

Pipeline
REBUILD

Replace. Renew. Reliable.

Planning Committee

July 13, 2021

Agenda

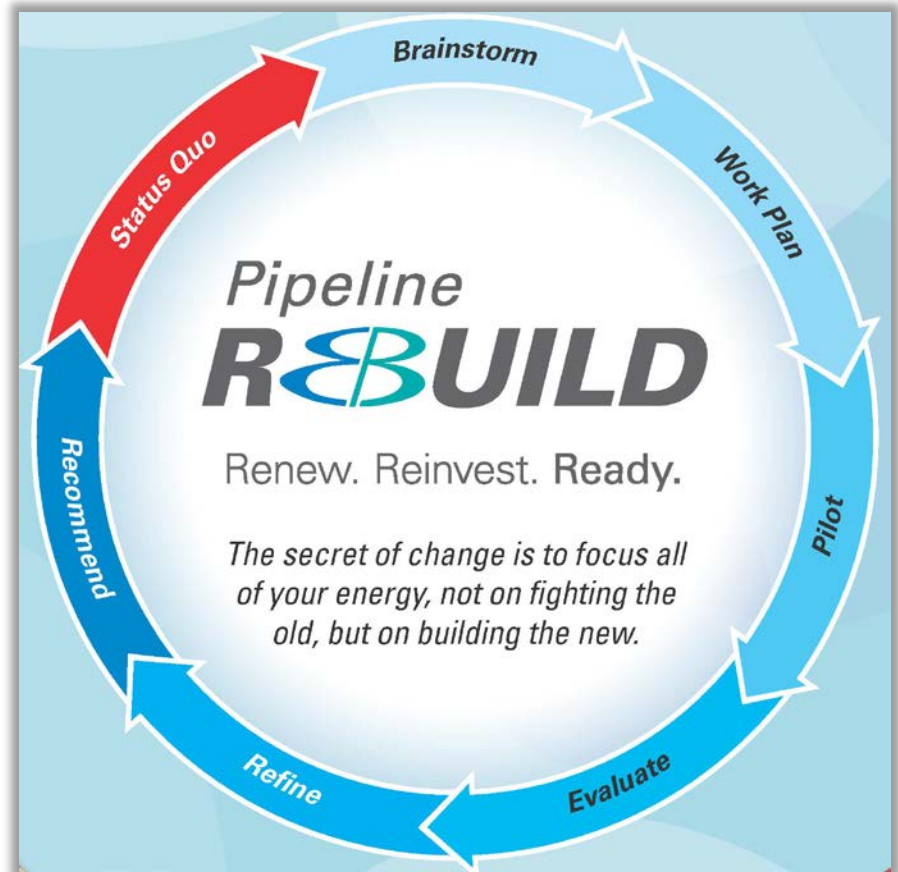
- Mission & Goals
- FY21 in Review
 - Results
 - Highlights
 - Challenges
 - Metrics
- Research & Innovation
- Road Ahead



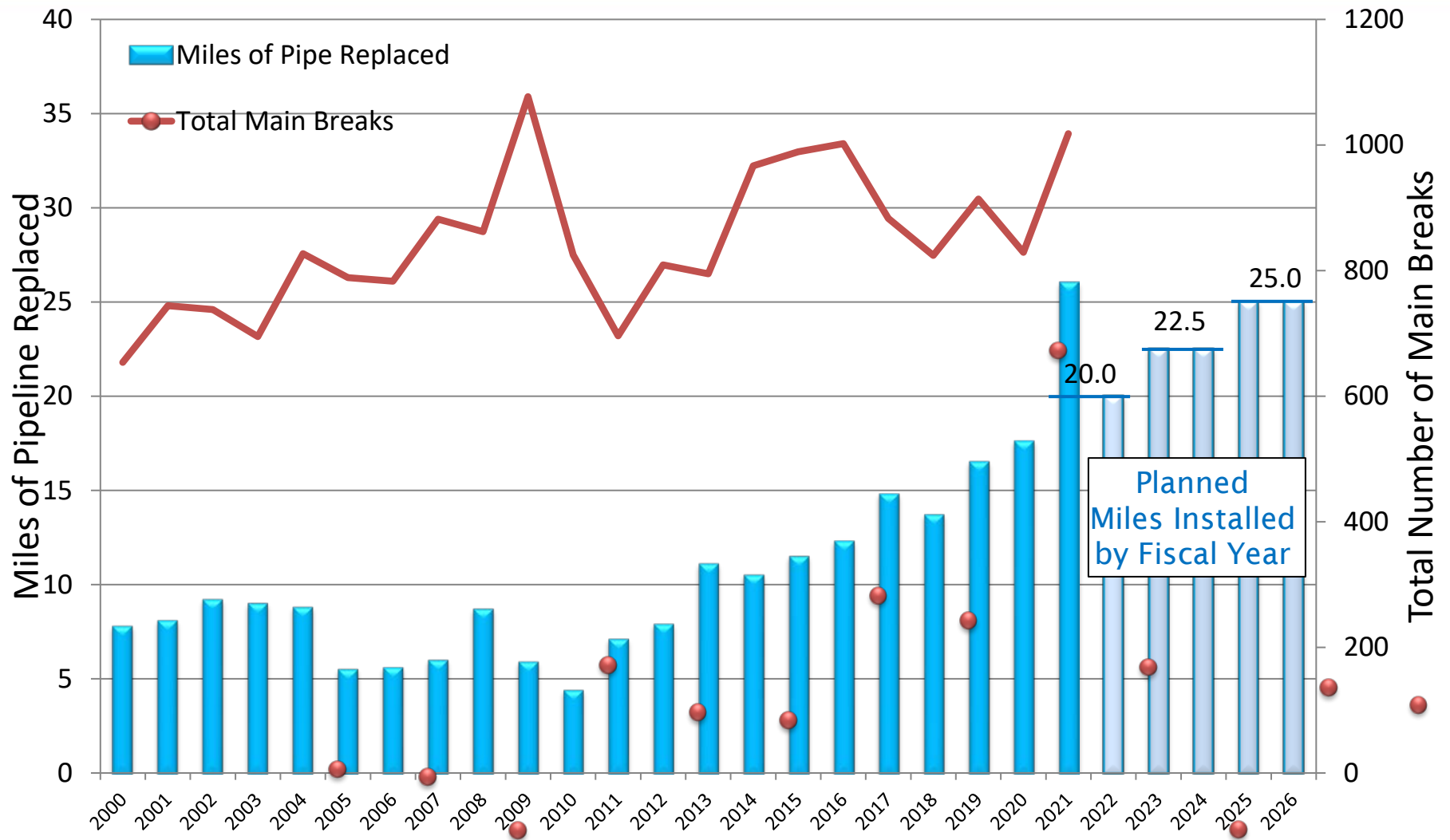
Pipeline Rebuild Mission and Goals



- Sustainable long-term replacement rate
- Reduce main breaks and water loss
- Collaboration
- Research and Innovation
- Scale-up and leverage improvements



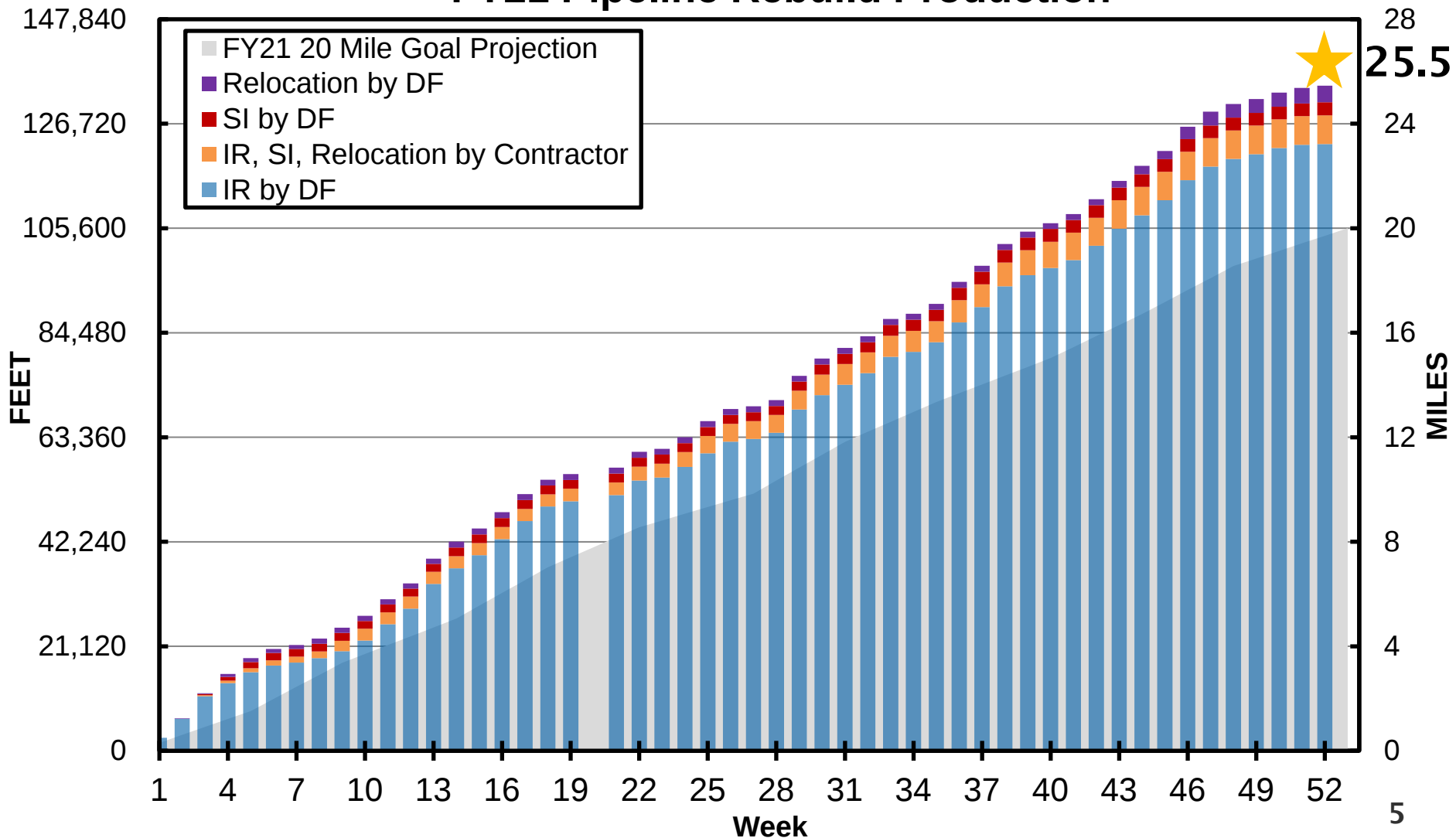
FY22-26 Goals



FY21 Results



FY21 Pipeline Rebuild Production

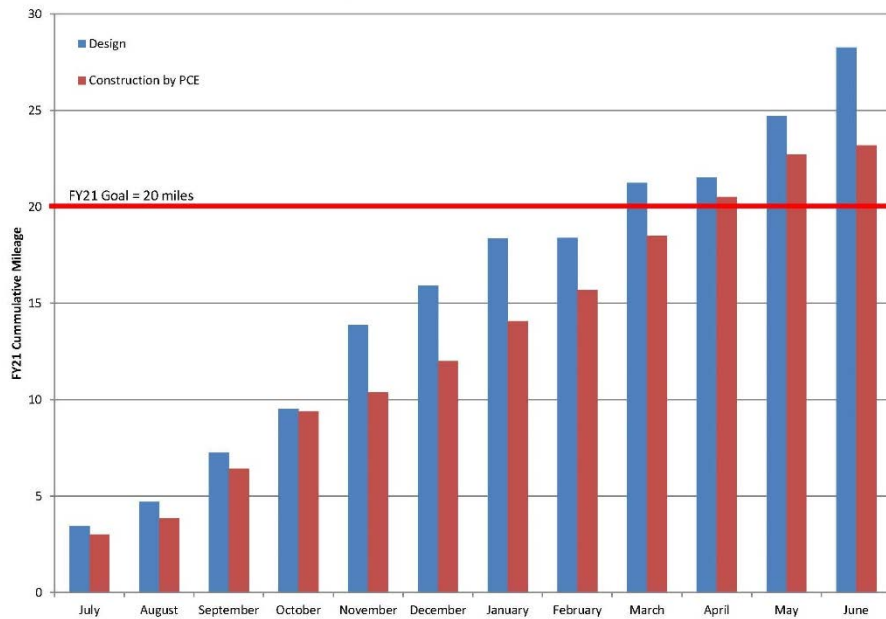


FY21 Highlights



- Technology integration
- 12th crew
- New leadership staff
- Design output and pipe replaced
- Core team collaboration
- Stakeholder engagement

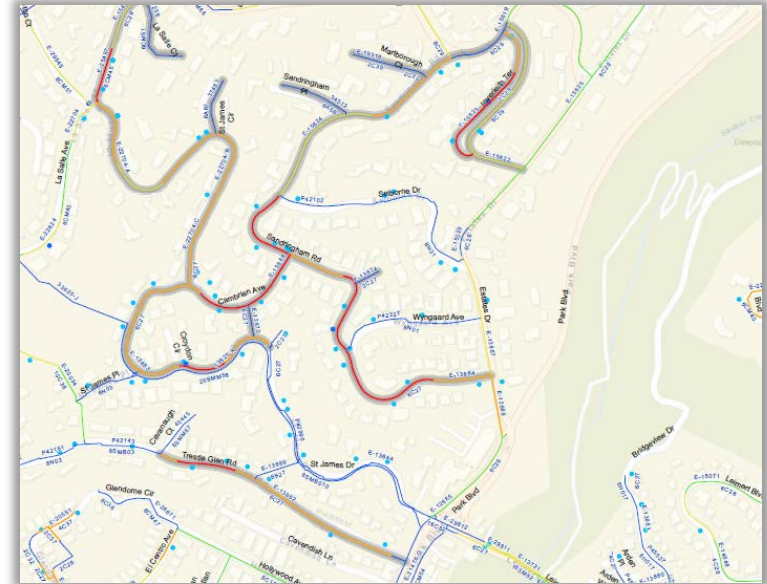
IR FY21 Design/Construction Mileage Tracking



Scale Up Improvements



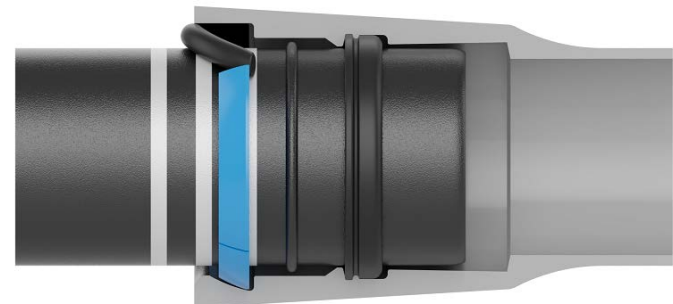
- Selecting the right pipe
 - Improved risk analysis and applied machine learning
- Streamline design
- Construction materials & methods
 - Pipe recommendations
 - Fittings
 - Hydrant runs
 - Chlorination & disinfection practices



Ductile Iron Pipe



- Materials recommendation
- Specifications and standards
- Pipe in stock



iPVC Pipe



- Restrained pipe
 - Joint harnesses
 - Locking fittings
- Productive installations
- U.S. Manufacturing in FY22



FY21 Challenges



- Materials
 - Supply and delivery
- Permitting
 - Paving restoration
- COVID-19
 - County orders
 - Recruitment pause
 - Testing/Contact Tracing
- Red flag warnings



Pipeline Metrics



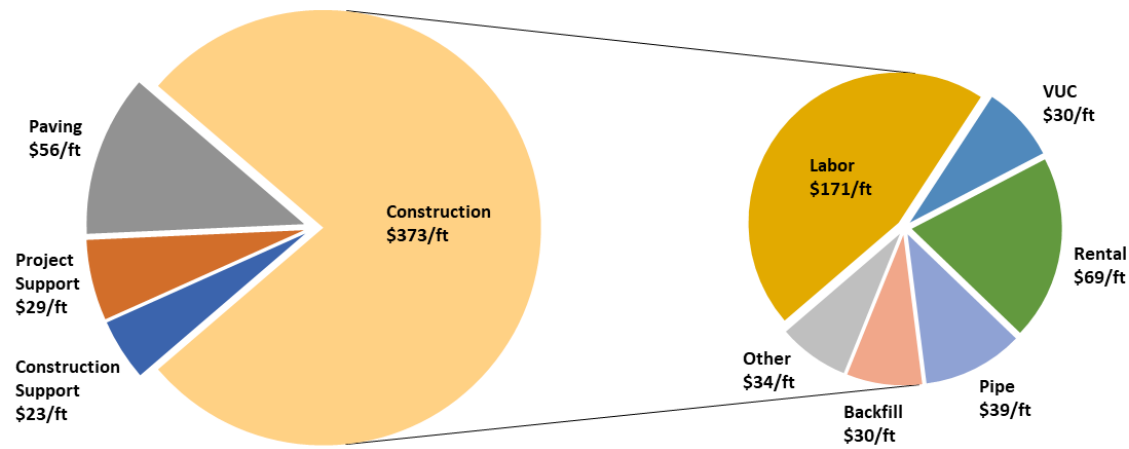
- Project scope
- Cost breakdown
- Productivity
- Community impacts
- Safety
- Construction feedback

Cost Breakdown



Performance Indicators

Direct Cost Per Foot (By Project Phase)			FY20 Averages	
Construction	\$ 389	84%	\$ 380	76%
Construction Support	\$ 15	3%	\$ 25	5%
Project Support & Documentation	\$ 17	4%	\$ 34	7%
Paving	\$ 42	9%	\$ 59	12%
Total	\$ 463	100%	\$ 498	100%



FY17-20 average \$481/ft

Productivity & Community Impacts



Productivity

FY20 Avg

Pipe Overall Installation Rate (Feet Per Crew Day)	65	49
Pipeline only Installation Rate (Feet Per Crew Day)	112	82
Transfer Service Rate (No. of Services Per Crew Day)	5	6

Community Impacts

FY20 Avg

Neighborhood Presence (Days)	484	266
Neighborhood Presence (Days Per 500 Feet)	44	93
Construction Period (workdays)	131	58
Construction Period (workdays per 500 Feet)	12	16

- FY21 1.9 miles/crew
- FY16-21 100+ miles of replacements

Research & Innovation Culture



1

Pipe Data →
Big Data



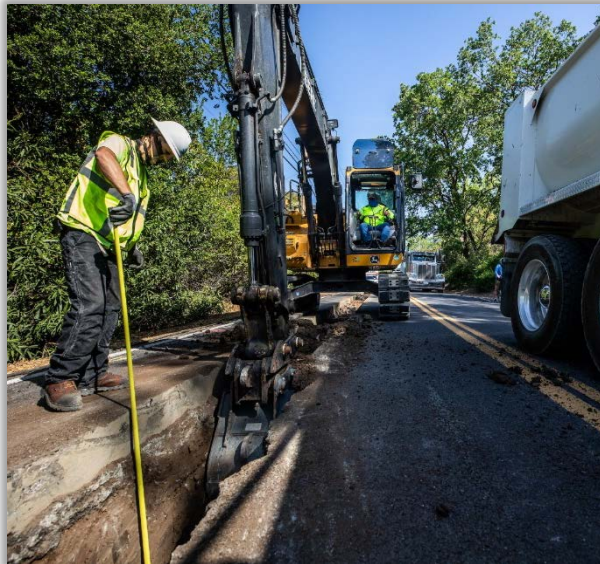
2

Machine
Learning



3

Visualize Risk



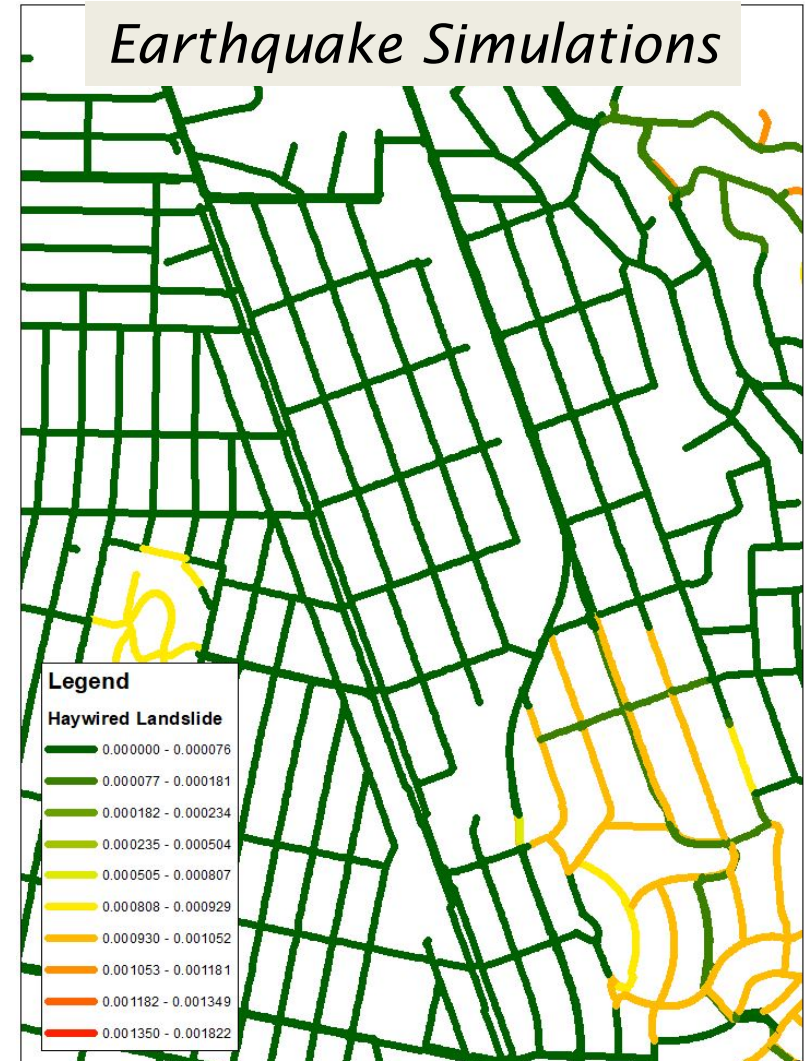
- Improve efficiencies
- Reduce costs
- Research and test new technologies
- Take risks
- Informed decision making
- Management support

Innovations in Pipe Selection Process

Satellite Leak Detection

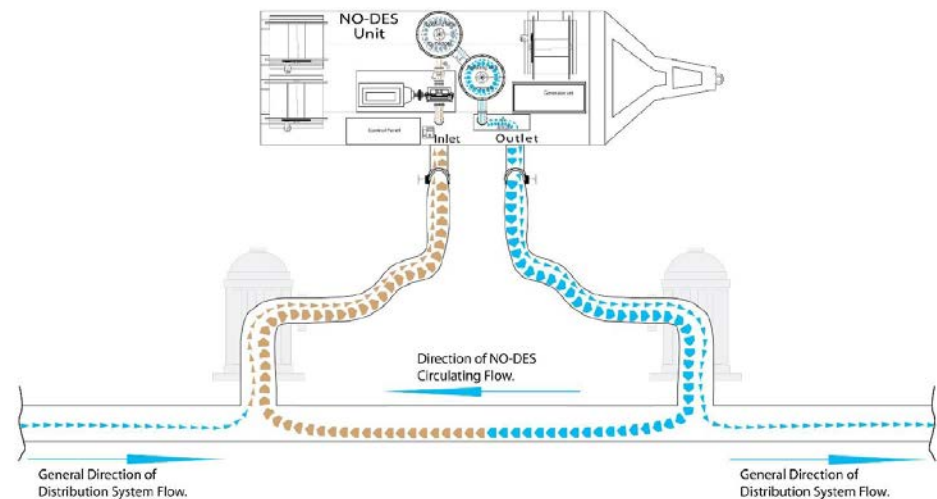


Earthquake Simulations



NO-DES Pilot

- Neutral Output Discharge Elimination System
- Flushing, filtration, and chlorination
- No exposure to distribution water
- Reduction in discharges – added benefit during drought



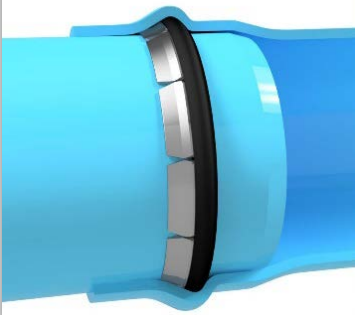
Resilient Materials and Pipe Testing Research



- Testing at CU Boulder
- Cornell large-scale testing equipment moving to UC Berkeley
- Organizing initial testing plans – Smart Infrastructure Center



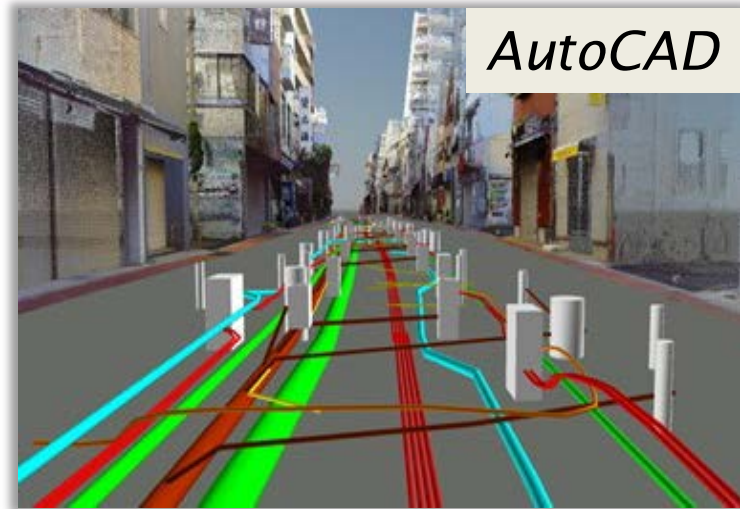
All-in-One Restraint and Sealing Solution for Anger Type Joints



Additional FY21 Pilots



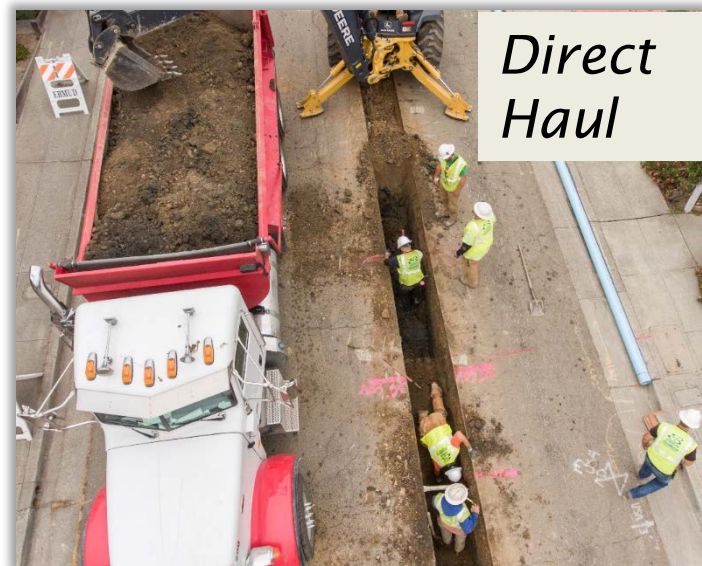
Saw Cutting



AutoCAD



*Leak Detection
on Services*



*Direct
Haul*

Road Ahead

- FY22 Goals
 - Design 25 miles
 - Install 20 miles
- Training
- Pipeline migration analysis
- Long-term resource loading and replacement strategy
- Stay innovative



Meet the 12 Pipeline Crews



Trail Use Permit Review



Planning Committee
July 13, 2021

Agenda



- Trail Use Permit Program Review
- Customer Assistance Program Pilot
- Next Steps

Trail Use Permit Review



- Used to monitor recreational trail use on EBMUD watershed
- Users agree to follow EBMUD rules and regulations specific to natural resource and water quality protection
- Valuable tool for public education and enforcement of rules and regulations

Trail Use Permit Fees



- Single day TUP \$3.00
- One-year TUP \$10.00
- Three-year TUP \$20.00
- Five-year TUP \$30.00

Trail Use Permit Administration and Revenue



Administration Cost and Revenue

Year	Total Annual Trail Use Permit Administrative Hours	Total Annual Trail Use Permit Administrative Cost	Total Annual Trail Use Permit Revenue
2020	540.5	\$40,663	\$170,965
2019	485.1	\$36,210	\$75,394
2018	497	\$37,625	\$79,139

*Maintenance and patrol costs not included

Trail Use Permit Pilot for Customer Assistance Program



- Qualified Customer Assistance Program (CAP) enrolled customers receive a one-year permit, free of charge, and immediate access to trails.
- Staff will monitor trail use by CAP customers through direct feedback and use information to develop additional strategies to serve disadvantaged communities.

Trail Use Permit Pilot for Non-CAP customers



- Develop strategies to reach low-income non-bill paying customers and those outside EBMUD service area.
- Evaluate free one-day trail use permits concurrently with CAP pilot.
- Partner with external organizations that work with disadvantaged communities to promote EBMUD trails and recreation venues.

Next Steps



- Implement 1-year trail use permit pilot for CAP customers
- Evaluate trail use patterns using available data
- Focused outreach and advertising to raise awareness about EBMUD trails
- Explore ways to increase trail use by non-billed disadvantaged customers
- Consider trail permit fee structure changes, including free day permits
- Present findings to the Board – Fall 2022

Questions



Research and Innovation at EBMUD

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Agenda

- Innovation Practice
- District Innovation Initiatives
- Strategic Research and Innovation
- Smart Infrastructure Center
- Next Steps



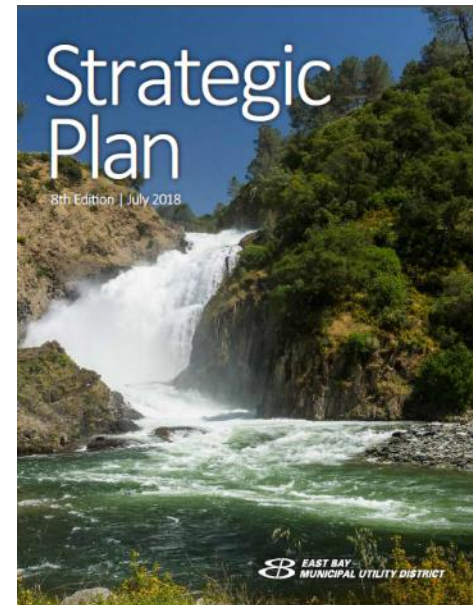
Innovation Practice - Why Innovate?



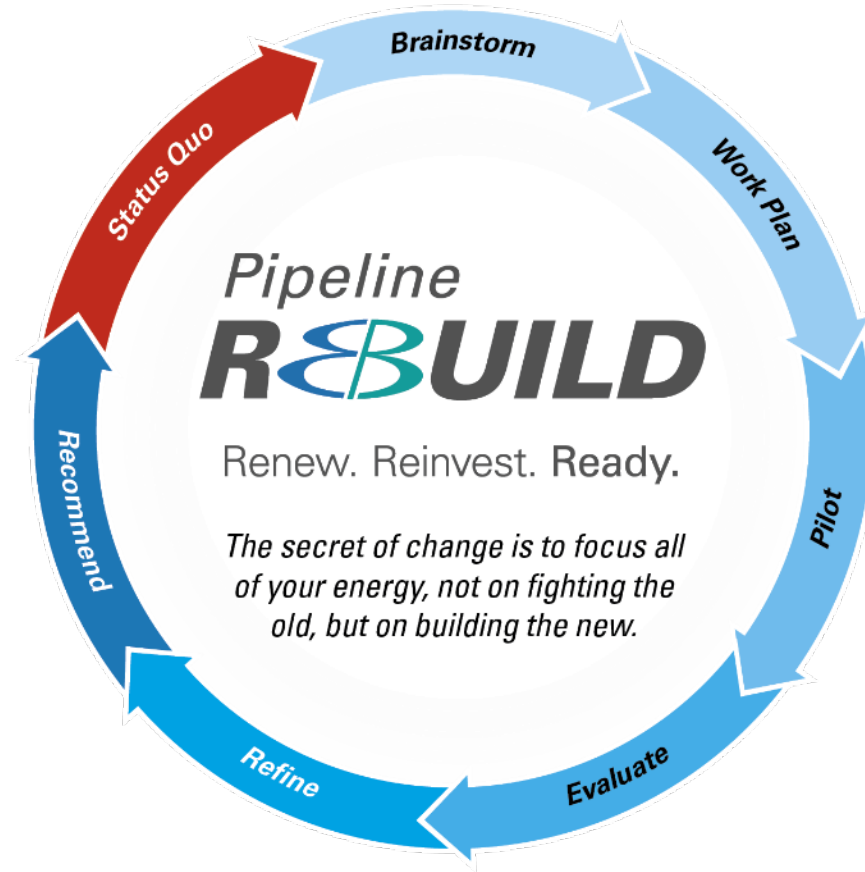
Innovation is essential for utilities to:

- meet increasingly stringent regulatory requirements,
- improve efficiency and effectiveness,
- reduce costs,
- meet increasing customer expectations and workforce needs, and
- attract future talent.

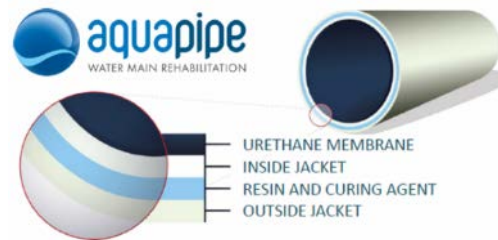
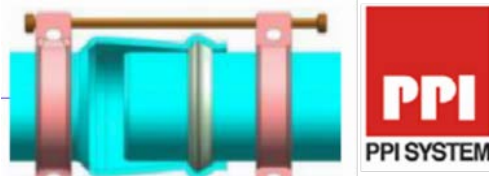
A structured innovation program aligns with the District's Strategic Plan.



Pipeline Rebuild: Innovation Process



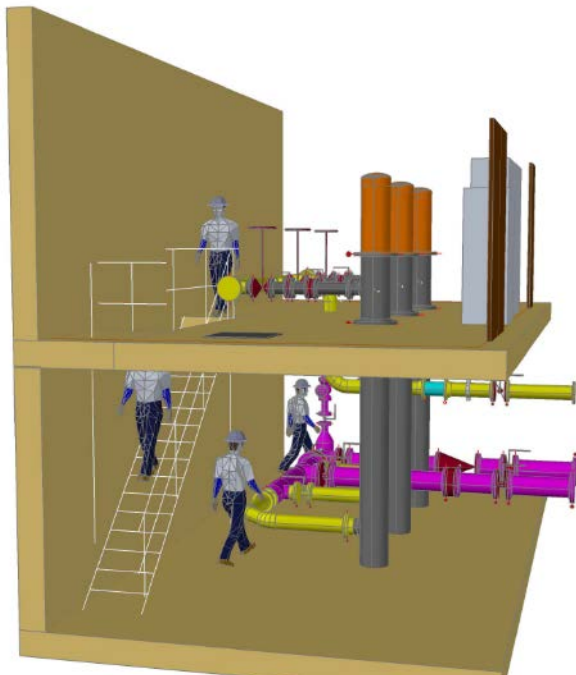
Pipeline Rebuild: Next Generation Pipelines



Building Information Modeling and Design



- BIM
 - 3D Design Models
 - Design Verification
 - Visualizations for Client and Community Review
- Infrastructure Project Tracker
 - Project tracking
 - District-wide collaboration: for Planning, Design, Construction and Public Outreach



DEA 19-017A: Shepherd Canyon

Pipeline System Extension - District Forces
DEA19017

City:	OAKLAND
Ward:	3 (Director Young)
County:	Alameda County
To Be Constructed By (Primary):	PCE
Additional Construction Support:	
Project Description:	Install 430 feet of 8-inch and 12-inch diameter pipe. Provide water service to Applicant.
Project Driver:	
Deadline Date:	
Deadline Date Description:	

Project Manager:



Shawn M Kunstal (16799)
skunstal@ebmud.com
510-287-1278

Status:	Active
Status Notes:	Project transferred from Pipe Dream on 6/23/2021 in the Closeout Phase.
Phase:	Initiation
Phase Notes:	
Created:	06/23/2021 15:59 by Elena (Owre) Dudek
Last Updated:	06/23/2021 15:59 by Elena (Owre) Dudek

GIS View Map Add



Wastewater Renewable Energy Program



Trucked Waste



Anaerobic Digesters



Onsite Cogeneration



WASTE



BIOGAS



ELECTRICITY

Wastewater Use of Surplus Biogas

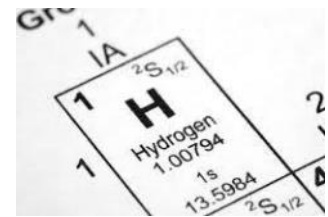


Three engines
2.15 MW each



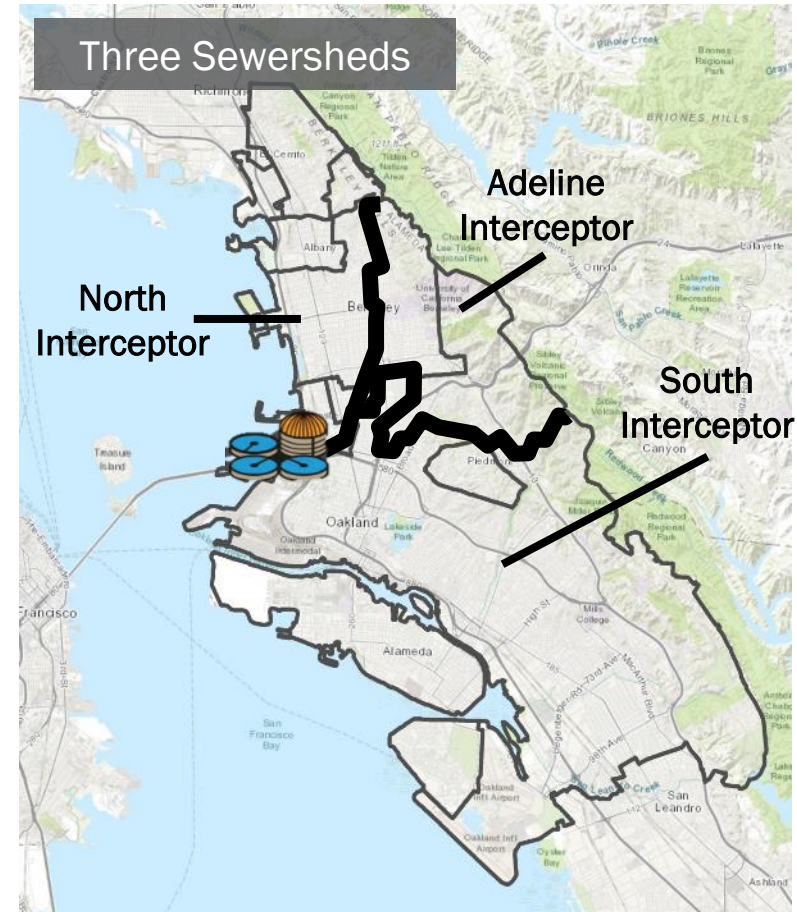
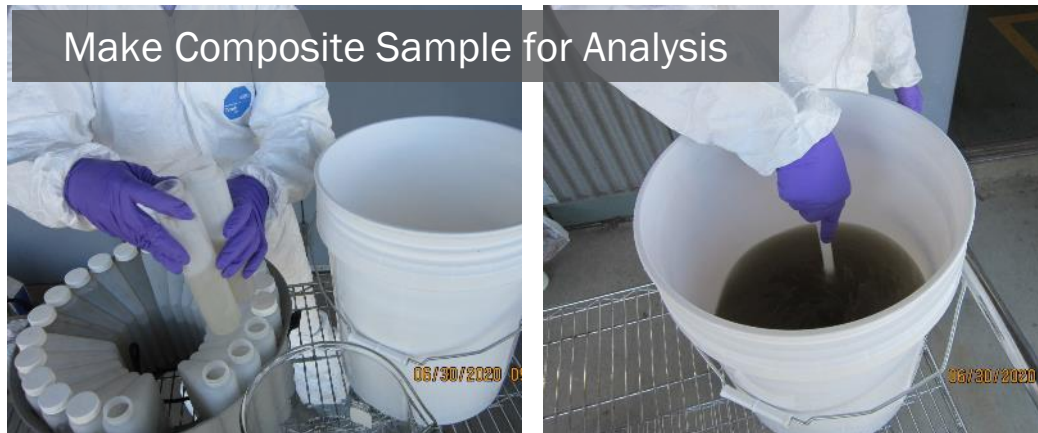
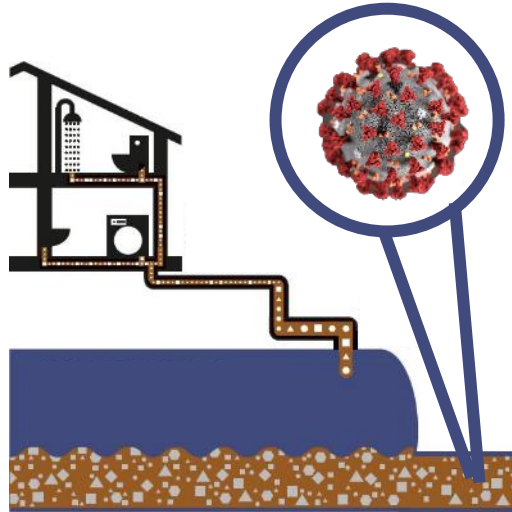
Turbine
4.5 MW

NOW



FUTURE

COVID-19 Wastewater Epidemiology



Climate Change: Carbon Sequestration via Biosolids



Biosolids

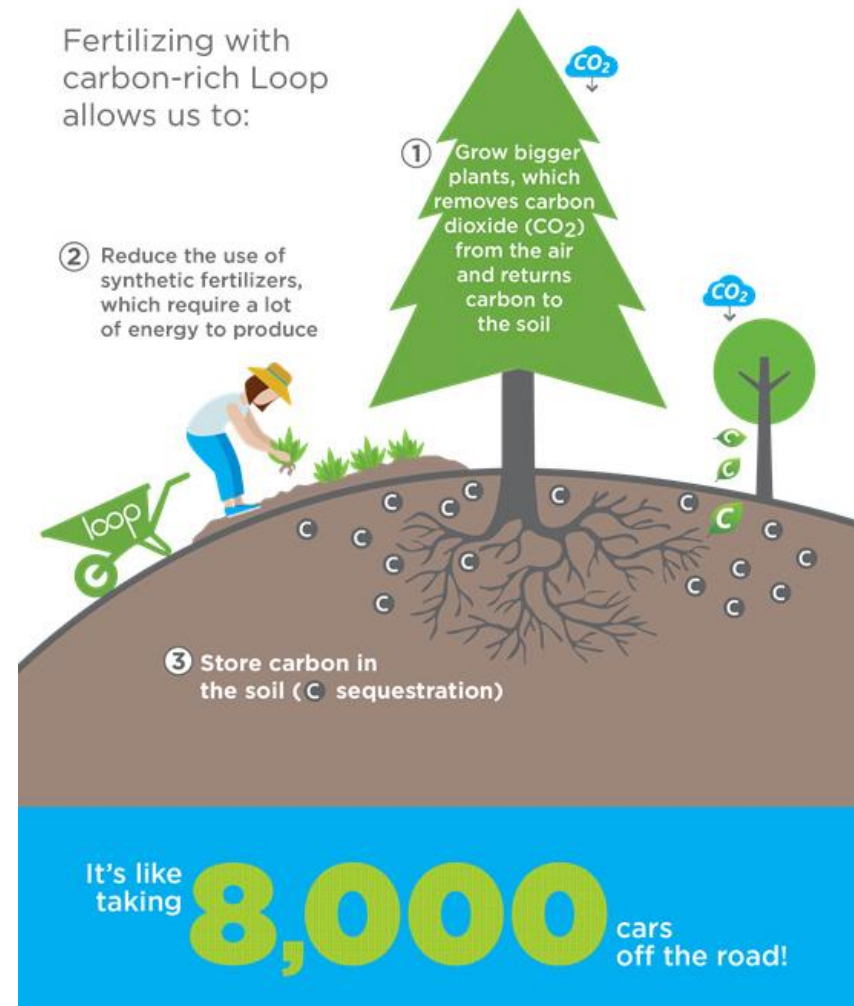


Fertilizing with carbon-rich Loop allows us to:

② Reduce the use of synthetic fertilizers, which require a lot of energy to produce

① Grow bigger plants, which removes carbon dioxide (CO_2) from the air and returns carbon to the soil

③ Store carbon in the soil (C sequestration)



District Partnerships and Activities



Agency and Utility Collaboration:

- Clean-17 and Dirty Dozen
- Professional Organizations:
AWWA, WRF and CWEA
- Innovation Groups -
Technology Approval Group (TAG)



Strategic Research Innovation



Innovation Roadmap



Successfully developing the roadmap and implementing an innovation program requires:

- A strong team
- Sustained senior management support
- Discipline
- A process to prioritize, evaluate, implement and manage change

Proposed District Office of Research and Innovation



- Coordinate the District's Innovation Efforts
 - Build on existing innovation efforts
- Office of Research and Innovation
 - Provide leadership and strategic direction
 - Instill a culture of innovation
 - Identify and develop Innovations
 - Prioritize funding
 - Oversee effective evaluation and deployment of new technologies and work processes

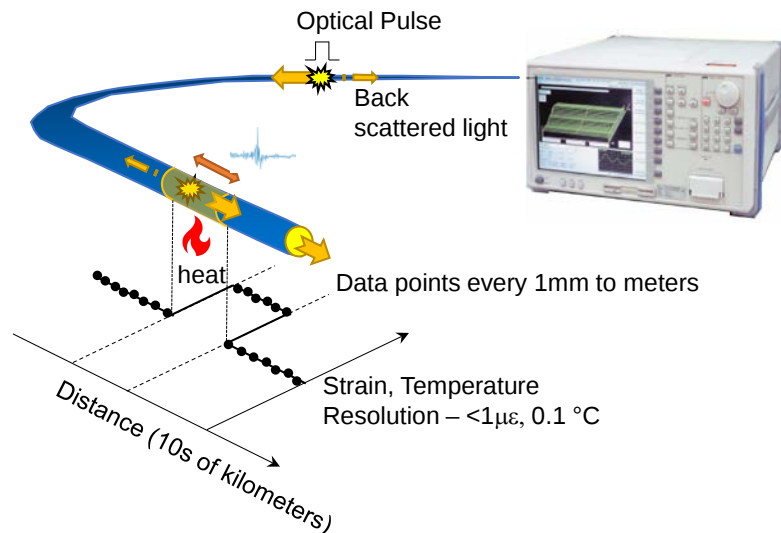


Smart Infrastructure Center: Proposal



- Vision

- Innovative solutions to realize adaptable infrastructure systems with “intelligence for life”



- Research and Innovation Hub

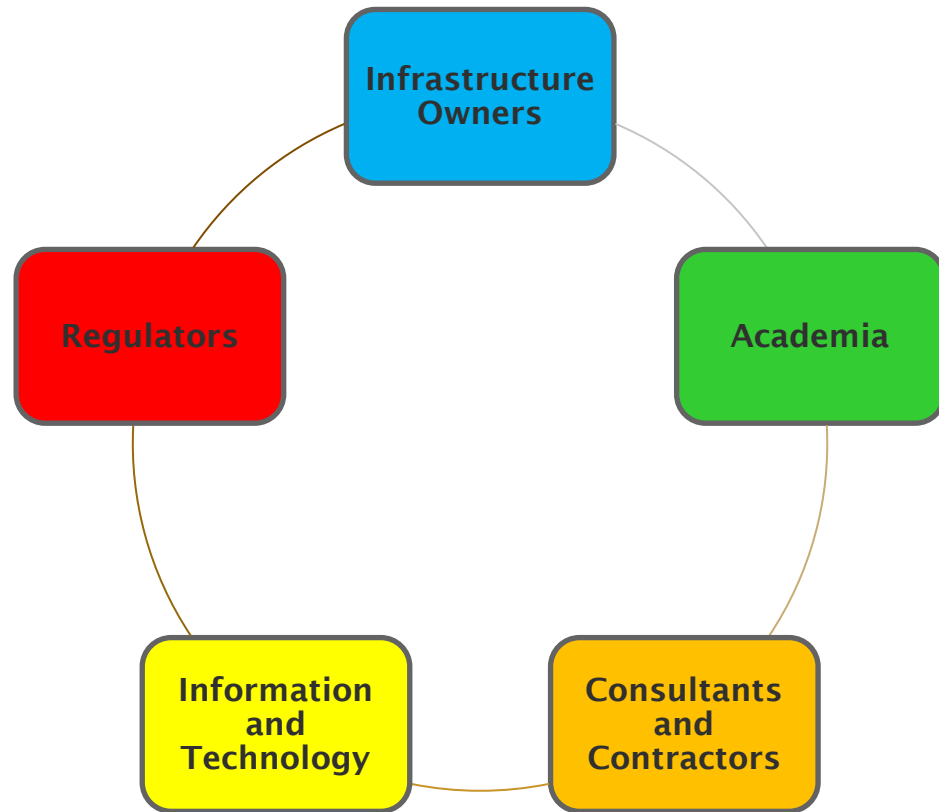
- Pacific Earthquake Engineering Research
- Berkeley Water
- Institute of Transportation Studies
- Lawrence Berkeley National Laboratory
- Center for Information Technology Research in the Interest of Society
- Global Metropolitan Studies

Smart Infrastructure Center: Innovation Ecosystem



- Objectives

- Infrastructure
- Water Supply and Natural Resources
- Climate Change
- Water and Wastewater Operations
- Emergency and Community Preparedness



Smart Infrastructure Center: Opportunities



Infrastructure

- Large scale pipe testing facility
- Smart construction and maintenance



Monitoring and robotics technologies (UAV, fiber optics, GPR)



Big Data and AI
Cyber threats

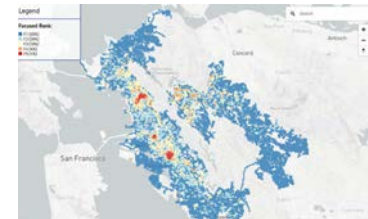
Resilient water network

- Aging physical infrastructure
- Water quality
- Energy management



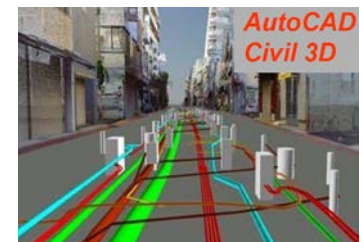
Community Resilience

- Engagement & Public trust
- Interdependent infrastructure (e.g., Caltrans, PG&E)
- Risk of cascading failures
- Resiliency planning and design



Sustainability

- Water supply and natural resources
- Sea level rise, watershed
- Smart roads



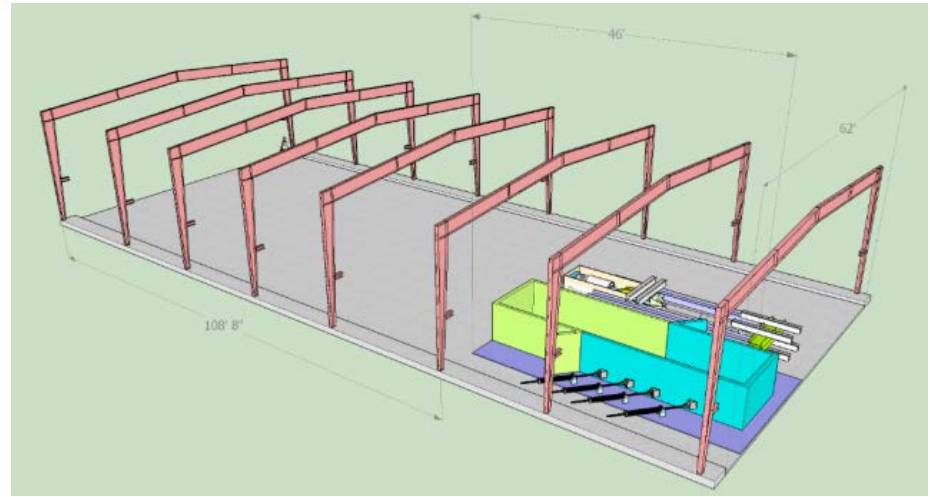
Smart Infrastructure Center: Diversity, Inclusion, Culture and Equity



- EMPOWER program
- EDGE in Tech Initiative
- Fannie Lou Hamer Black Resource Center

- Undergraduate Course
 - Technology and Engineering
 - Innovation
 - Community
 - Skill training

Smart Infrastructure Center: Pipeline Testing Facility



- Large-Scale Pipeline Testing Facility
- Extension of UC Berkeley's Civil and Environmental Engineering's Structure and Geotechnical Lab
- At the Richmond Field Station Building

Smart Infrastructure: Phased Approach



Phase 1 (2021-2022) \$1.5m in Utility contributions

- Development of large-scale pipeline testing facility
- Workshops to support business plan development
- Develop mid-term and long-term business plans
- Start utility sponsored course and community outreach

Phase 2 (2022-2025) \$3-4 million in Utility and UC funding

- Expansion of large-scale pipeline testing facility
- Develop smart construction process testing facility
- Execution of the mid-term and long-term business plans

Phase 3 (2024 and beyond)

- Self supporting 'innovation' center

Next Steps

- Smart Infrastructure Center Agreement
- Large-Scale Pipeline Testing Facility at UC Berkeley
- Workshops with UC Berkeley Staff & Industry Partners
- District Office of Innovation & Research



Questions and Discussion

Formalize an Innovation Team



Goal – a strong team with sustained senior management support, bringing together efforts of innovation champions throughout the organization in partnership with our stakeholders

Excessive Water Use Penalty Ordinance

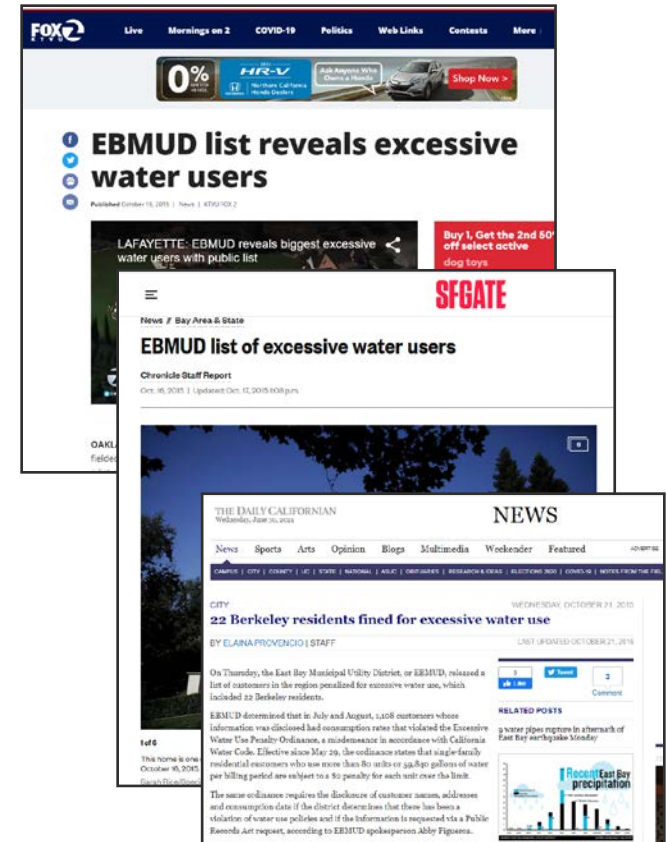
Planning Committee

July 13, 2021

Background



- Ordinance enacted April 28, 2015
- Applies during Stage 3 and 4 droughts to SFR customers
- \$2 per CCF above threshold
- Approximately 5,600 accounts were assessed a penalty during in 2015-2016
- District required to release information of violators if requested



SB 814 Requirements



- SB 814 became law in 2016 prohibiting excessive water use for SFR customers
- Requires agencies to discourage excessive water use:
 - Whenever mandatory rationing is in place
 - Urban retail water supplier affected when the Governor has issued a proclamation of a state of emergency based on local drought conditions
- Options to discourage excessive water use include ordinance, rule, rate structure, or tariff

Authority to Discourage Excessive Water Use



- District's current Ordinance based on Water Code section 377 and Government Code section 53069.4
- New State law provides agencies authority to establish mechanism to discourage excessive use (Water Code sections 365-367)

Process for Enforcement



Current Ordinance	Recommended Amendments
• Penalty added to customer's first billing cycle exceeding the threshold.	• Add warning for first billing cycle exceeding the threshold. No financial penalty.
• Water bill with penalty serves as notice of violation.	• Customers not in violation until second exceedance, when financial penalty is levied.
• Penalty at \$2/CCF when customer use exceeds threshold	• Remove specific dollar amount from the Ordinance. Financial penalty to be set by Board at time of enactment.

Penalty Thresholds



	Stage 2	Stage 3	Stage 4
55 to 68-day billing cycle	<i>140 CCF</i>	120 CCF	80 CCF
25 to 38-day billing cycle	<i>70 CCF</i>	60 CCF	40 CCF
Approximate gallons/day	<i>1,745</i>	1,496	997

District Action During Governor-Declared Droughts



- Board to set specific excessive water use threshold and penalty fee when Ordinance is enacted



Next Steps



- Board discussion (August 10, 2021)
- First reading of Ordinance (Sept. 14, 2021)
- Second reading of Ordinance (Sept. 28, 2021)
- Ordinance effective 30 days later