

San Diego's Quest for Water Reliability

WESTCAS

June 21, 2017

Maureen Stapleton, General Manager
San Diego County Water Authority



San Diego County
Water Authority

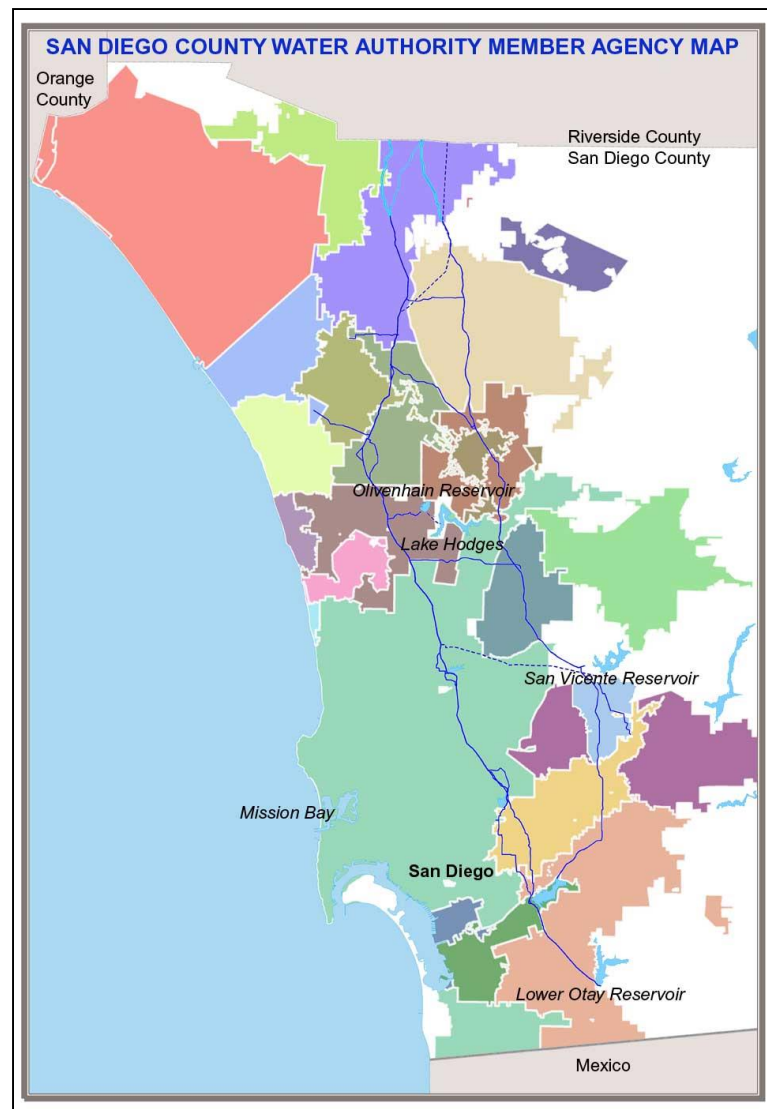
San Diego County Water Authority

Wholesale water agency and regional water planner created by state Legislature in 1944

- ▶ Serves 3.3 million people and region's \$222 billion economy
- ▶ 24 member agencies (retailers)

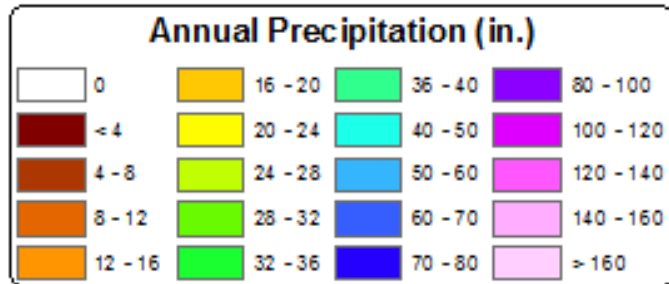
Provides 80–90% of water used in San Diego County

- ▶ Builds, owns, operates and maintains large-scale regional water infrastructure
- ▶ Largest ag-to-urban water conservation & transfer in U.S.
- ▶ Invested more than \$3 billion in facilities (desalination, pipelines, treatment and reservoirs) in the last 15 years



Climate Matters: San Diego Receives Little Rainfall

Average Annual Precipitation
in the Southwest

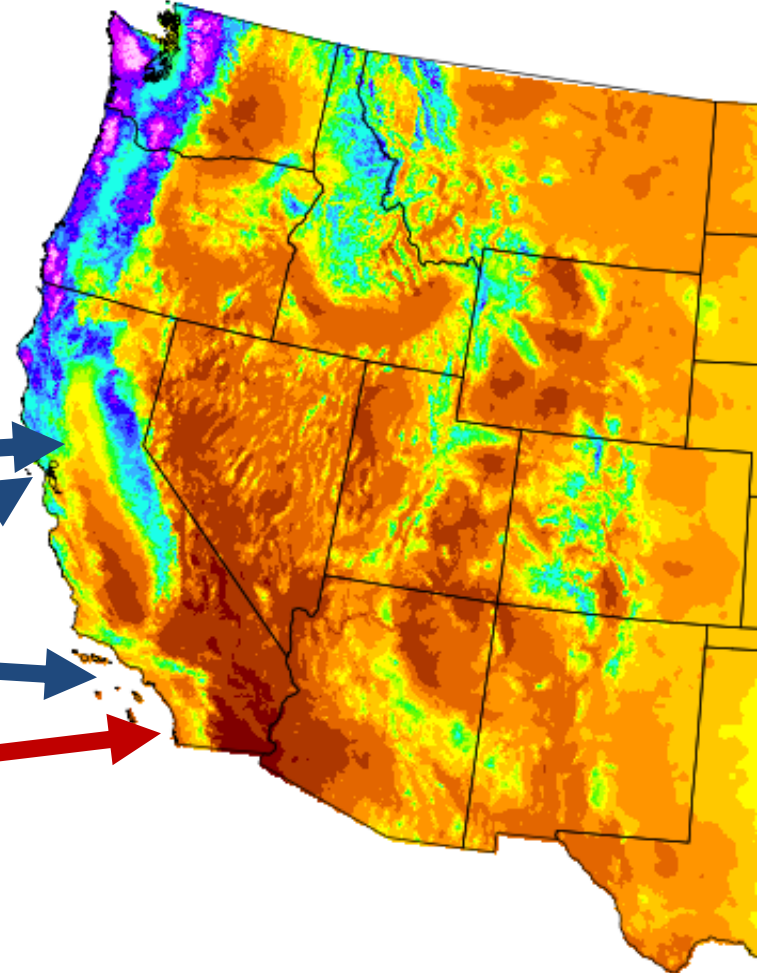


Sacramento: 21.17"

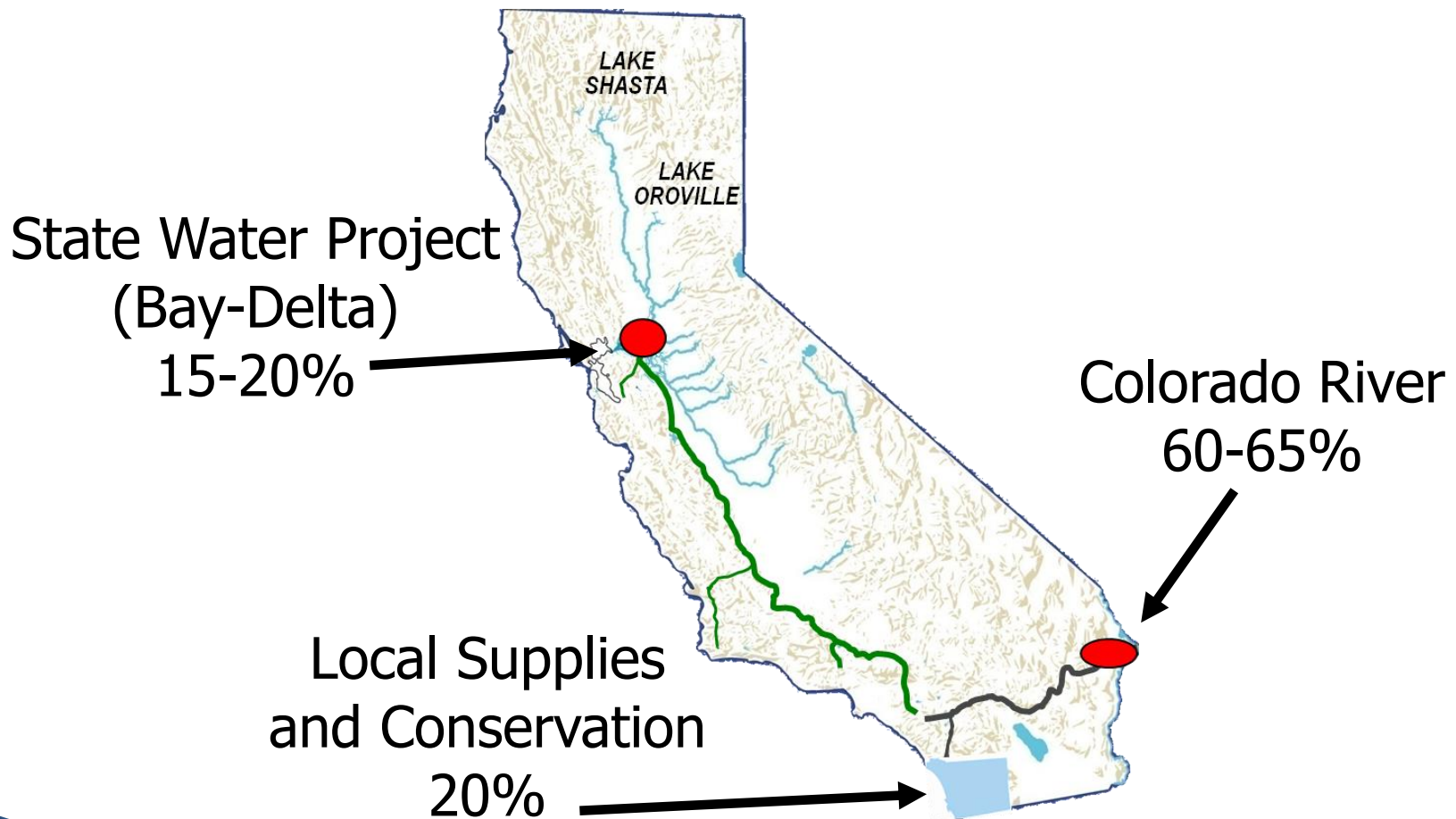
San Francisco: 20.78"

Los Angeles: 14.93"

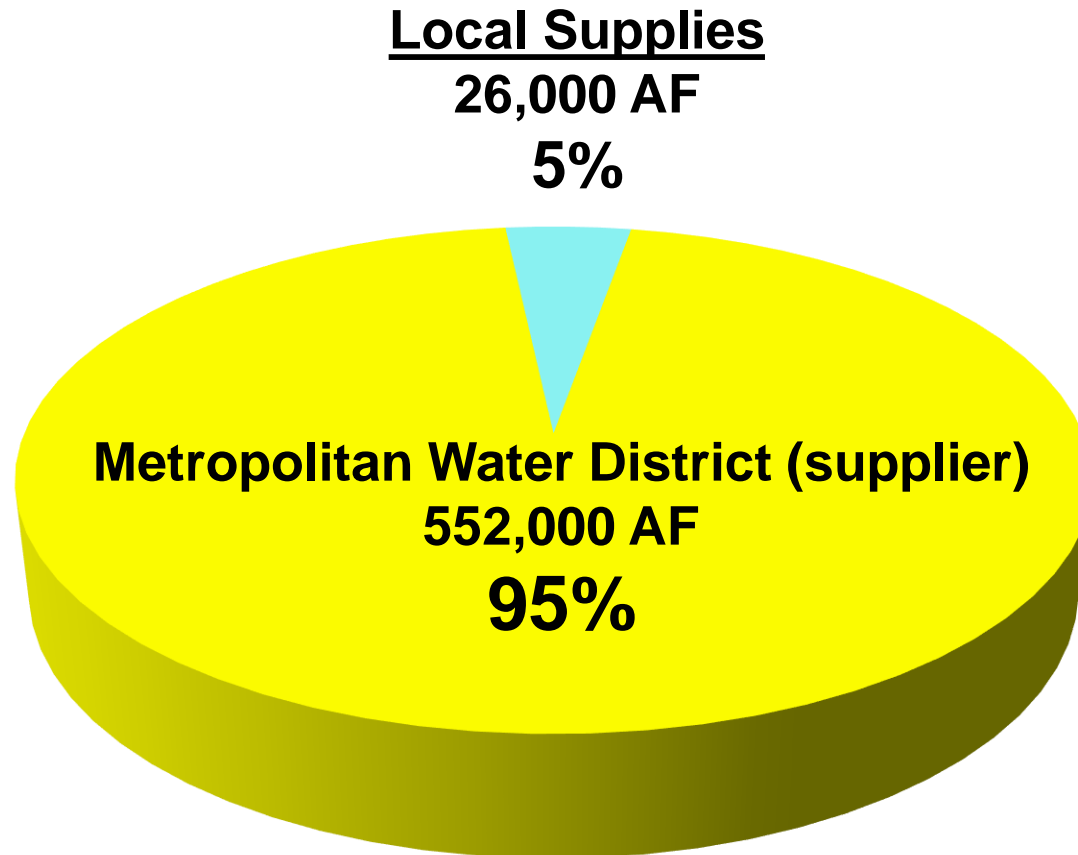
San Diego: 10.34"



Sources of San Diego County's Water Supply



San Diego County Water Supply 1991



Total = 578,000 AF
713 million m³



1991-92: San Diego's Drought Crisis

State to Shut Off Water Delivery to Southland

By VIRGINIA ELLIS
and TED ROHRlich
TIMES STAFF WRITERS

SACRAMENTO — Gov. Pete Wilson on Monday announced new and unprecedented cutbacks of state water deliveries so drastic that Southern California will be cut off from this traditional source mid-March.

Wilson said drought conditions state to notify ci

Limits on tap water use urged by staff

By Steve LaRue
Staff Writer

The staff of the San Diego County Water Authority (CWA) will continue to recommend a blanket ban of tap water on private lawns and golf course roughs and fairways despite intense opposition by landscaping contractors

S.D. Faces 31% Cut in Imported Water Supply

By JENIFER WARREN
TIMES STAFF WRITER

Faced with record-low rainfall and no prospects for relief, the Metropolitan Water District declared a water emergency on Tuesday and cut by 31% the amount of water it delivers to 27 agencies from Ventura to San Diego.

50% Water-Delivery Cut Will Be Blow to San Diego

■ **Drought:** Metropolitan Water District directors also vote a 90% cut in allocation for agricultural users.

Water Dependence Bodes a Dry San Diego Future

■ **Drought:** A twisted history of water politics has left the county at the vulnerable end of the supply pipeline.

San Diego Civic Leaders “Never Again!” “No More Water Shortages!”

Grim water outlook is getting even worse

By Steve LaRue
Staff Writer

SACRAMENTO — Southern Californians are likely to be ordered to cut back their water consumption by an unprecedented 30 percent this spring unless more snow falls on the Sierra Nevada, the area's chief water official said yesterday.

State Water Project cuts off water to farms; urban slash expected

L.A. Ready to Battle San Diego Over Water

■ **Conservation:** DWP officials weigh legal action as southern neighbor refuses to impose rationing.

Water: Authority to Vote Today on Mandatory Restrictions

Companies cringe at 50 percent cut in water

Firms offer conservation plans to mayor; some say cutbacks could cripple growth

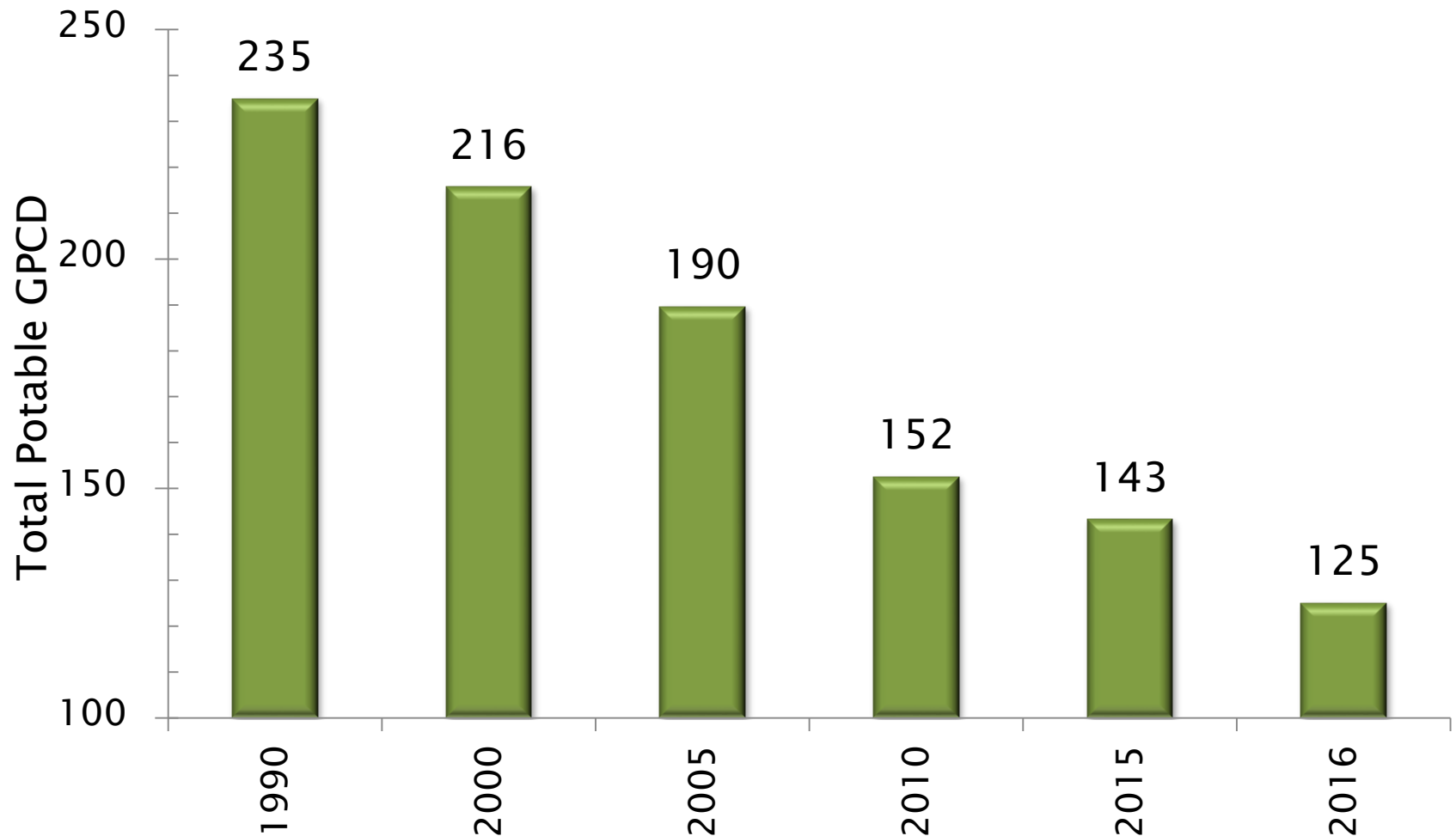


Reliability Through Diversification

- ▶ Employ resource strategies unique to local conditions
- ▶ No single resource strategy can manage all uncertainties
- ▶ Multi-faceted approach
 - Conservation
 - New diversified supplies
 - Imported
 - Local
 - Infrastructure investments



40%+ Decline in Per Capita Water Use in Water Authority Service Area Since 1990



The reduction in potable per capita water use since 1990 offsets the need for over 300,000 acre-feet per year within the region.

Landmark Water Conservation Law



SB 1224 (Killea, 1991)
AB 952 (Kelley, 2001)
AB 1561 (Kelley, 2002)



AB 2717 (Laird, 2004)
AB 1881 (Laird, 2006)
AB 349 (Gonzalez, 2015)



AB 514 (Kehoe, 2003)
AB 2572 (Kehoe, 2004)
SB 1050 (NR&W, 2007)



SB 553 (Kelley, 2000)
AB 1465 (Hill, 2009)



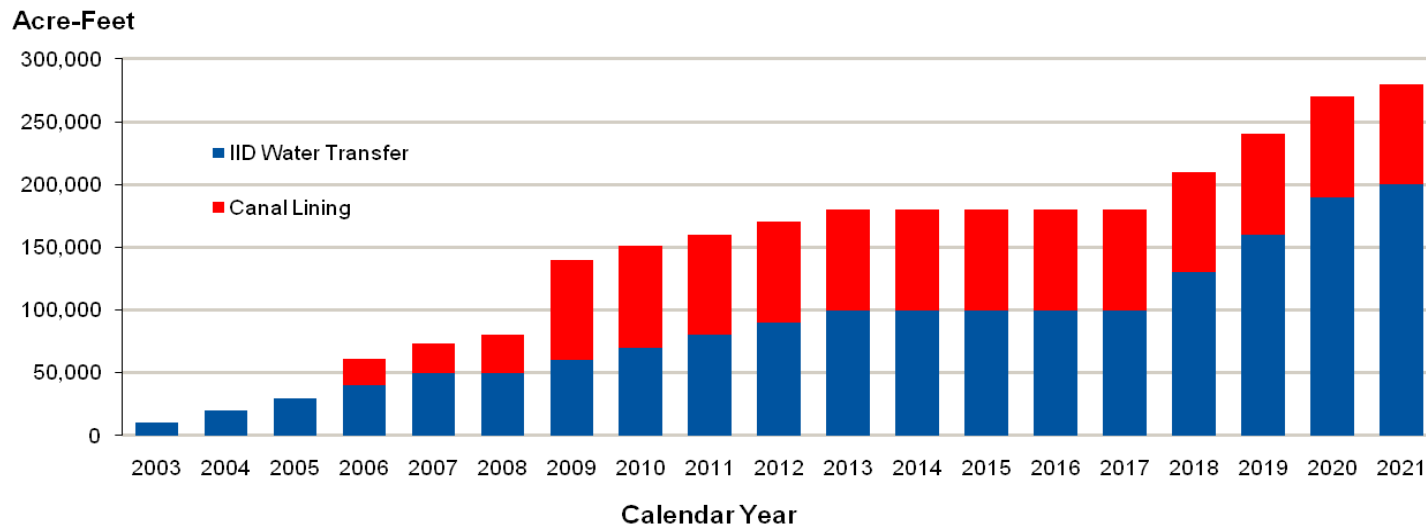
2003 Quantification Settlement Agreement

- Water Authority secures new, more reliable Colorado River supplies
 - Imperial Irrigation District transfer
 - 200,000 AF/year (246 million m³) for 45–75 years
 - Canal–lining projects
 - 80,000 AF/year (98 million m³) for 110 years
- Key to diversification strategy
- By 2021, 34% of region's supply



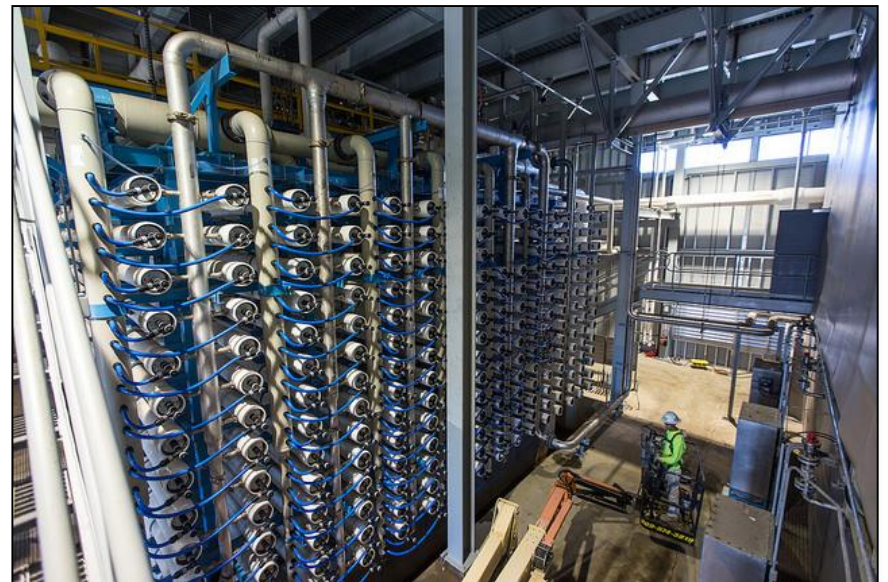
Lining the Coachella Canal

IID and Canal Lining Deliveries 2003-2021



Carlsbad Seawater Desalination

- ▶ Largest seawater desalination facility in North America
- ▶ Owned and operated by Poseidon Water
- ▶ 30-year contract
- ▶ \$1 billion investment
- ▶ Up to 56,000 AF/year (69 million m³)
- ▶ Commercial operation began in Dec. 2015



Next Increment of Water Supply

- ▶ City of San Diego Pure Water Project
- ▶ North San Diego Water Reuse Project
- ▶ Padre Dam Advanced Purification Project

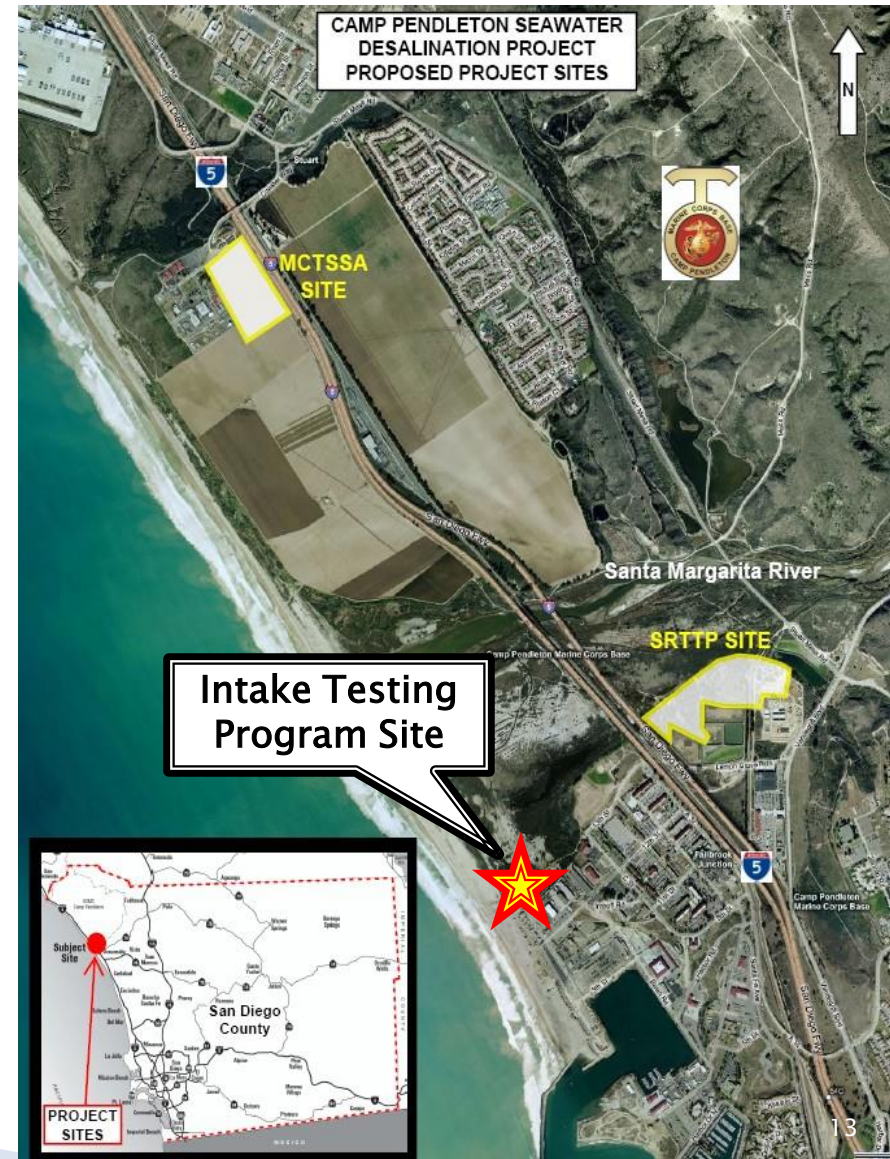


City of San Diego's
Advanced Water Purification Facility

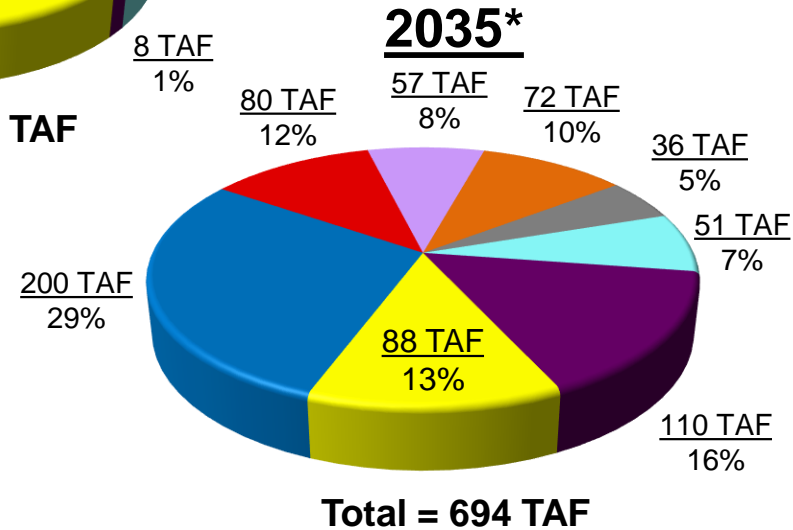
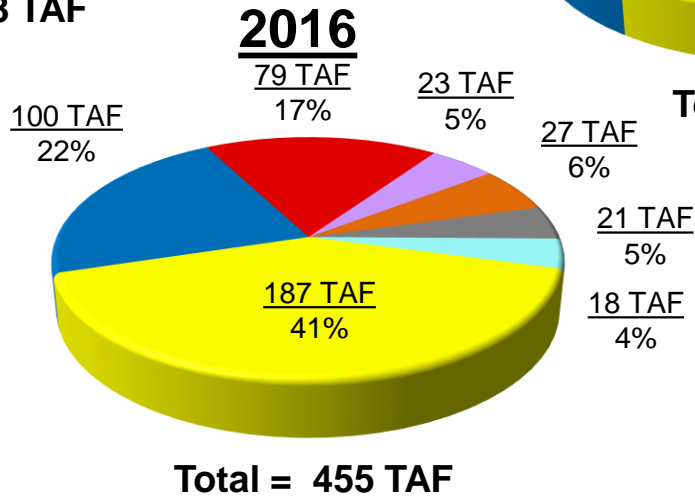
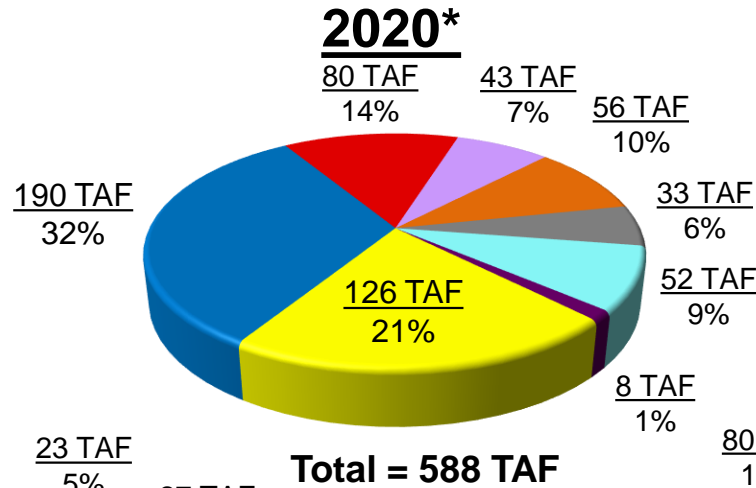
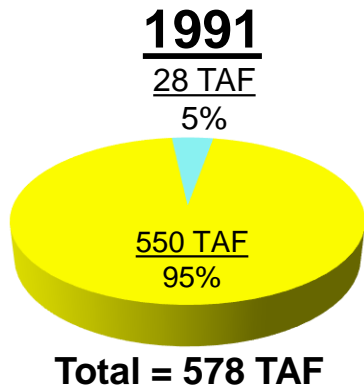


Potential Camp Pendleton Desalination Plant

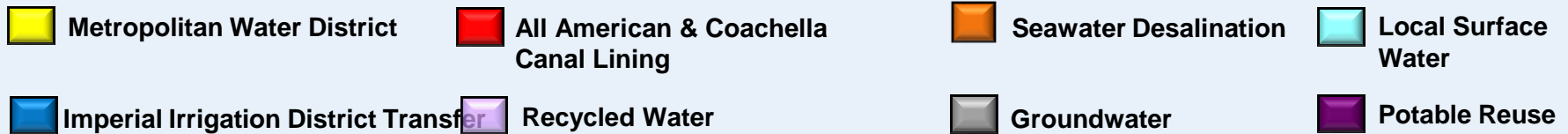
- ▶ Unique, large coastal location at top of Water Authority's Aqueduct system
 - 50–150 MGD (189,000 m³ – 567,000 m³)
- ▶ Long-term water supply option (post-2030)
- ▶ New intake and discharge facilities
- ▶ Detailed feasibility and technical studies completed (2009–2013)
- ▶ Pilot-scale intake testing program under way



Increasing San Diego County's Water Supply Reliability through Supply Diversification



(Region under State-Mandated Drought Restrictions)



* Includes verifiable and additional planned local supply projects from 2015 UWMP

Investing in Major Water Infrastructure: \$3+ billion



Historic Investments in Infrastructure

San Vicente Dam Raise & Related Projects
\$816 million



Carlsbad Seawater Desalination Projects
\$1 billion

Plant Site



Olivenhain Dam & Reservoir
\$198 million



Twin Oaks Valley Water Treatment Plant
\$179 million



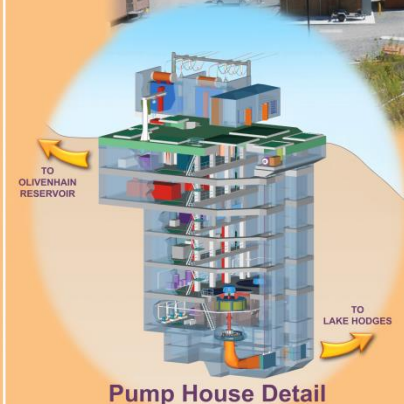
All-American & Coachella Canal Lining Projects
\$447 million
(\$190 million from Water Authority)



Pipeline Relining
\$493 million



Lake Hodges Projects
\$208 million



Pump House Detail



Project: All American & Coachella Canal Lining Projects

Approved: 2003

Complete: 2010 (AAC) and 2006 (CC)

**Cost: \$447 million total, including
\$190 million from Water Authority**

Benefits: 80,200 AF/Y for 110 Years



Project: Twin Oaks Water Treatment Plant

Approved: 2005

Complete: 2008

Cost: \$179 million

**Benefit: 100 MGD advanced membrane
treated supply for region**



Project: Lake Hodges Projects

Approved: 1998; Pumped Storage added 2002

Complete: 2013

Cost: \$196 million

**Benefits: 20,000 AF storage
40MW of power**

Project: San Vicente Dam Raise & Related Projects

Complete: 2014

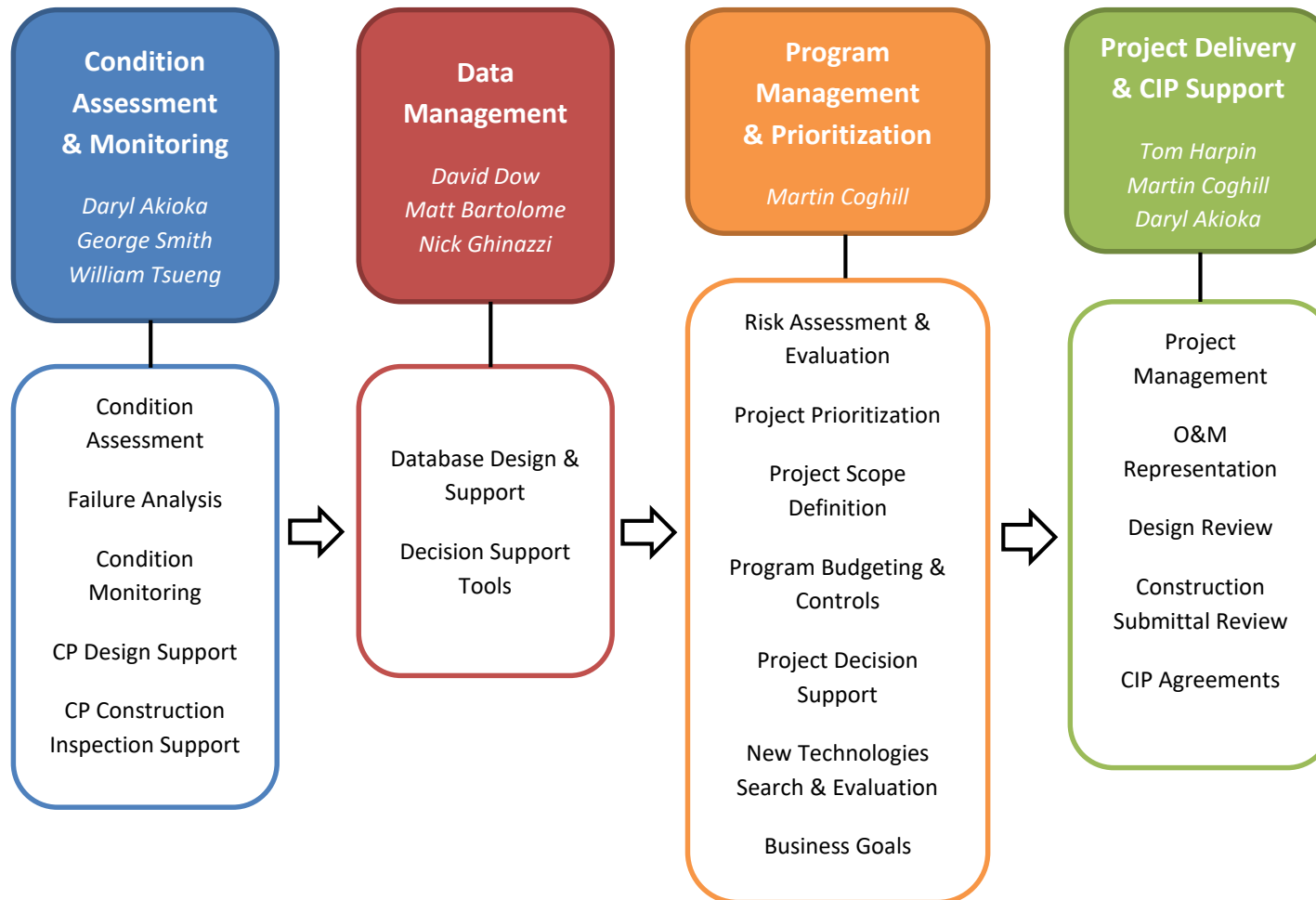
Cost: \$816 million



Benefit: Increase reservoir capacity by 152,000 acre-feet



ASSET MANAGEMENT ACTIVITIES



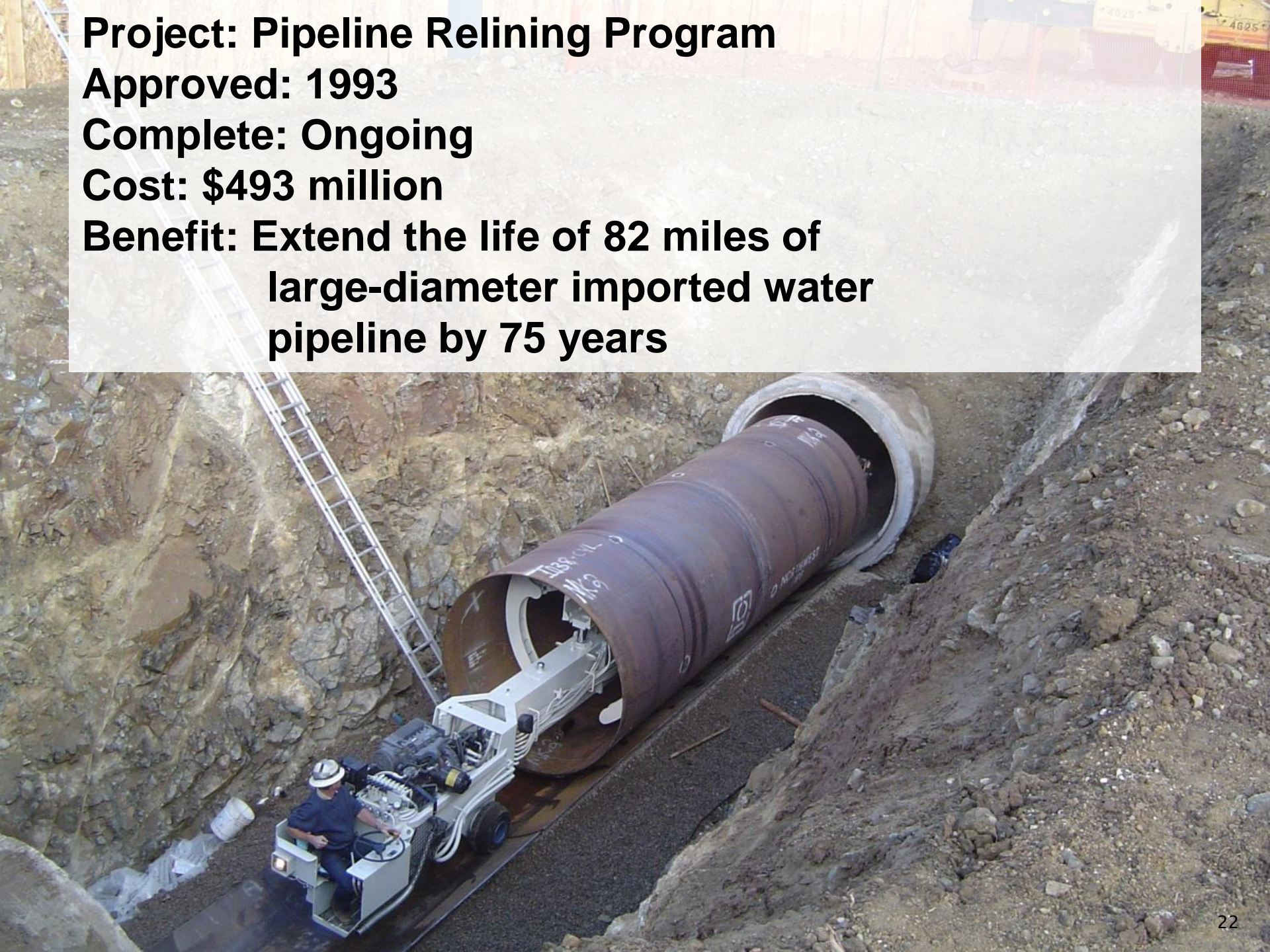
Project: Pipeline Relining Program

Approved: 1993

Complete: Ongoing

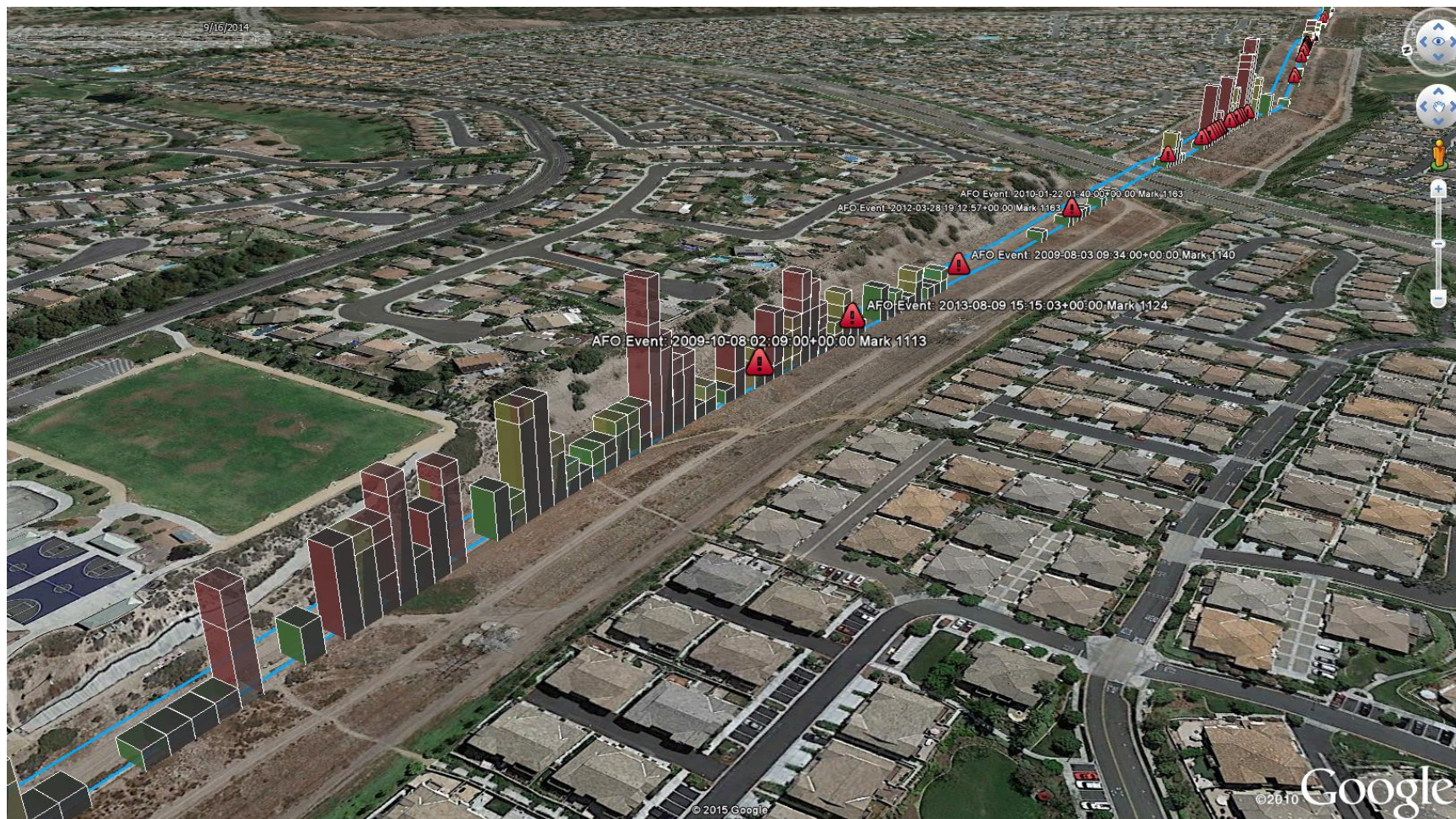
Cost: \$493 million

**Benefit: Extend the life of 82 miles of
large-diameter imported water
pipeline by 75 years**



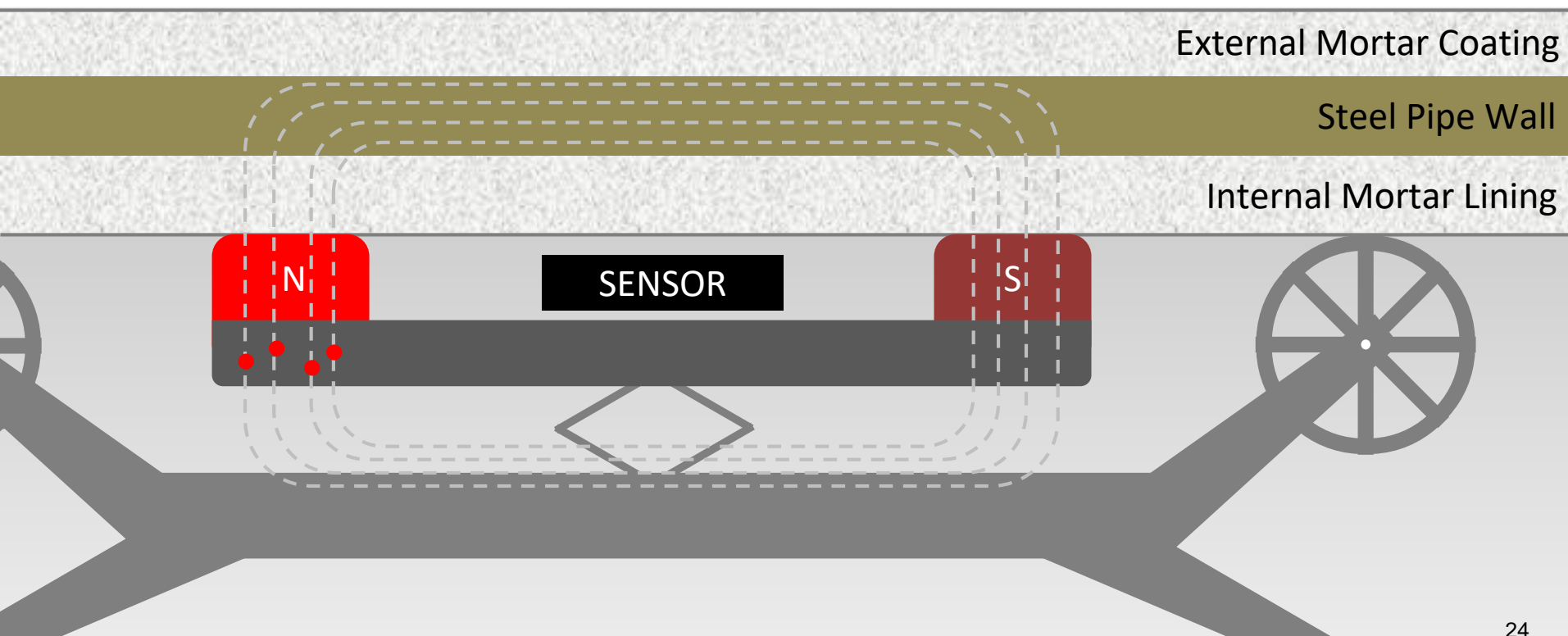


PCCP Condition Assessment Data





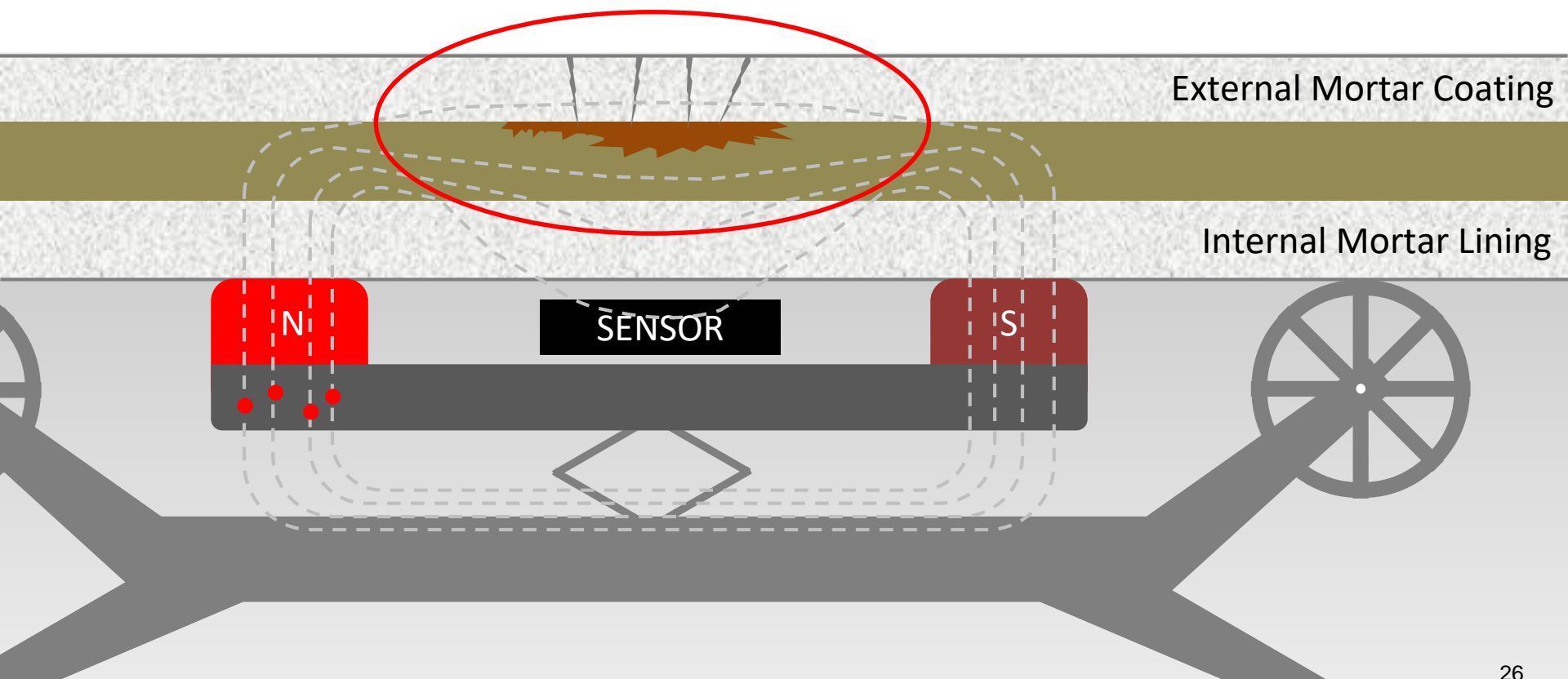
MAGNETIC FLUX LEAKAGE





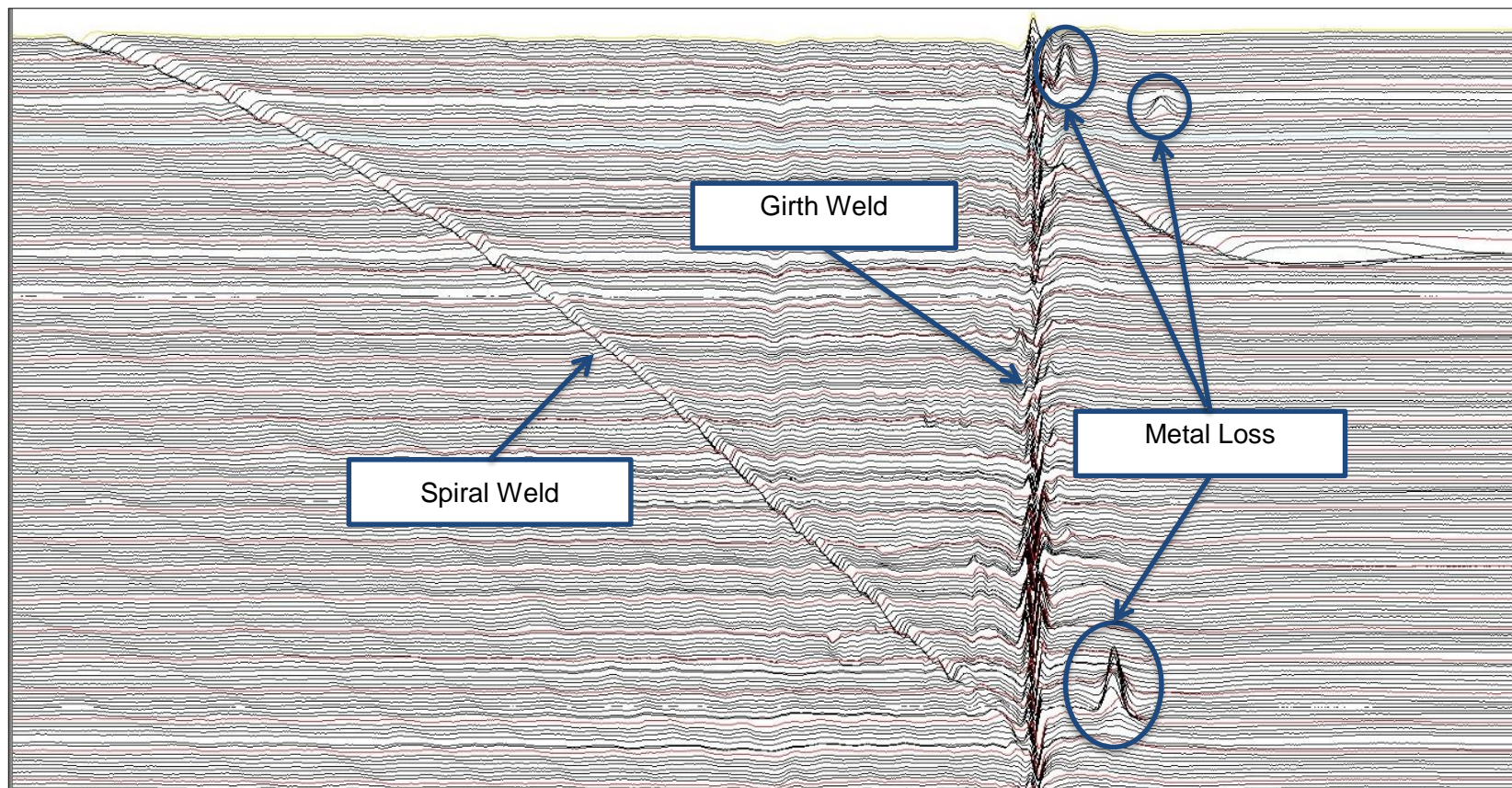


MAGNETIC FLUX LEAKAGE





MFL DATA ANALYSIS



Diversifying Our Energy Portfolio



Current Energy Facilities



Rancho Peñasquitos Hydroelectric Facility

- Started in 2007
- 4.5MW capacity
- In-line generation



Lake Hodges Facilities

- Pumped storage
- Completed in 2012
- 40MW capacity
- On-demand power
- First new pumped storage project in U.S.A. in nearly 30 years



Solar Power

- Kearny Mesa Headquarters
- Escondido operations center
- Twin Oaks Valley Water Treatment Plant
- 2,700 MWh per year
- Solar meets ~40% of treatment plant's energy needs



Water Authority's Potential New Energy Initiatives



San Vicente Energy Storage Facility

- 300–500MW capacity



On-Site Batteries

- Charge during low-cost periods; discharge to meet peak demands



Floating Solar

- Up to 8MW

Wind Turbines at Olivenhain Dam

- 1 MW



Innovation Program and Opportunities



A Long History of Innovation



San Diego County
Water Authority

Dedication to Innovation

PARTNERSHIPS

The San Diego County Water Authority shapes the future with cutting-edge tools and programs to operate and maintain 310 miles of large-diameter pipelines and other facilities.



San Diego County
Water Authority

Dedication to Innovation

INFRASTRUCTURE & OPERATIONS

The San Diego County Water Authority shapes the future with cutting-edge tools and programs to operate and maintain 310 miles of large-diameter pipelines and other facilities.



Inspections

The Water Authority was among the first agencies to use Magnetic Flux Leakage technology¹ to assess steel water pipelines. It also deploys Remote Field Technology² to inspect hard-to-access pipeline types.

Conservation & Transfer

In 2003, the Water Authority partnered with the Imperial Irrigation District to craft the largest ag-to-urban water transfer in U.S. history.



Resource Protection

The Water Authority co-leads the Imperial Regional Water Management Group to and manage state grant funds for pioneer water-related programs.



Data Visualization

The Water Authority has developed a three-dimensional interface for managing and evaluating voluminous records generated by high-tech pipeline assessments.

Environmental Stewardship

Joining with wildlife agencies, the Water Authority manages a groundbreaking, long-term conservation strategy that allows the agency to build and maintain vital water infrastructure while supporting endangered species.



San Diego County Water Authority
Imperial Regional Water Management Group



San Diego County
Water Authority

Dedication to Innovation

ENERGY

The San Diego County Water Authority shapes the future with creative initiatives to improve water-use efficiency through classes, incentives, online tools and other resources.



San Diego County
Water Authority

Dedication to Innovation

EFFICIENCY & OUTREACH

The San Diego County Water Authority shapes the future with creative initiatives to improve water-use efficiency through classes, incentives, online tools and other resources.

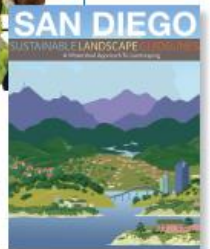
Citizens Water Academy

The Citizens Water Academy is a pioneering effort to educate emerging regional leaders about water issues through lectures, activities and field trips.



Sustainable Landscapes

The San Diego Sustainable Landscapes Program pushes the envelope of environmentally friendly landscape design.



Classes

WaterSmart Landscape Makeover Program classes have proven their effectiveness in helping homeowners cut outdoor water use.

On-Demand Videos

An original series of online videos guides homeowners through the process of transforming conventional yards into water-efficient landscapes.



San Diego County
Water Authority

Olivenhain Dam Micro-Wind Turbines

- Challenge – Increase energy production to benefit ratepayers
- Solution– Micro-turbines across face of dam

Benefits

- 1MW potential
- Pilot May 2017



Optical Advanced Metering Infrastructure

- Challenge – High cost of traditional AMI installation
- Solution – Optical AMI (Water Pigeon) Camera built in meter lid

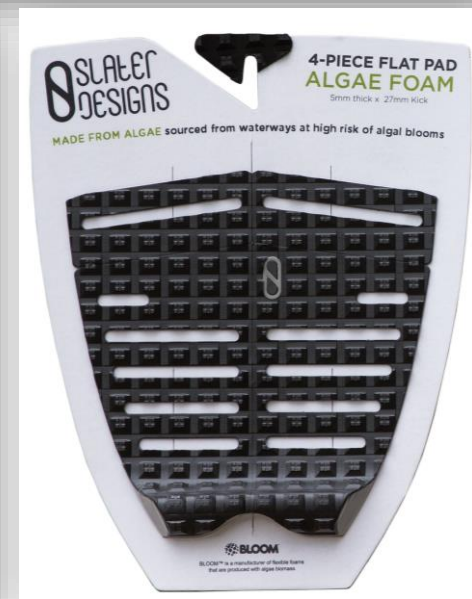
Benefits

- ½ cost of AMI, ¼ install time
- 90 Day pilot study
- 4 agencies participated
- 10 – 15% pilot savings



Algae Harvesting

- Challenge – Algae blooms
- Solution – Harvesting algae on site
- Benefits
 - WQ improvement
 - Operating cost reduction
 - Reduces petroleum products
 - Local business support
- Nine agencies interested, proven technology



Our Vision

**Pioneering.
Visionary.
Agile.
Driven.**

*That's who we are.
That's what we do.*



**San Diego County
Water Authority**

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