LOWER IPSWICH RIVER WATERSHED DECISION SUPPORT TOOL

North Shore Water Resilience Task Force (NSWRTF)

Taskforce Meeting

May 6, 2025

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AGENDA

- Introductions
- Project Progress to Date
- Decision Support Tool Purpose
- Decision Support Tool Development Approach
- Demo

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KEY EKI TEAM

Ayman Alafifi, PhD, PE
Project Manager

- 15 Years of experience
- Water resources planning and management
- Data integration, dashboards, and decision support tools

David Melycher, LEP, LSP
Principal-in-Charge

- >30 Years of experience in Massachusetts
- Massachusetts Licensed Site Professional
- Manages EKI's East Coast Operations
- EKI's PFAS initiative lead

Anona Dutton, PG, CHG
Technical Advisor

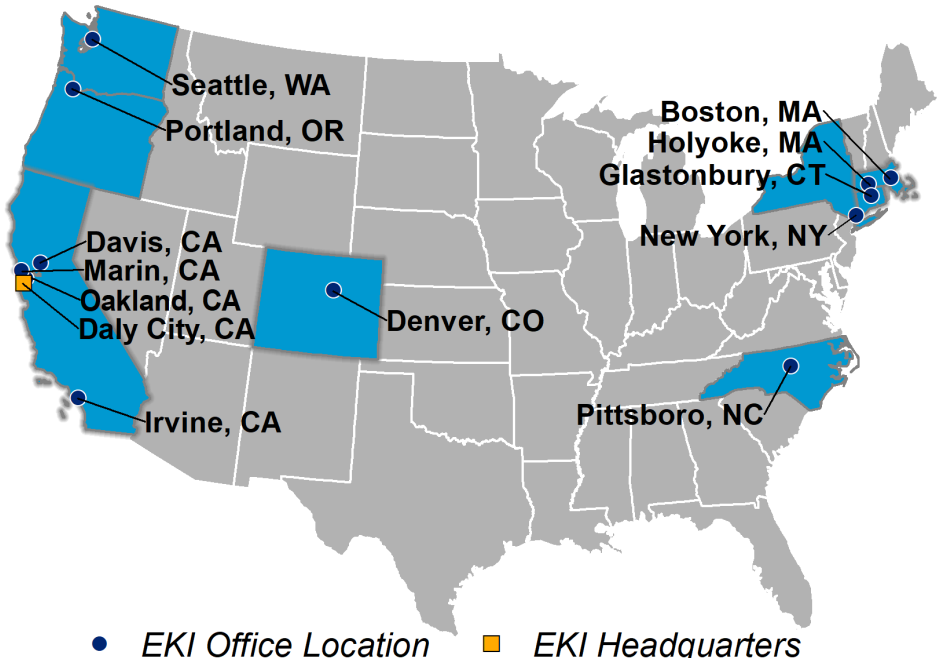
- >20 Years of experience
- Water resources planning & management
- Oversight of numerical modeling, DST development, data management and visualization deliverables

Ellie White, EIT
Tool Development

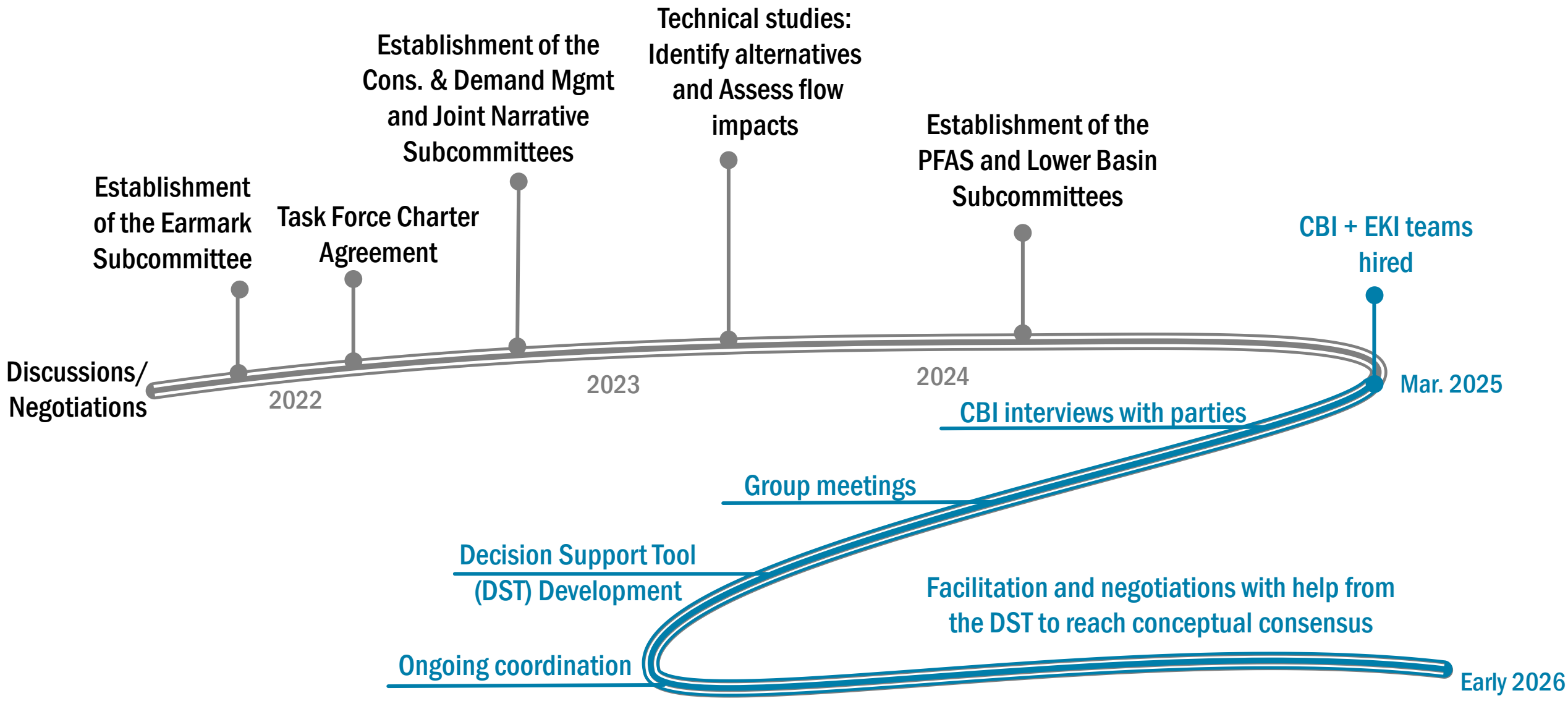
- 5 years of experience
- PhD in Civil and Environmental Engineering
- Data science, water resources, data visualizations

ABOUT EKI

- Employee-owned
- Founded in 1989
- 140+ employees: engineers, hydrogeologists, geologists, environmental scientists, GIS database specialists, data scientists
- Extensive water resources planning and engineering expertise
- Experience in decision support tool development and data science applications including data management, visualization, automated reports, and predictive analytics



PROGRESS TO DATE



EKI'S UNDERSTANDING OF THE KEY BASIN CHALLENGES

- Seasonal low flows.
- Reduced local water availability.
- Future climate variations are likely to lead to longer periods of higher temperatures and more frequent droughts.
- Existing infrastructure and regulatory frameworks may not be sufficient to support necessary improvements and inter-community water sharing.

DECISION SUPPORT TOOL (DST) PURPOSE

- Build on the foundational analyses and studies already completed
- Translate discussions and facilitation outcomes into measurable objectives and priorities
- Assess impacts of alternatives on the watershed and communities, including costs, benefits, and breakpoints
- Support interactive scenario planning including exploring tradeoffs and adjusting proposed alternatives
- Enable collaborative and informed decision-making through transparent assumptions and visualization

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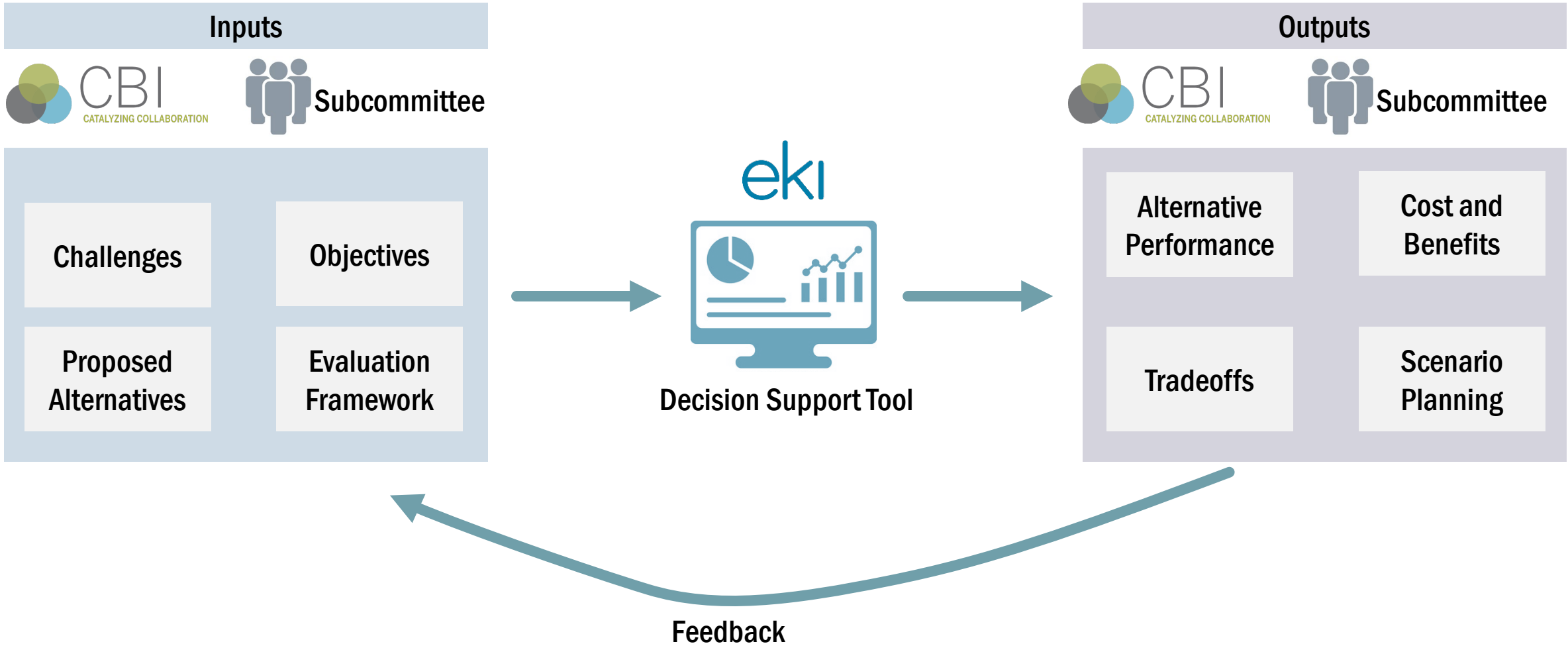
DST FRAMEWORK



DST DEVELOPMENT PROCESS

1. Define Objectives
2. Identify Alternatives
3. Develop Evaluation Metrics
4. Evaluate Alternatives

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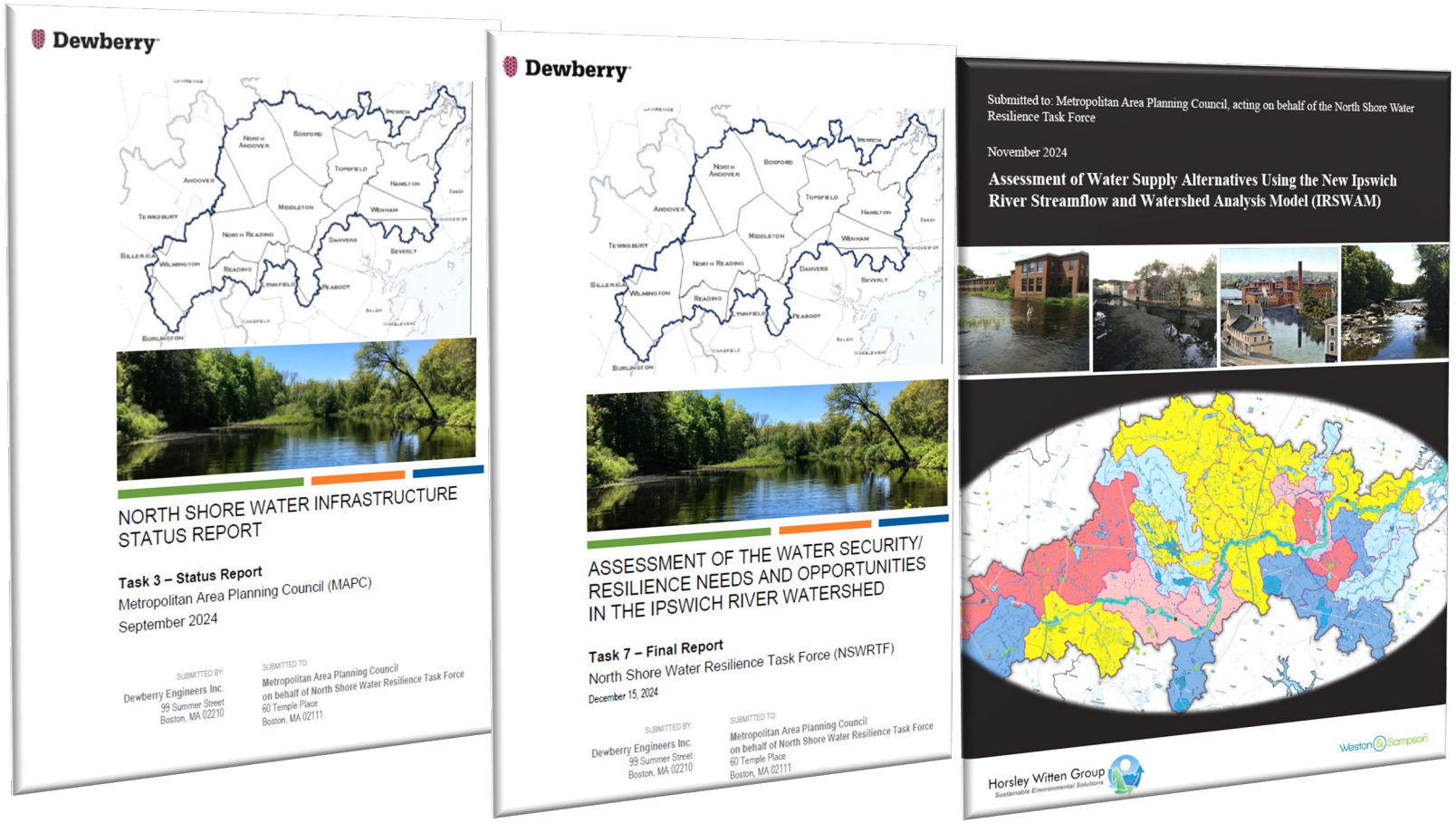
1. DEFINE OBJECTIVES (EXAMPLES)

1. Improve water supply reliability for Ipswich River Watershed communities
2. Improve the health of aquatic ecosystems in the Ipswich River Watershed
3. Support comprehensive regional solutions through collaboration among all stakeholders
4. Obtain funding to implement the necessary infrastructure solutions

2. IDENTIFY ALTERNATIVES



2. IDENTIFY STARTING ALTERNATIVES FOR EXPLORATION

Examples from the Dewberry study

	Scenario 1		Scenario 2		Scenario 3	
Salem/Beverly	SBWB	16.1	SBWB	16.1	SBWB (Beverly) MWRA (Salem)	9.1 7.0
Hamilton	SBWB	1.0	SBWB	1.0	SBWB	1.0
Wenham	SBWB	0.5	SBWB	0.5	SBWB	0.5
Ipswich	SBWB	0.5	SBWB	0.5	SBWB	0.5
Peabody	MWRA	5.3	MWRA	5.3	MWRA	5.3
Wilmington	MWRA	1.5	MWRA	1.5	MWRA	1.5
LCWD	MWRA	1.0	MWRA	1.0	MWRA	1.0
Danvers-Middleton	MWRA	5.5	MWRA	5.5	SBWB	2
Topsfield	MWRA	0.8	SBWB	0.8	SBWB	0.8

Split

Switched to

Down to

Switched to

Other Variations?

- ❑ Participation
- ❑ Volume
- ❑ Timing

STUDIED ATTRIBUTES OF EACH ALTERNATIVE*

- Estimated project costs
- Rough timeline
- Initial assessment of infrastructure needs
- Initial assessment of water quality implications
- Estimate of reduction of groundwater pumping
- Modeled impact on streamflow
- Considerations related to technical feasibility
- Likely legislative and regulatory requirements

* *May need to verify and/or fill in data gaps*

3. DEVELOP EVALUATION METRICS

Example Qualities of Useful Metrics:

- Align with the objectives
- Address community needs and concerns
- Reflect priorities
- Balance quantitative and qualitative criteria
- Capture strengths and limitations of alternatives
- Comparable across all alternatives to eliminate bias

4. EVALUATE ALTERNATIVES

- Apply weights to each metric, based on their relative importance
- Compare alternatives using the metrics and assigned weights
- Test how outputs change with different inputs
- Identify trade-offs between alternatives

DEMO
EXAMPLE FROM ANOTHER PROJECT

Access here: https://tinyurl.com/NSWRTF-DEMO

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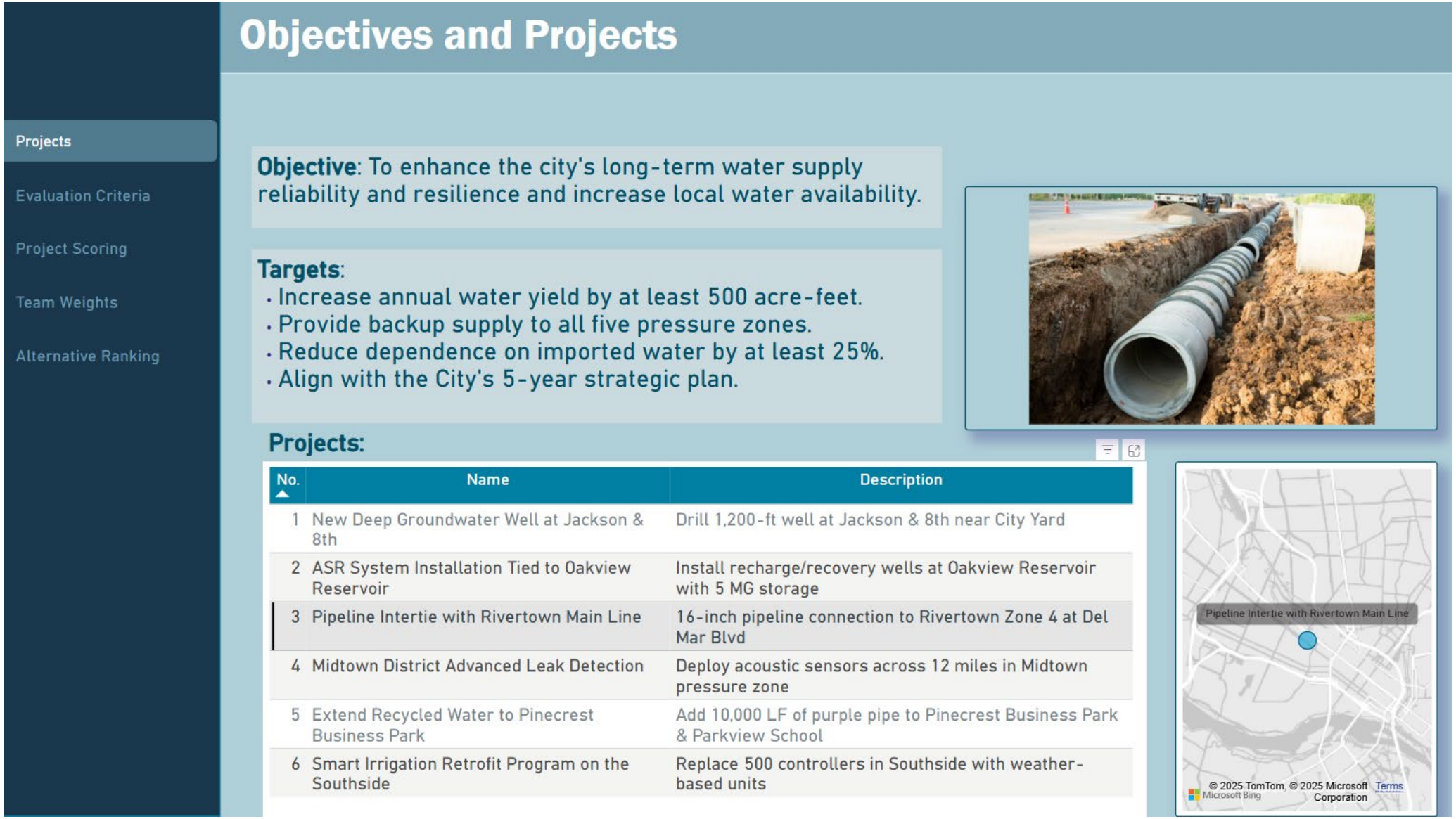
DEMO SCREENSHOTS



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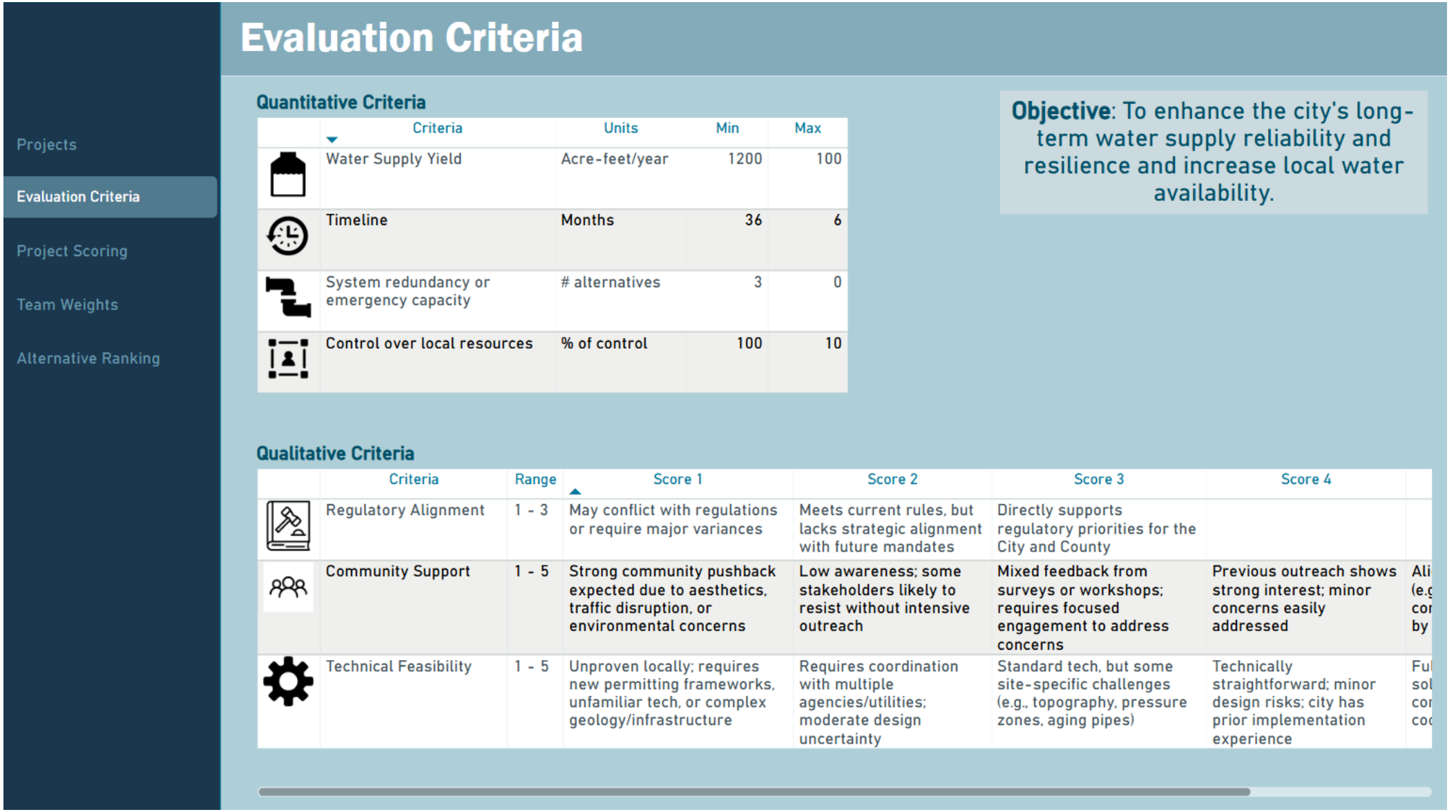

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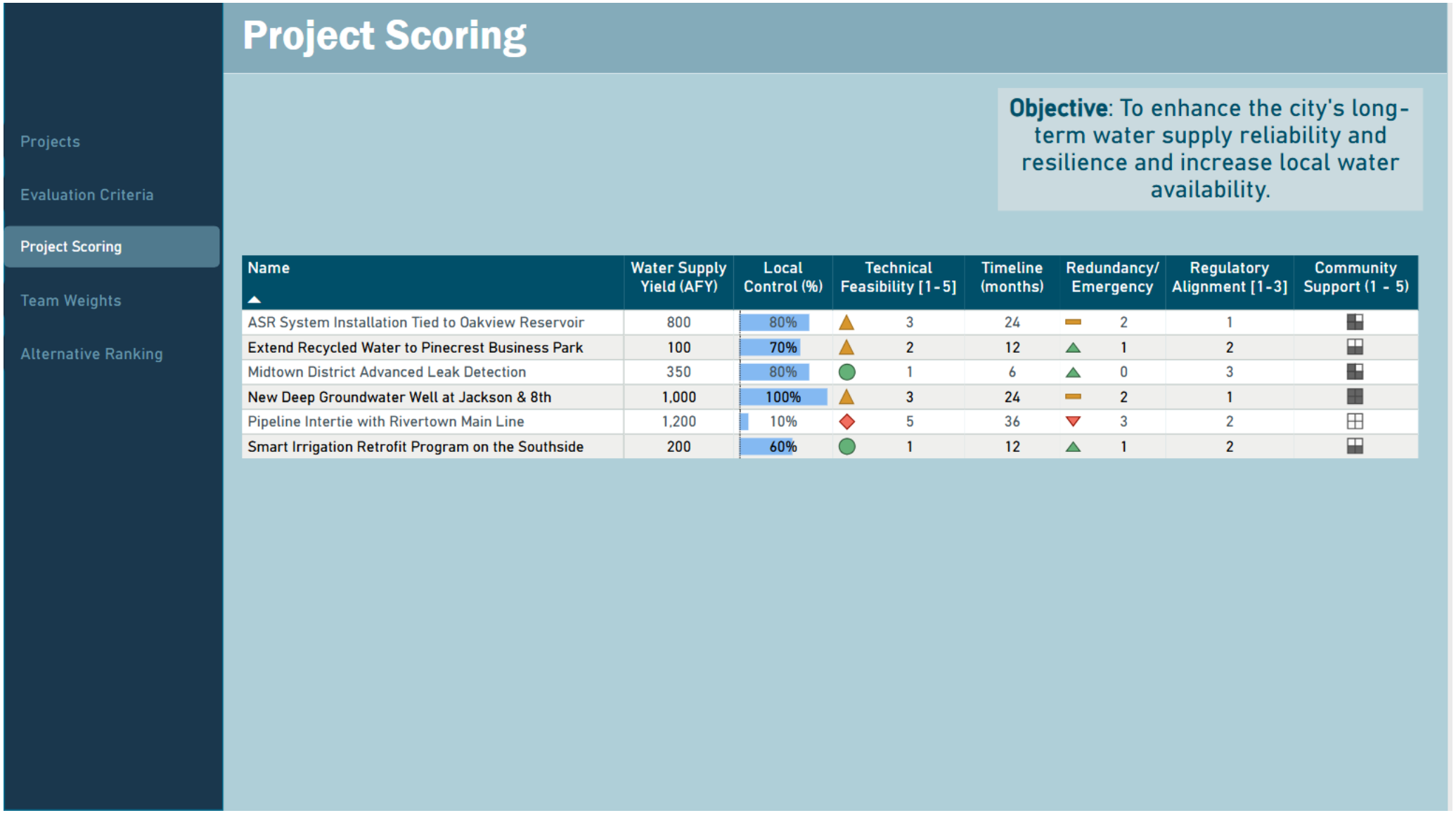

Name	Water Supply Yield (AFY)	Local Control (%)	Technical Feasibility [1-5]	Timeline (months)	Redundancy/ Emergency	Regulatory Alignment [1-3]	Community Support (1 - 5)
ASR System Installation Tied to Oakview Reservoir	800	80%	3	24	2	1	
Extend Recycled Water to Pinecrest Business Park	100	70%	2	12	1	2	
Midtown District Advanced Leak Detection	350	80%	1	6	0	3	
New Deep Groundwater Well at Jackson & 8th	1,000	100%	3	24	2	1	
Pipeline Intertie with Rivertown Main Line	1,200	10%	5	36	3	2	
Smart Irrigation Retrofit Program on the Southside	200	60%	1	12	1	2	

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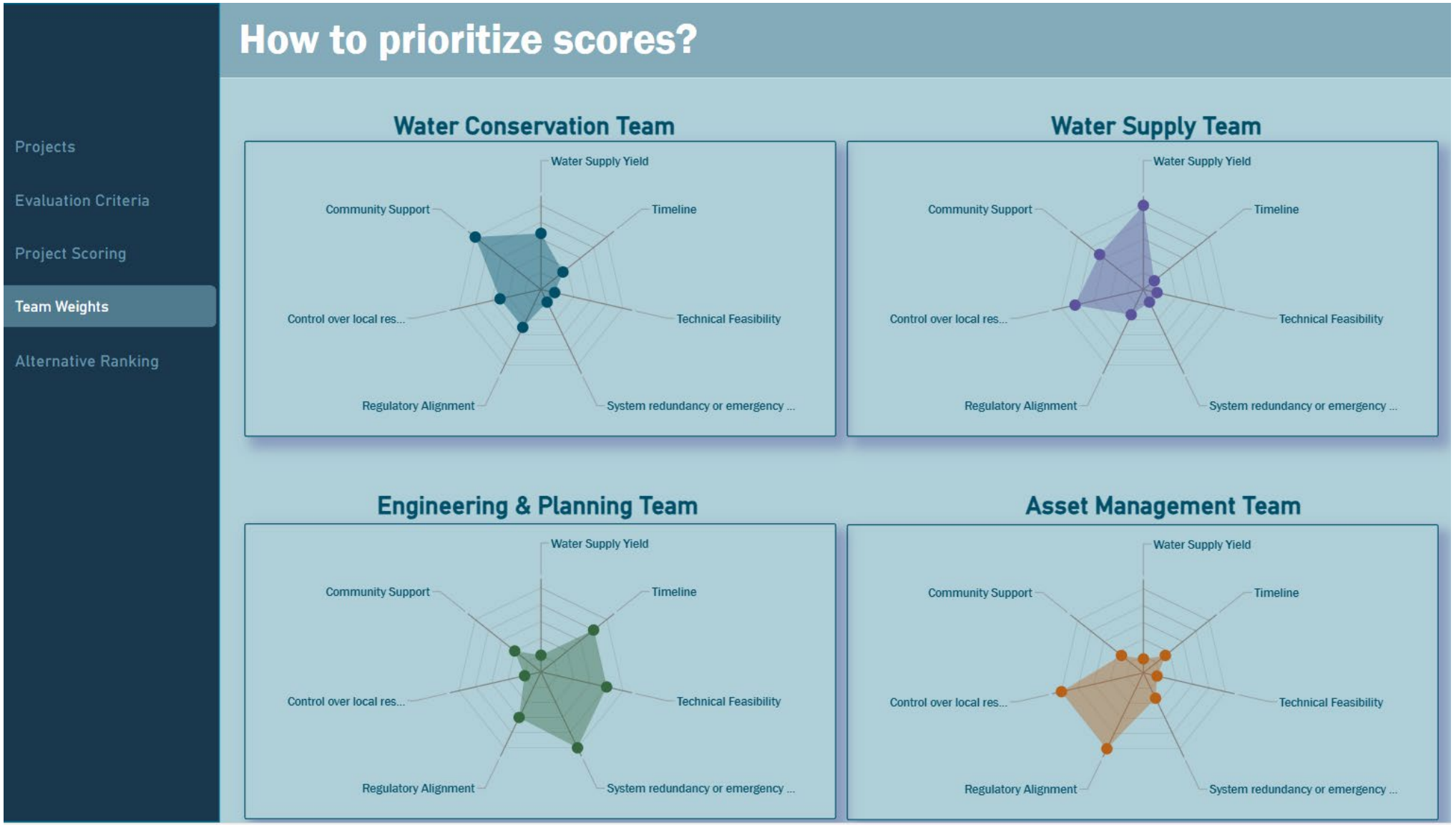

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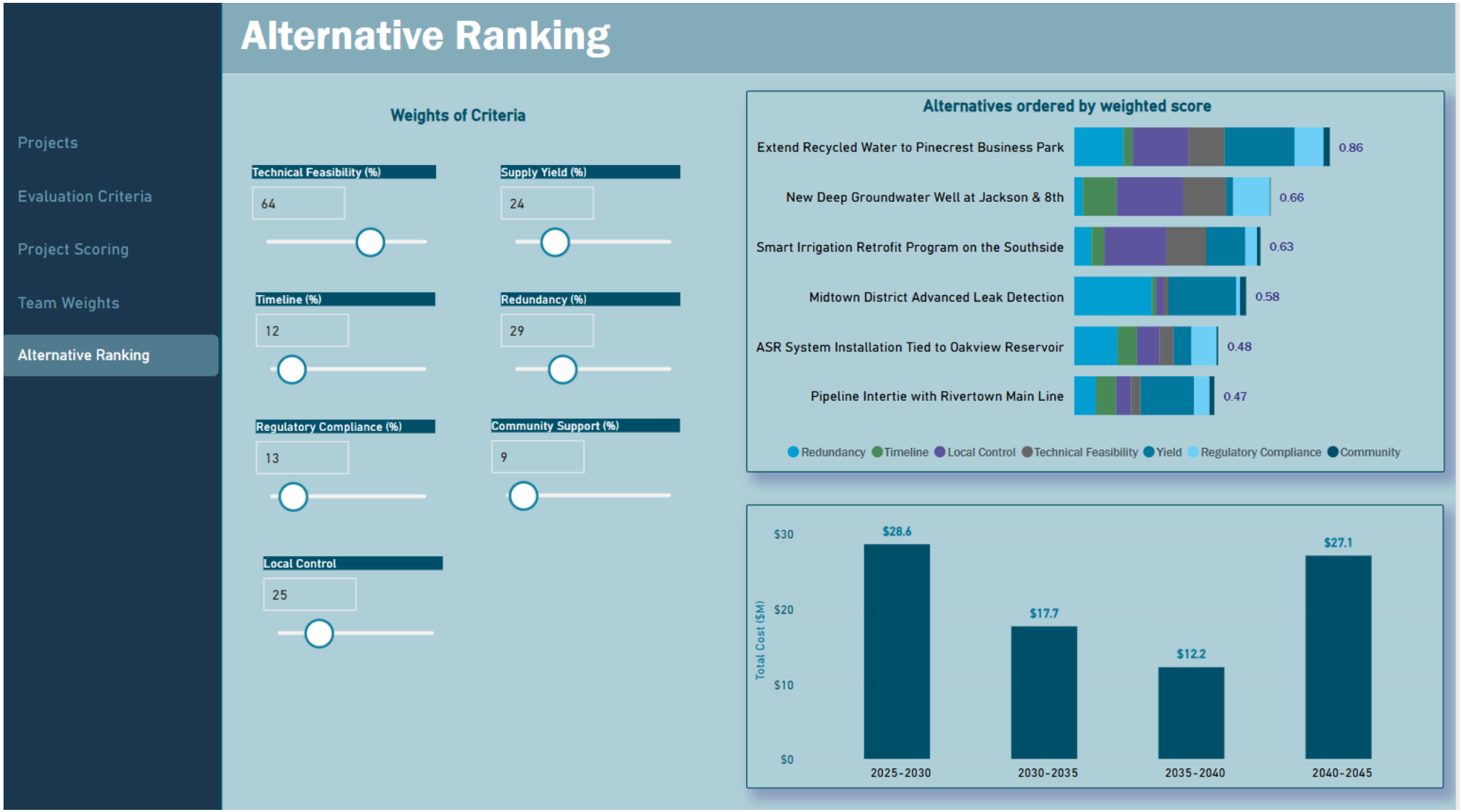

QUESTIONS

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