PURPOSE

together we create a strong foundation for Houston to thrive

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5 TO THRIVE VALUES

respect | ownership | communication | integrity | teamwork

SERVICE LINES

HOUSTON WATER BRANCHES					
Drinking Water Operations	Wastewater Operations	Northeast Water Purification Plant Expansion Project	Resources & Client Services	Planning	Regulatory Compliance

CAPITAL PROJECTS

CUSTOMER ACCOUNT SERVICES

HOUSTON PERMITTING CENTER

HOUSTON WATER

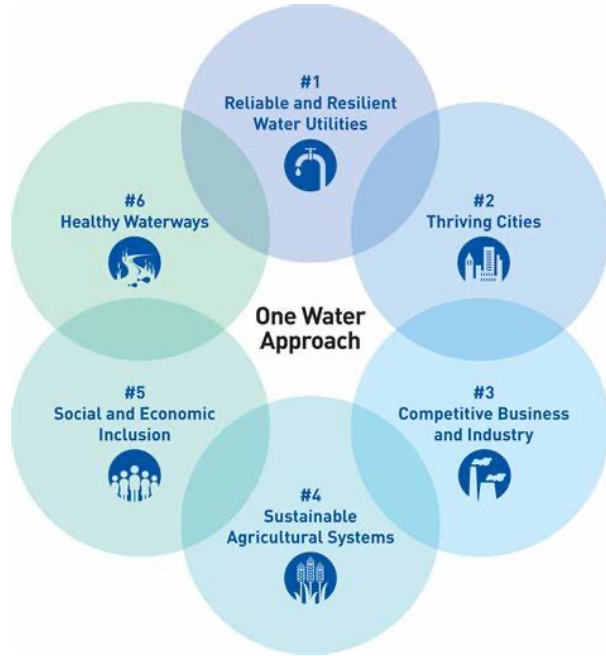**TRANSPORTATION AND DRAINAGE OPERATIONS**

HOUSTON WATER PLANNING BRANCH

HOUSTON PUBLIC WORKS

OVERVIEW:

- **One Water Plan (Phase I)**

- **ArcGIS Utility Network Model Migration**

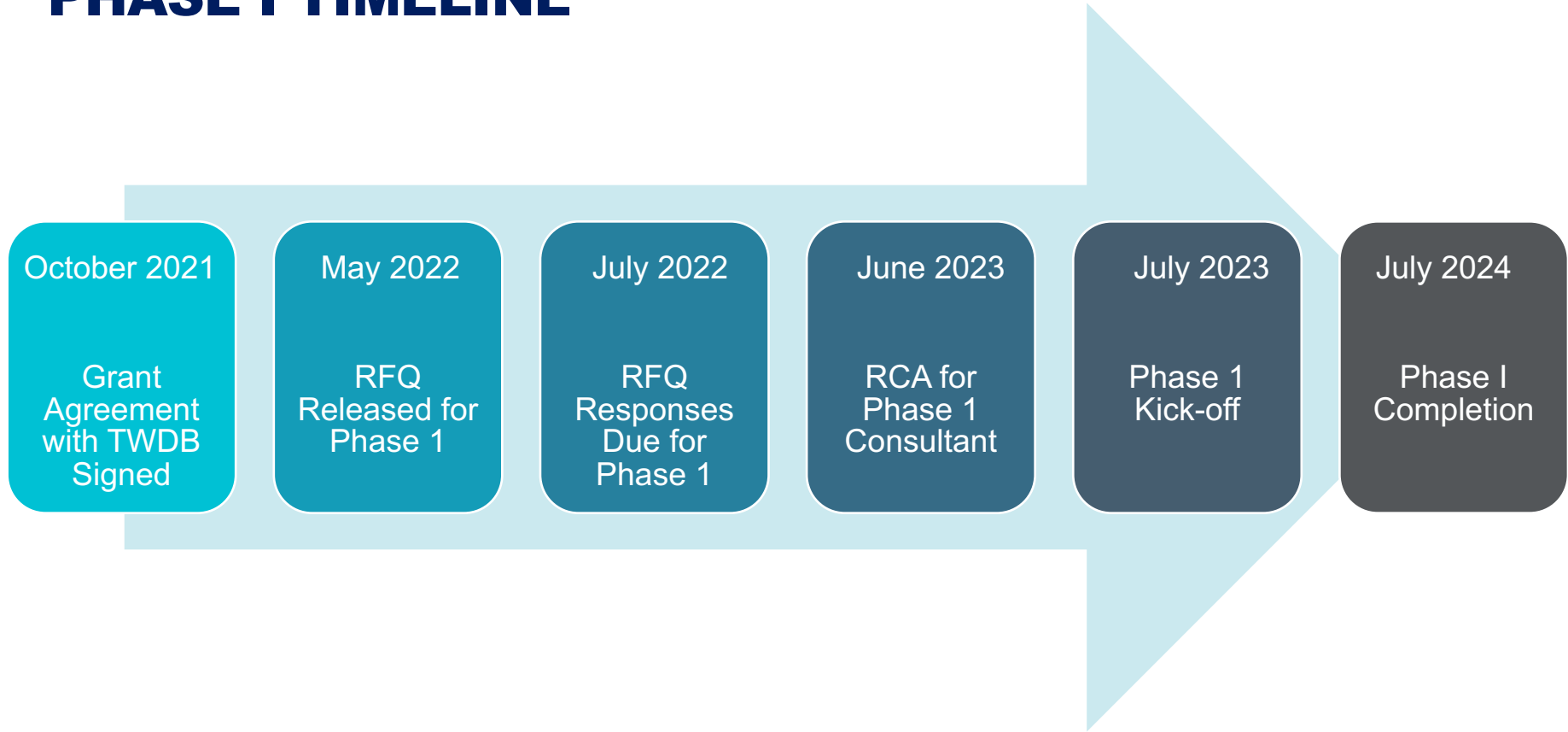- **Smart Utility - Digital Twin & Smart Sewer**

ONE WATER APPROACH

One Water Approach

#1 Reliable and Resilient Water Utilities
#2 Thriving Cities
#3 Competitive Business and Industry
#4 Sustainable Agricultural Systems
#5 Social and Economic Inclusion
#6 Healthy Waterways

HOUSTON'S ONE WATER PLAN

Drinking Water Operations

Community & Stakeholder Input

Wastewater Operations

Stormwater Operations

HOUSTON PUBLIC WORKS

6

PHASE I TIMELINE

October 2021	May 2022	July 2022	June 2023	July 2023	July 2024
Grant Agreement with TWDB Signed	RFQ Released for Phase 1	RFQ Responses Due for Phase 1	RCA for Phase 1 Consultant	Phase 1 Kick-off	Phase I Completion

HOUSTON PUBLIC WORKS

PHASE 1 - COMPONENTS

Stakeholder Collaboration

Community Engagement Plan

Water Equity Roadmap

Implementation Plan for Phase 2

HOUSTON
PUBLIC WORKS

ARCGIS UTILITY NETWORK MIGRATION

- **Modernizes the water and wastewater systems geodatabase framework.**

- **Migrates to newer data structure, architecture, and platform, tools and workflows.**
  - **From ArcFM to ArcGIS Pro**
  - **Local architecture to AWS platform**
  - **Data service editing**
  - **Workflow manager and data reviewer**

Project Initiation January 2022

Anticipated Completion June 2023

Post-Migration July 2023 – June 2024
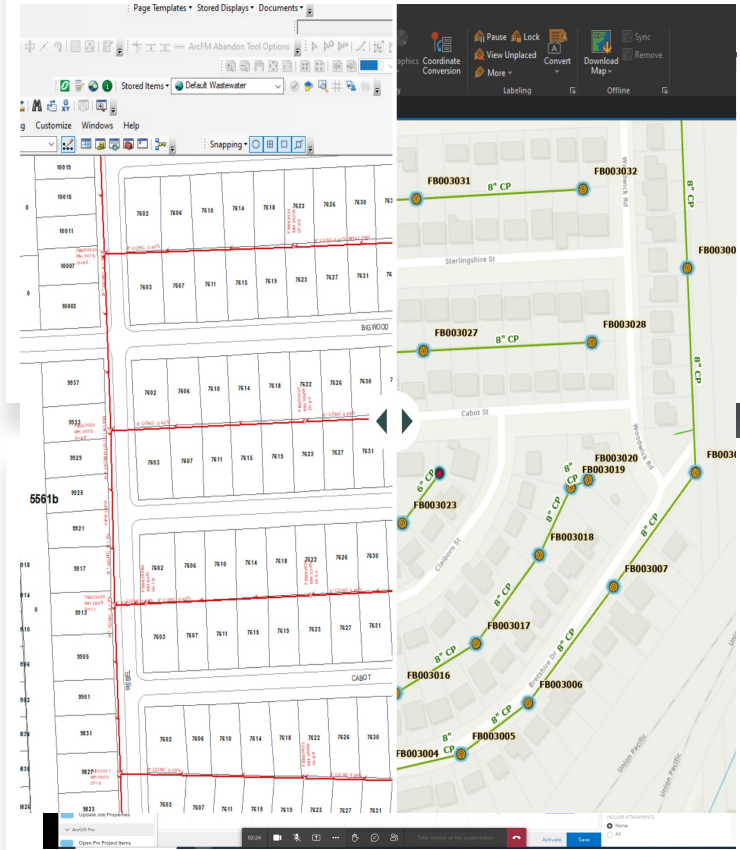
PROJECT CHALLENGES

- Project delivery delays

- Extensive financial and staff time investment

- Complex learning curves resulting from changes in data structure, architecture, tools, and workflows

- Staff turnover

- Preparation of staff and internal stakeholders for these changes

- Unforeseen post-migration needs or impacts

HOUSTON
PUBLIC WORKS

PROJECT BENEFITS

- Responsive, fast system

- Additional functionality like network tracing

- Efficiencies gained in improved processes (e.g. workflow manager)

- Facilitates sharing and connecting to data services

- Modernizes software tools (e.g. ArcGIS Pro vs ArcFM)

- Efficiencies gained by GIS staff being able to customize the system

- Enhances security (i.e. no direct database access)

- Safeguards replicas when schema edits are made

HOUSTON
PUBLIC WORKS

DIGITAL TWIN PLAN

Model Building → Data Integration (IT, ET, OT) → Real Time Operational Dashboard → Predictive Platform (ML/AI) → Operational Digital Twin

Integrating ET, IT and OT data and have full accessibility for all use cases and for single source of truth

Real time view of system and future prediction using AI/ML to better manage the resources for future scenarios

Edge computing capability allows all users to take advantage of it
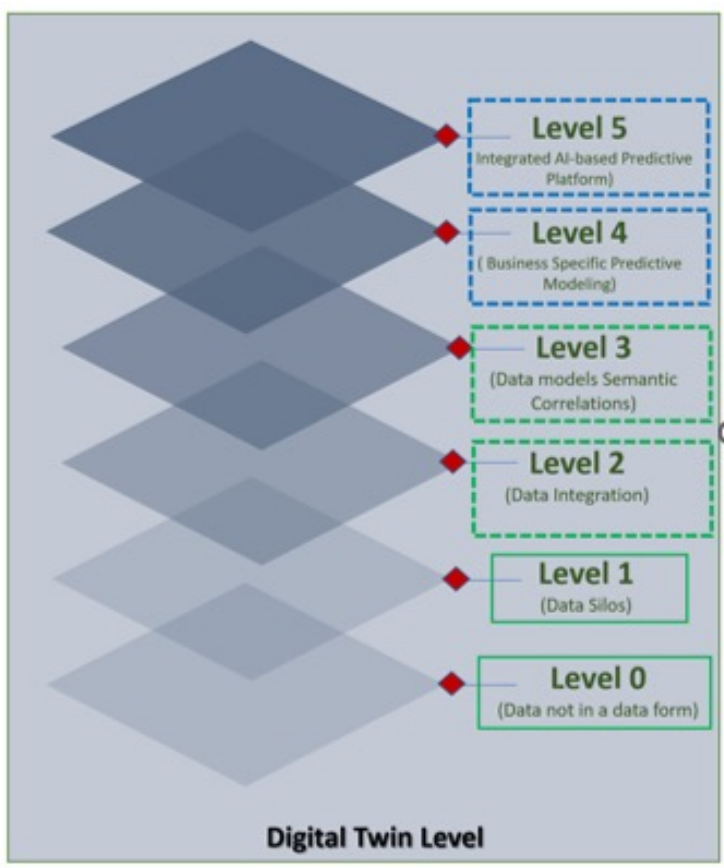
Digital Twin Level

DIGITAL TWIN LEVEL

Smart Water Pilot Projects:

- 5 AI Models (In-house)

- 3 Predictive Modeling Pilot Projects
  - Pipe Failure Predication (Grundfos, Voda)
  - Near-Real Time "Operational Digital Twin" (WaterSight/Bentley)
  - 3D Modeling & Strategic Asset Management for Water Facilities (Carollo)

SMART SEWER

Smart sewer initiative is an innovative approach to managing the operations of the City of Houston's over 6,000 miles of extensive sewer pipes with the help of advanced technology.

The operations of the collection system are currently monitored through about 2,000 intelligent level meters, about 200 flow meters and 380 lift stations on a real-time basis.

By leveraging real-time data and advanced predictive analytics, it enables efficient monitoring, prevention of Sanitary Sewer Overflows (SSOs), preventive and predictive maintenance, optimized resource allocation, enhanced emergency response, data-driven decision making, and environmental protection.

Implementing successfully this initiative would eventually lead to improved system performance, cost savings, and a more sustainable and resilient sewer infrastructure.