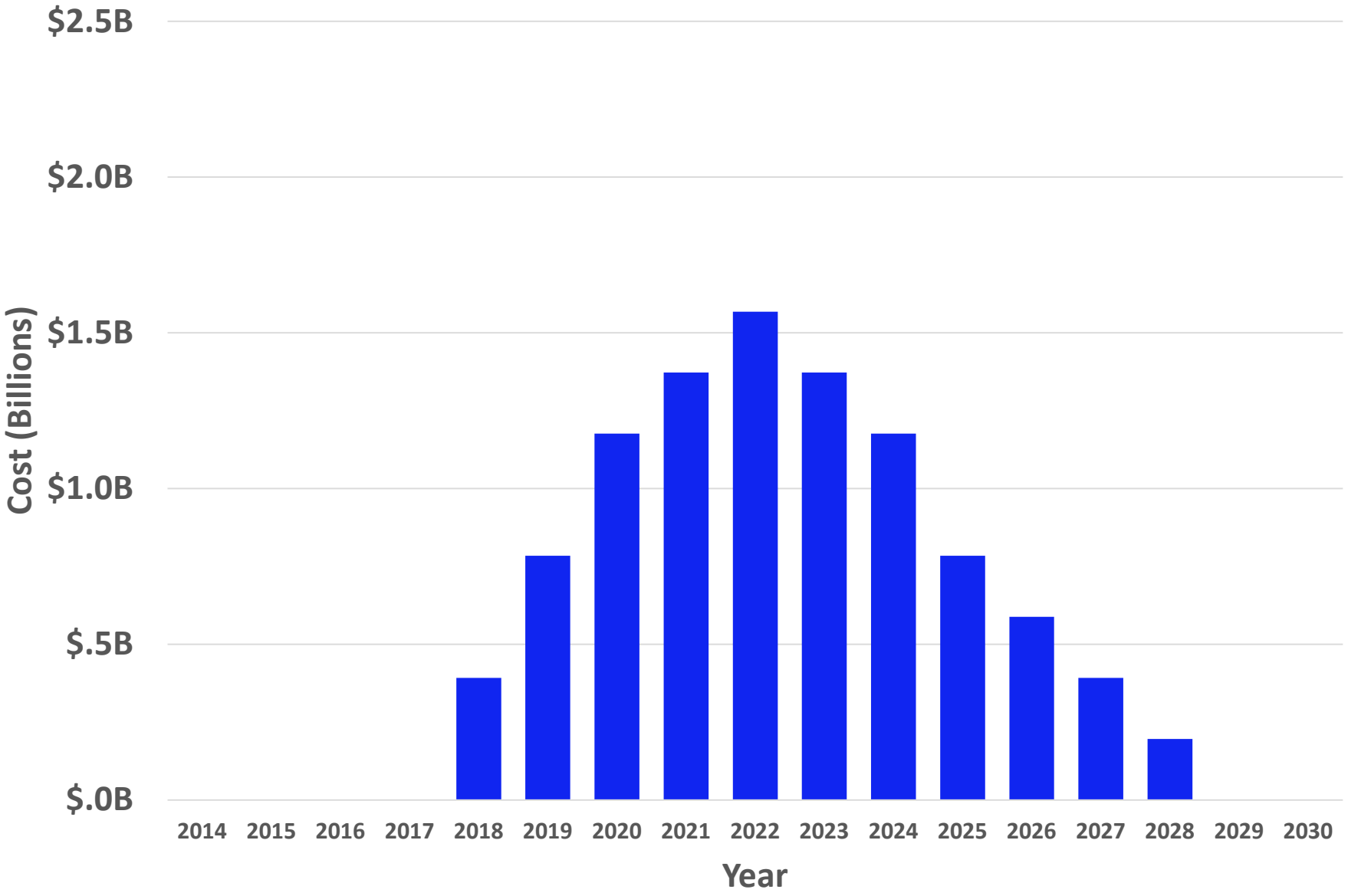
Risk Examples

- Initial works delayed leading to consequent delays to main construction
- Geotechnical investigation delayed leading to delay in design completion and start of construction
- Transmission power delayed leading to delay to start of tunneling
- Differing geotechnical conditions leading to slower progress, increased cost and delay to completion of tunneling
- Substantial design change required during construction leading to delay in commissioning

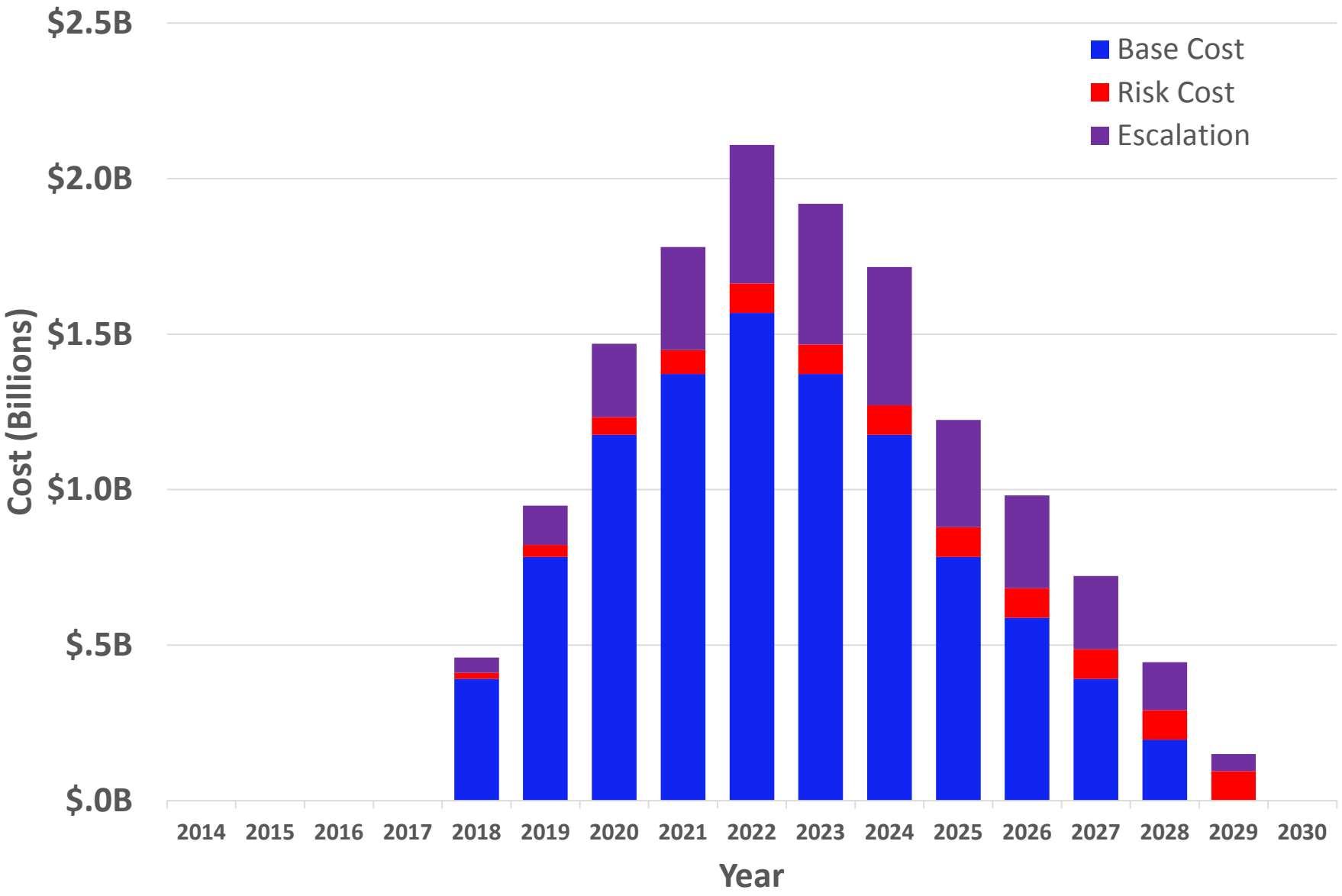
Program Estimate

Item	5RMK Estimate (Billions)
Estimated Base Construction Cost	$9.50
Contingency	$3.38
Program Management/Construction Management/Engineering	$1.91
Land Acquisition	$0.15
Grand Total	**$14.94**

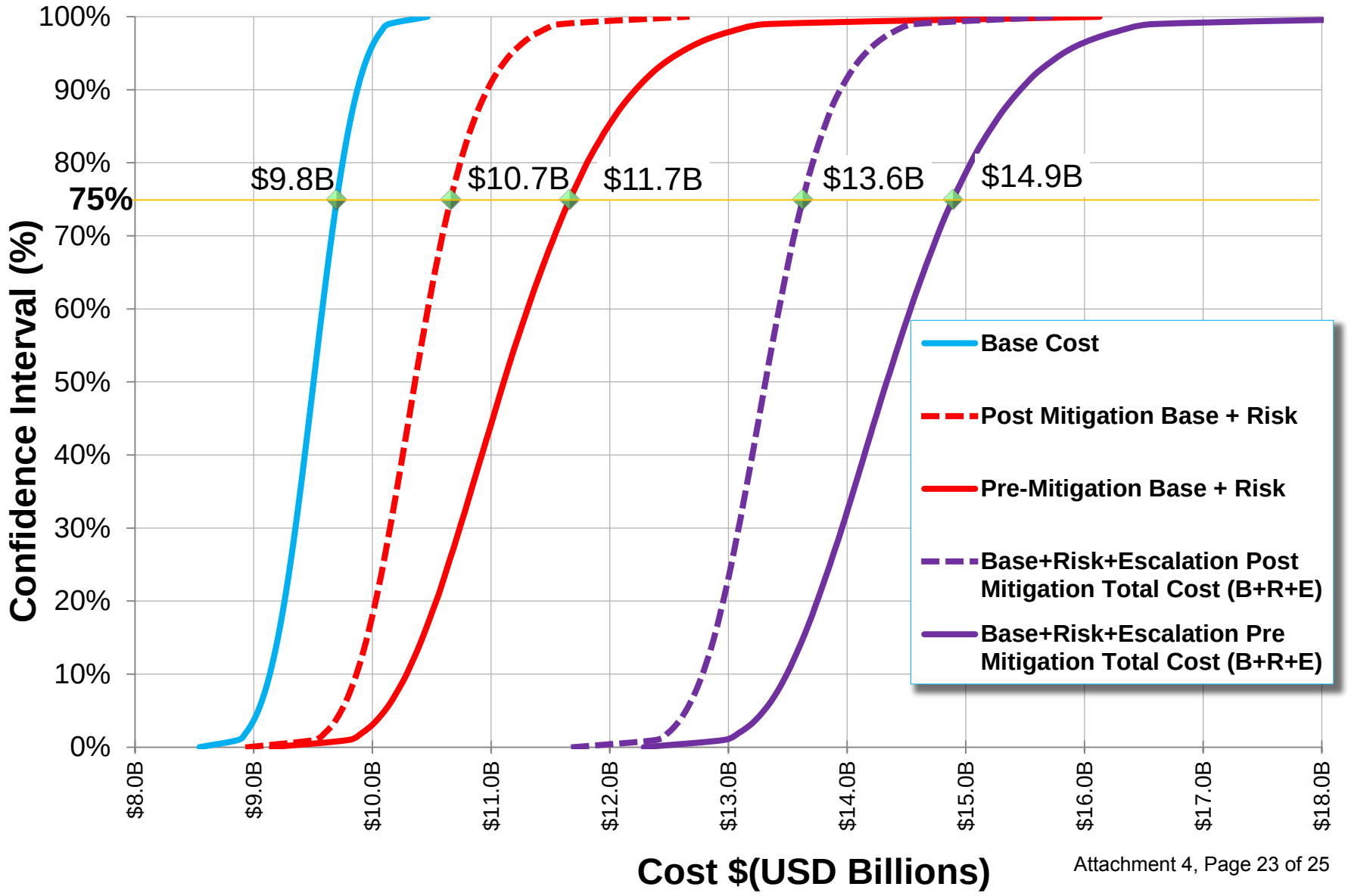
Annual Expenditures – 2014 Dollars



Annual Expenditures – with Risk and Inflation Cost



Construction Cost Distribution Profile



Estimate Summary

Item	Risk with Mitigation at 75% Confidence Interval [1][3] (Billions)	5RMK Estimate [1],[2] (Billions)	Jacobs Eng Estimate [1],[2] (Billions)
Construction	$10.66	$9.50	$8.86
Contingency	—	$3.38	$3.15
Construction Subtotal	**$10.66**	**$12.88**	**$12.01**
PM/CM/Eng	$1.91	$1.91	$1.91
Land acquisition	$0.15	$0.15	$0.15
Grand Total	**$12.72**	**$14.94**	**$14.07**

(1) Program estimates in 2014 dollars
(2) ~36% Contingency on construction for 5RMK and Jacob Engineering estimates
(3) Based on risks known at time of assessment

Questions ?