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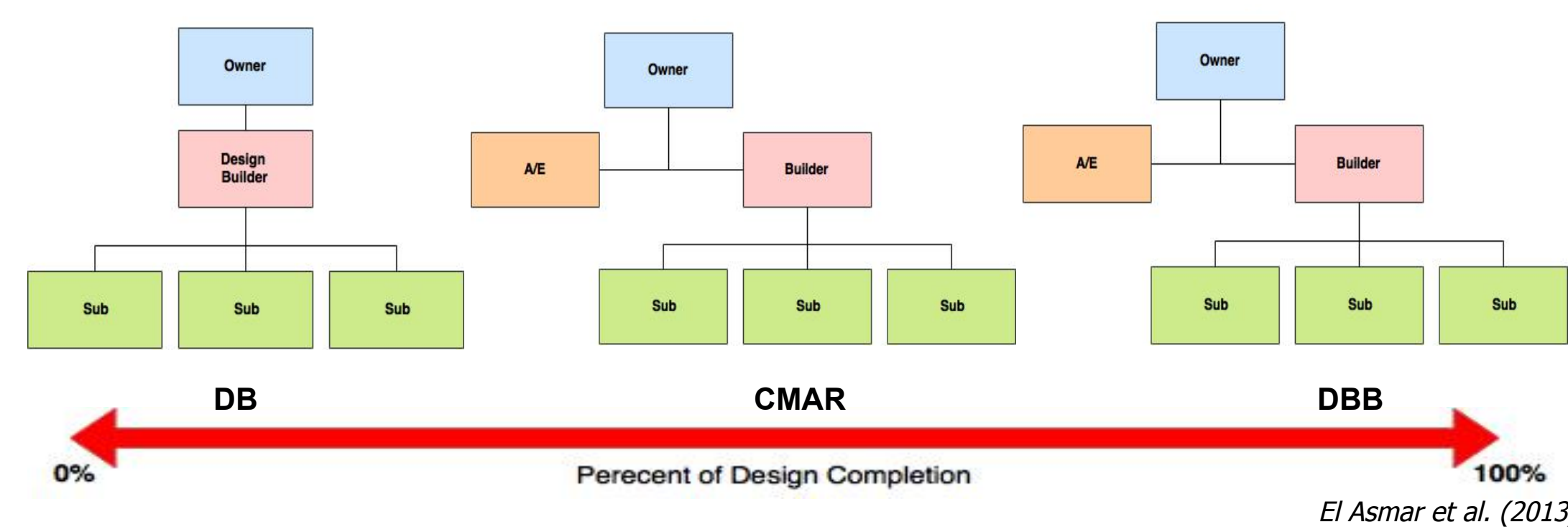
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Motivation

- There is a growing need to renovate and upgrade existing aging water and wastewater treatment plans across the United States. According to the American Society of Civil Engineers (ASCE), present U.S. water infrastructure systems and wastewater infrastructure systems received a failing grade of "D" and "D+" respectively on the 2017 ASCE Infrastructure Report Card (ASCE 2017). Alternative project delivery methods have gained popularity across numerous sectors; however, questions remain about which method to use for a given project. Water infrastructure stakeholders approached us to help develop a solution.

Background



- Different project delivery methods have their own particular advantages/disadvantages depending on unique project characteristics.
- In DBB the contractor is typically involved once design has been completed. In CMAR the construction team is involved before the design is completed, and in DB the design/builder is involved even earlier in the design phase.

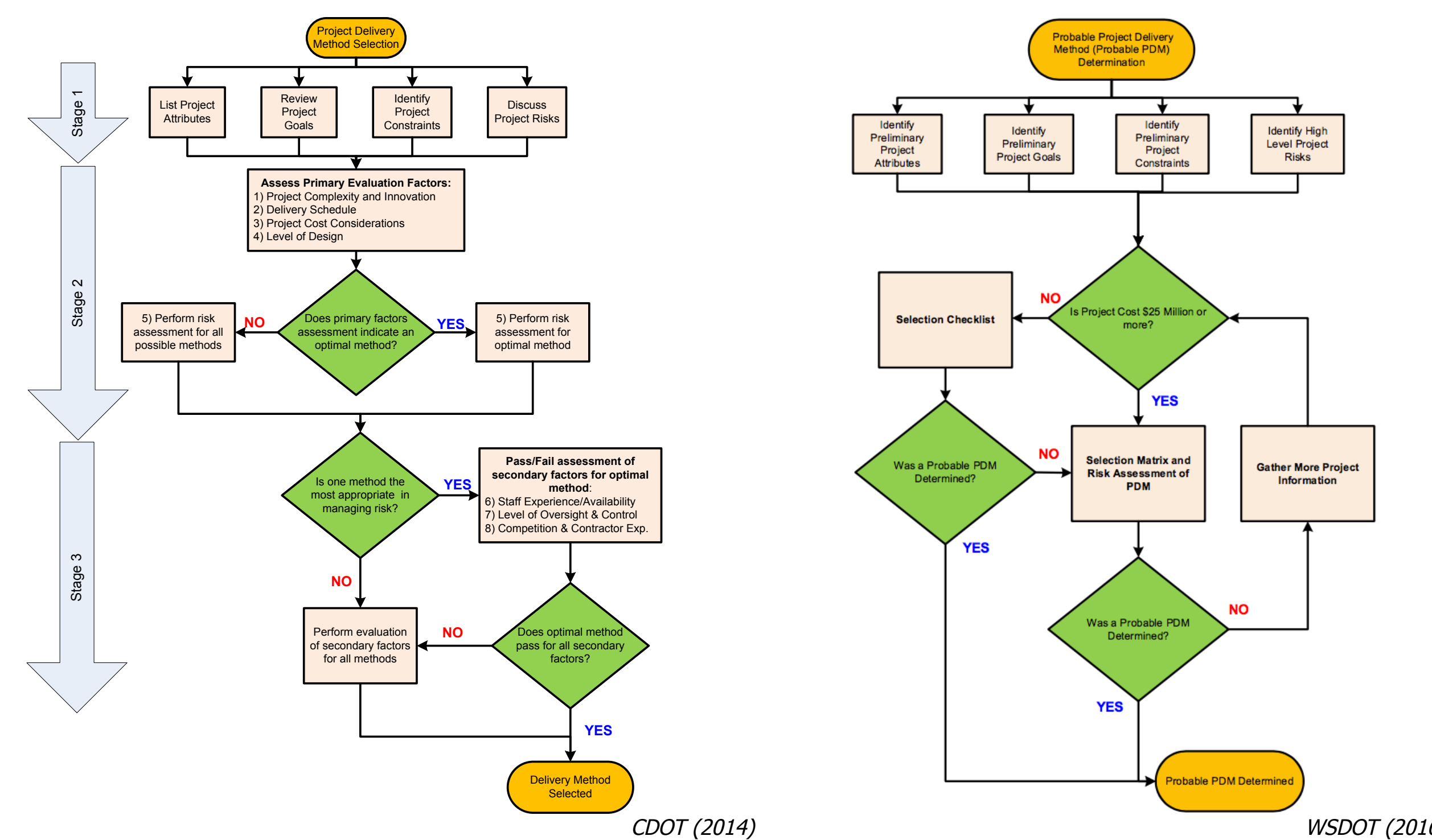
Objective & Methodology

- This study will detect all key project delivery selection factors within five selected existing frameworks which are the The Airport Cooperative Research Program (ACRP), Transit Cooperative Research Program (TCRP), Colorado Department of Transportation (CDOT), Washington State Department of Transportation (WSDOT) and the Alaska Department of Education and Early Development (ADEED) project delivery method decision-support models.

Organization	Year	Application Sector	Title
ACRP	2009	Airports	A Guidebook for Selecting Airport Capital Project Delivery Methods
TCRP	2009	Transit	A Guidebook for the Evaluation of Project Delivery Methods
CDOT	2014	Transportation	Project Delivery Selection Matrix
WSDOT	2016	Transportation	Project Delivery Method Selection Guidance
ADEED	2017	Education	Project Delivery Method Handbook

- The aim is to combine the selection factors of all models under one optimized web-based decision-support tool and reveal their commonalities, to be used for the water infrastructure sector.

Sample of Existing Decision-Support Models



30 Delivery Method Selection Factors

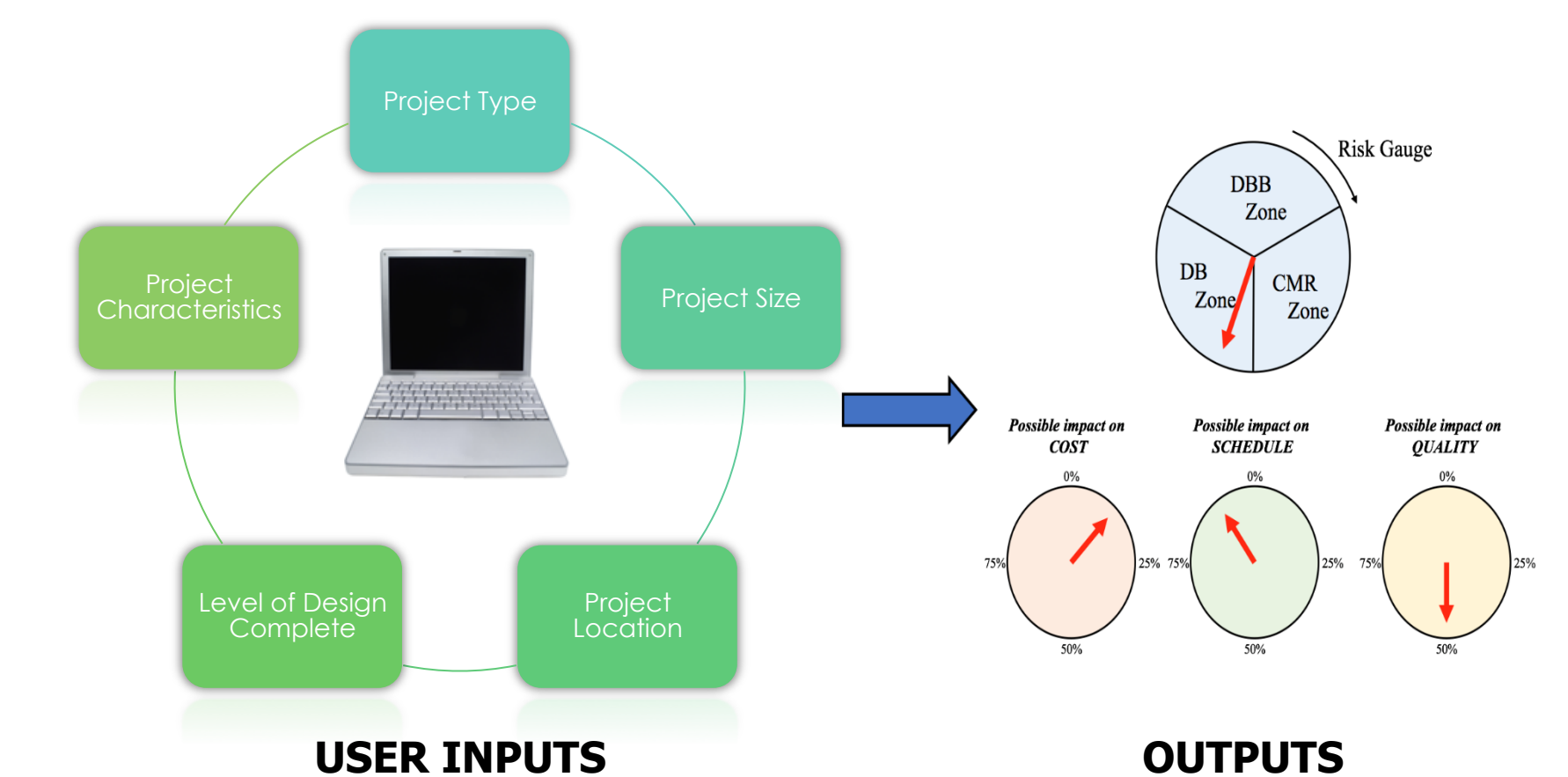
Project Delivery Selection Factors	ACRP (2009)	TCRP (2009)	CDOT (2014)	WSDOT (2016)	ADEED (2017)	TOTAL
Project Delivery Schedule	X	X	X	X	X	5
Owner Involvement and Control	X	X	X	X	X	5
Risk Management and Allocation	X	X	X	X	X	4
Project Cost Control	X		X	X		3
Lifecycle Costs	X	X		X		3
Third-Party Involvement	X	X		X		3
Competition	X	X	X			3
Disadvantaged Business Enterprise	X	X		X		3
Legislation and Regulation	X	X			X	3
Adversarial Relationships	X	X			X	3
Staffing Requirements and Capabilities	X	X	X			3
Project Size	X	X				2
Early Cost Estimation and Precision	X	X				2
Maintainability	X	X				2
Owner Experience	X	X				2
Impact on Existing Operations	X			X		2
Sustainability Goals	X	X				2
Community and Stakeholders Input		X	X			2
Project Complexity and Innovation			X	X		2
Funding				X	X	2
Construction Claims	X	X				2
Safety	X					1
Owner Goals and Objectives		X				1
Labor Unions		X				1
Level of Design			X			1
Contractor Experience			X			1
Amount of Overlapping Design and Construction					X	1
Scope Definition					X	1
Potential for Change During/After Construction					X	1
Need for Contractors' Input					X	1

Discussion

- Committing to a Project delivery schedule is typically the most significant challenge within construction projects; hence it is not unexpected to see this project delivery method selection factor present within all explored frameworks.
- Other selection factors are addressed to accommodate for a concern of a specific sector a certain framework is serving, for example the *impact on existing facility operations* selection factor is mentioned within the ACRP framework, as airport construction projects take into consideration existing operations and traffic.
- ADEED's framework is the most recent decision-support model between the frameworks; implying that its developers' may have had more insight into the recent alternative project delivery market.

Conclusion & Future Work

- The 5 models collectively produced 30 selection factors, all worth delving into further to produce an optimized decision-support tool aimed at the water infrastructure sector, allowing owners/users to input their project details to obtain the most appropriate project delivery method



- This preliminary study includes a small number of project delivery method decision-support models, and our ongoing work is focused on reviewing and adding several frameworks that may potentially add more selection factors to this already considerable list.
- The next steps of this study will also hone in on water and wastewater industry-specific selection factors. Once our initial list of factors is complete, we will meet with water infrastructure experts to review our findings and finalize the selection factors that are crucial to include in developing a new project delivery selection framework for the water and wastewater sector.

Acknowledgements

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