Austin WATER | WATER FORWARD
INTEGRATED WATER RESOURCE PLAN

Austin Integrated Water Resource Planning Community Task Force

Packet Index

June 6, 2017

Austin Integrated Water Resource Planning Community Task Force
June 6, 2017 – 6:00 p.m.
Waller Creek Center, Room 104
625 East 10th Street
Austin, Texas 78701

For more information go to:
Austin Integrated Water Resource Planning Community Task Force

AGENDA

Voting Members:

Sharlene Leurig - Chair	Marianne Dwight	Sarah Richards
Jennifer Walker – Vice Chair	Diane Kennedy	Lauren Ross
Todd Bartee	Perry Lorenz	Robert Mace
Clint Dawson	Bill Moriarty	

Ex Officio Non-Voting Members:
Austin Water: Greg Meszaros
Austin Energy: Kathleen Garrett
Austin Resource Recovery: Sam Angoori
Neighborhood Housing and Community Development: Rebecca Giello
Office of Innovation: Kerry O'Connor
Office of Sustainability: Lucia Athens
Parks and Recreation: Sara Hensley
Watershed Protection: Mike Personett

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1. **CALL TO ORDER – June 6, 2017, 6:00 p.m.**

2. **CITIZEN COMMUNICATION**

   The first 10 speakers signed up prior to the meeting being called to order will each be allowed a three-minute allotment to address their concerns regarding items not posted on the agenda.

3. **APPROVAL OF MEETING MINUTES**
   a. Approval of the meeting minutes from the April 18, 2017 and May 2, 2017 Task Force meetings (5 minutes)

4. STAFF BRIEFINGS, PRESENTATIONS, AND OR REPORTS

a. Public Outreach Update – City Staff (10 minutes)
    i. Task Force Discussion and Input
b. Presentation on preliminary screening of supply options – Consultant Team (60 minutes)
    i. Task Force Discussion and Input
c. Presentation of Task Force responses to IWRP sub-objectives weighting survey - City Staff (50 minutes)
    i. Task Force Discussion and Input

5. SUBCOMMITTEE REPORTS

6. VOTING ITEMS FROM TASK FORCE

7. FUTURE AGENDA ITEMS

8. ADJOURN

Note: Agenda item sequence and time durations noted above are subject to change.

The City of Austin is committed to compliance with the American with Disabilities Act. Reasonable modifications and equal access to communications will be provided upon request. Meeting locations are planned with wheelchair access. If requiring Sign Language Interpreters or alternative formats, please give notice at least 2 days (48 hours) before the meeting date. Please call Austin Integrated Water Resource Planning Community Task Force, at 512-972-0194, for additional information; TTY users route through Relay Texas at 711.

For more information on the Austin Integrated Water Resource Planning Community Task Force, please contact Marisa Flores Gonzalez at 512-972-0194.

MINUTES

Austin Integrated Water Resource Planning Community Task Force **SPECIAL CALLED MEETING**
April 18, 2017

The *Austin Integrated Water Resource Planning Community Task Force* convened in a Special Called Meeting on April 18, 2017 at Waller Creek Center, Conference Rm 104, 625 E 10th Street, in Austin, Texas.

Members in Attendance:

Sharlene Leurig - Chair	Diane Kennedy	Sarah Richards
Jennifer Walker – Vice Chair	Perry Lorenz	Lauren Ross
Todd Bartee	Robert Mace	

Ex-Officio Members in Attendance:
Mike Personett

Staff in Attendance:
Daryl Slusher, Kevin Critendon, Teresa Lutes, Marisa Flores Gonzalez, Mark Jordan, Prachi Patel, Jeff Fox, Mateo Scoggins, Chris Herrington, Matt Hollon, Katherine Jashinski, Joe Smith, Ginny Guerrero, Shannon Halley

Additional Attendees:
Ron Anderson, Bill Millican, David Venhuizen, Craig Smith

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1. **CALL TO ORDER**
   Sharlene Leurig, Chair, called the meeting to order at 4:07 p.m.

2. **CITIZEN COMMUNICATION: GENERAL**
   None

3. **APPROVAL OF MEETING MINUTES**
   The meeting minutes from the April 11, 2017 Austin Integrated Water Resource Planning Community Task Force regular meeting were approved on Member Mace's motion and Member Lorenz's second on a 6-0-0-5 vote with Members Dawson, Dwight, Kennedy, Moriarty and Walker absent.

4. **STAFF BRIEFINGS, PRESENTATIONS, AND/OR REPORTS**
   a. A presentation of draft weightings for the integrated water resource planning objectives and sub-objectives was provided by Marisa Flores Gonzalez, Senior Planner, Austin Water. This briefing was followed by a Task Force discussion including questions and answers.
   b. A progress update presentation on geospatial analysis of decentralized options (including rainwater, stormwater, graywater, onsite blackwater reuse, and wastewater scalping or sewer mining) was provided by Marisa Flores Gonzalez, Senior Planner, Austin Water and members of the Consultant team including Chris Kurtz from CDM Smith (joining remotely from Colorado) and Ryan Brotchie and Kate Williams from GHD (joining remotely from Melbourne, Australia). This briefing was followed by a Task Force discussion including questions and answers.

5. **SUBCOMMITTEE REPORTS**
   The Task Force formed a Decentralized Subcommittee, with members to include Chair Leurig, Vice Chair Walker, and Members Mace, Bartee, and Richards.

6. VOTING ITEMS FROM TASK FORCE
None

10. FUTURE AGENDA ITEMS
None

Chair Leurig adjourned the meeting at 6:11 pm.

The *Austin Integrated Water Resource Planning Community Task Force* convened in a Special Called Meeting on May 2, 2017 at Waller Creek Center, Conference Rm 104, 625 E 10th Street, in Austin, Texas.

Members in Attendance:

Sharlene Leurig - Chair	Diane Kennedy	Sarah Richards
Jennifer Walker – Vice Chair	Perry Lorenz	Lauren Ross
William Moriarty	Robert Mace	

Ex-Officio Members in Attendance:
Kathleen Garrett

Staff in Attendance:
Daryl Slusher, Kevin Critendon, Teresa Lutes, Marisa Flores Gonzalez, Mark Jordan, Prachi Patel, Jeff Fox, Joe Smith, Ginny Guerrero, Shannon Halley

Additional Attendees:
Ron Anderson, Bill Mullican, Tina Petersen, John Burke, Susan Roth

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1. **CALL TO ORDER**
   Sharlene Leurig, Chair, called the meeting to order at 6:10 p.m.

2. **CITIZEN COMMUNICATION: GENERAL**
   Bill Bunch spoke about potential opportunities for innovative water strategy type projects.

3. **APPROVAL OF MEETING MINUTES**
   The meeting minutes from the April 18, 2017 Austin Integrated Water Resource Planning Community Task Force regular meeting were reviewed and approval postponed until the next meeting.

4. **STAFF BRIEFINGS, PRESENTATIONS, AND/OR REPORTS**
   a. A presentation on preliminary characterization of demand management options was provided by Peter Mayer, P.E., Water DM. This briefing was followed by a Task Force discussion including questions and answers.
   b. A presentation on Task Force member responses to the IWRP sub-objectives weighting survey was postponed until a subsequent meeting.
   c. An informational presentation on the South Central Waterfront Initiative was provided by Alan Holt, Principal Planner, Planning and Zoning. This briefing was followed by a Task Force discussion including questions and answers.

5. **SUBCOMMITTEE REPORTS**
   None

6. **VOTING ITEMS FROM TASK FORCE**
   None

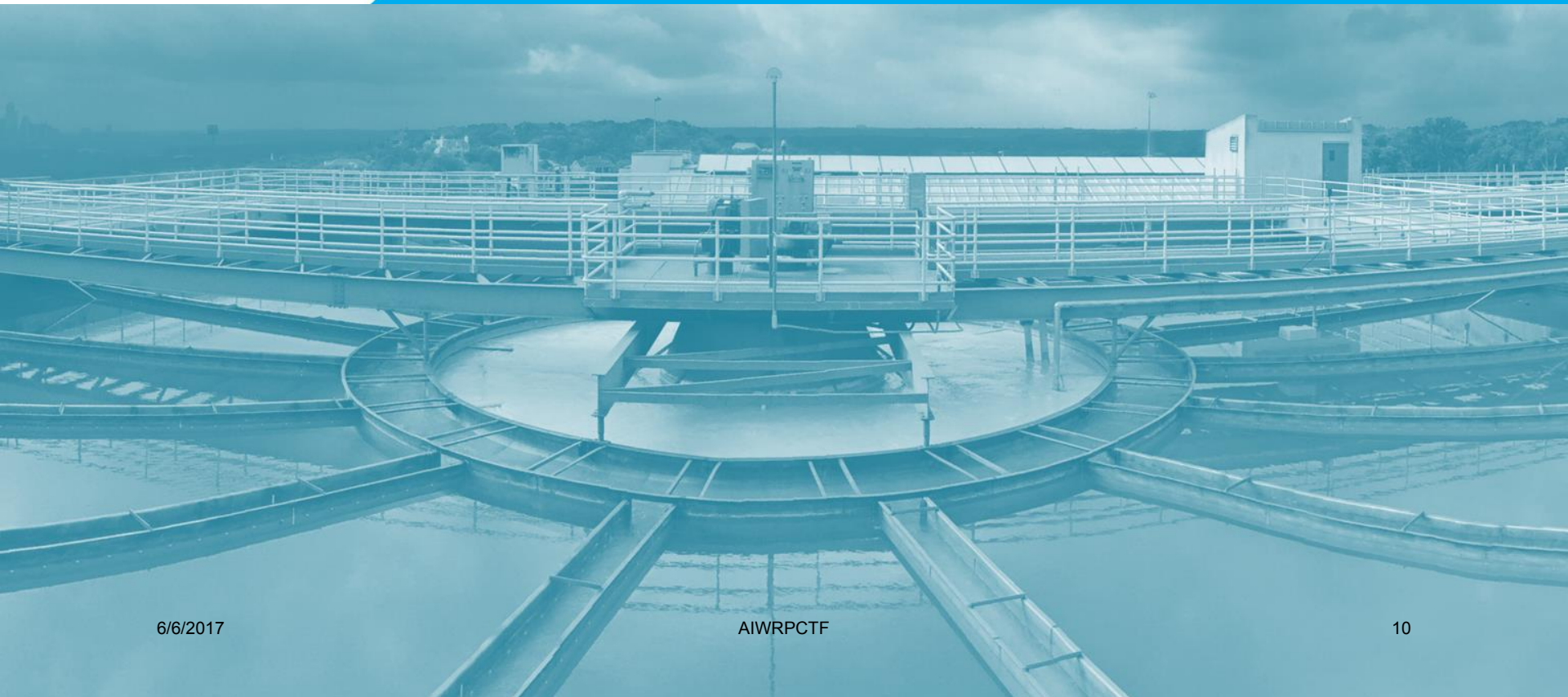
10. **FUTURE AGENDA ITEMS**
    None

Chair Leurig adjourned the meeting at 8:15 pm.

PRESENTATION

Water Forward
Austin's Integrated Water Resources Plan
Task Force Meeting

June 6, 2017



Public Outreach Update

Ongoing Outreach Activities

- Online Outreach
  - Social media: Facebook & Twitter
  - eNewsletters
    - Water Forward, WaterWise, Imagine Austin, Sustainability Office, AE's Power Plus, etc.
  - NextDoor
- Surveys
  - Community Values Survey
  - Public Comment Portal
    - Input on options

El Concilio – A Coalition of Mexican American Neighborhoods Meeting

Earth Day ATX
At Huston Tillotson

Ongoing Outreach Activities

Montopolis Neighborhood Association Meeting

Community Event	Texas Water Conference	4/12/2017
Community Event	IBM Earth Day	4/18/2017
Community Event	TX Parks and Wildlife Earth Day Event	4/20/2017
Community Event	IBM Earth Day	4/20/2017
Information Sharing	City of Pflugerville	4/20/2017
Community Event	Arboretum Plaza Earth Day	4/21/2017
Community Event	Earth Day ATX	4/22/2017
Community Event	Sun Radio Earth Day	4/23/2017
Community Event	Apartment Association Trade Show	5/4/2017
Community Group Meeting	Save Barton Creek Association Meeting	5/5/2017
District Town Hall	District 7 Town Hall	5/13/2017
Community Group Meeting	Northwest Austin Coalition Meeting - District 6	5/22/2017
Community Group Meeting	El Concilio – A Coalition of Mexican American Neighborhoods	5/25/2017
Community Group Meeting	Montopolis Neighborhood Association Meeting	5/30/2017

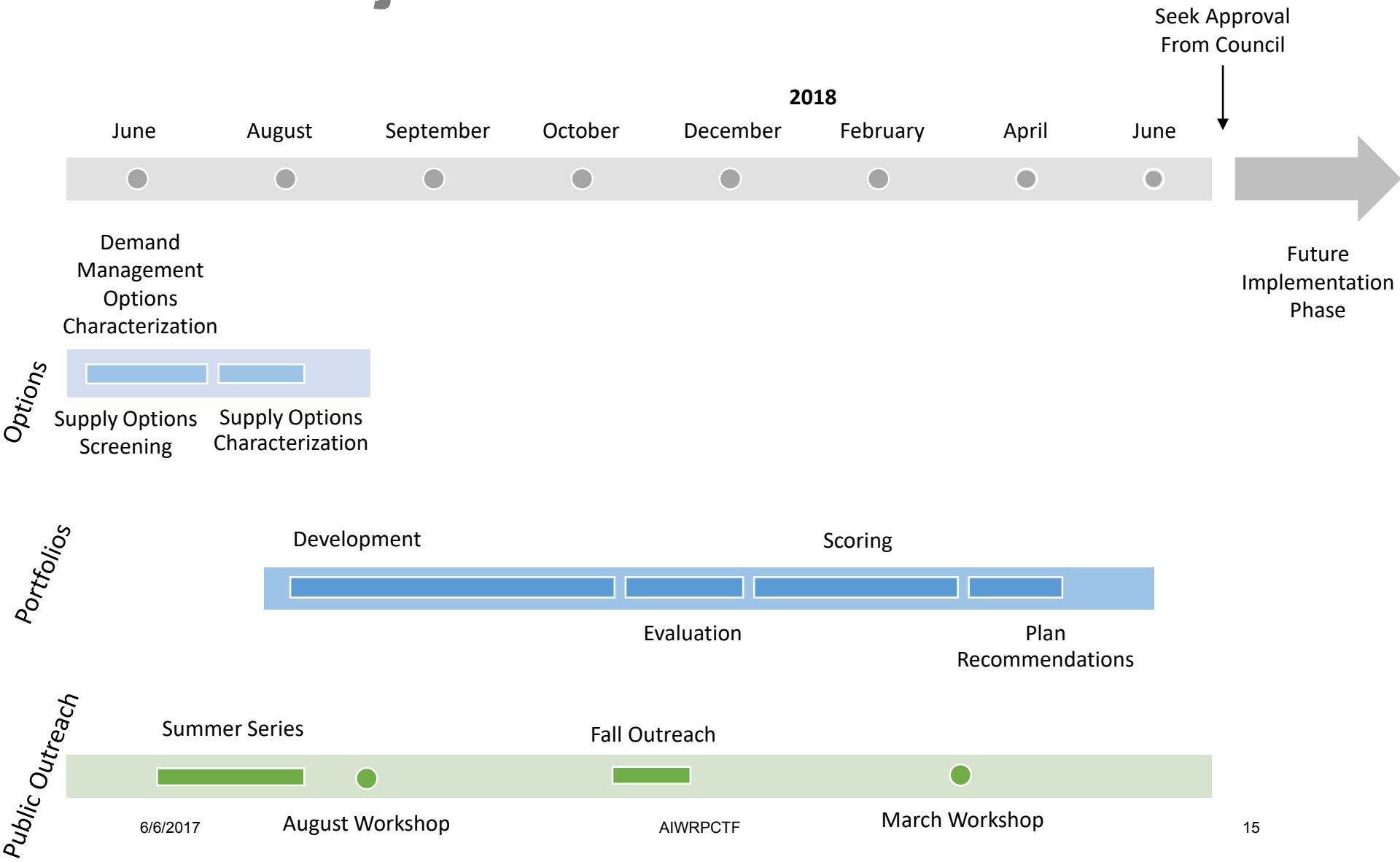
Save Barton Creek Association Meeting

Northwest Austin Coalition Meeting - District 6

Next Steps

- Scheduled Town Halls:
  - District 5, CM Kitchen, June 13th
  - District 10, CM Alter, June 19th
- Coordination with Leadership Austin
- Summer Series
  - Planning community engagement in each Council District
  - Dates and locations to be finalized soon

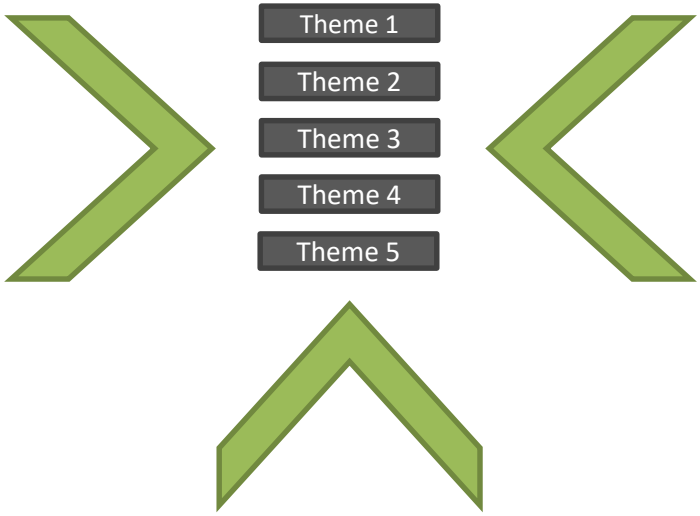
IWRP Project Timeline



Emerging Themes

Public Input

- Water Supply Reliability
- Cost and Affordability
- Conservation of Resources
- Environmental Stewardship



Austin Water

Water Forward Task Force

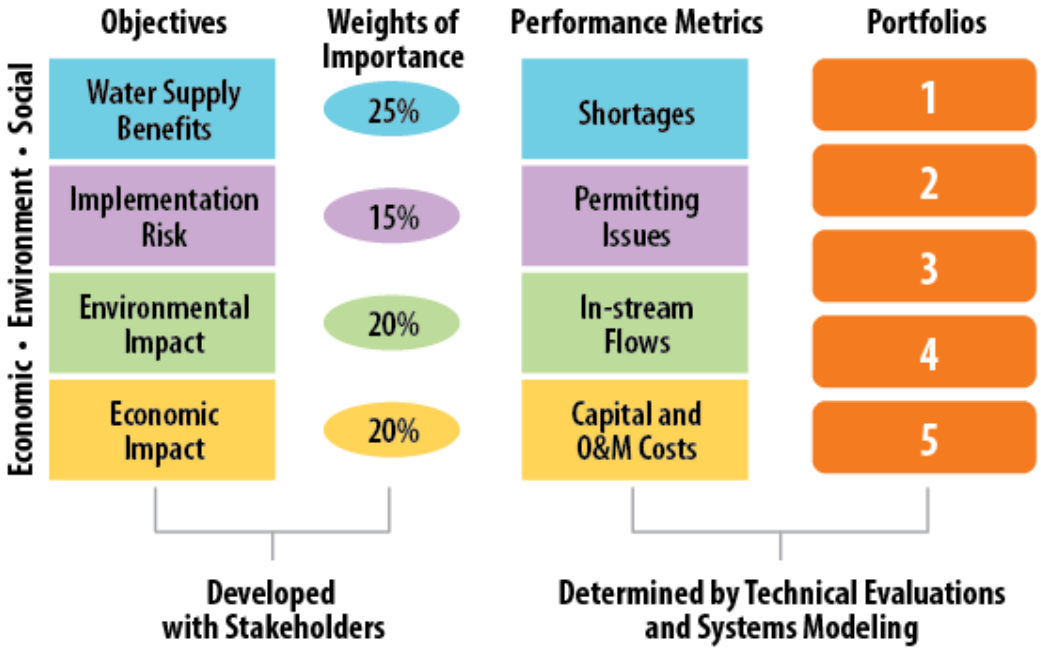
Questions and Discussion

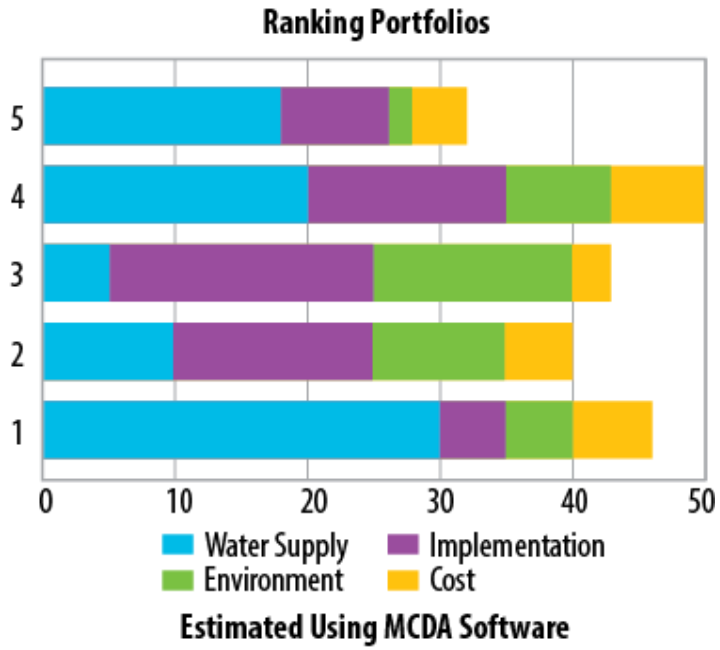
Draft Weightings For Objectives And Sub-objectives

Outline

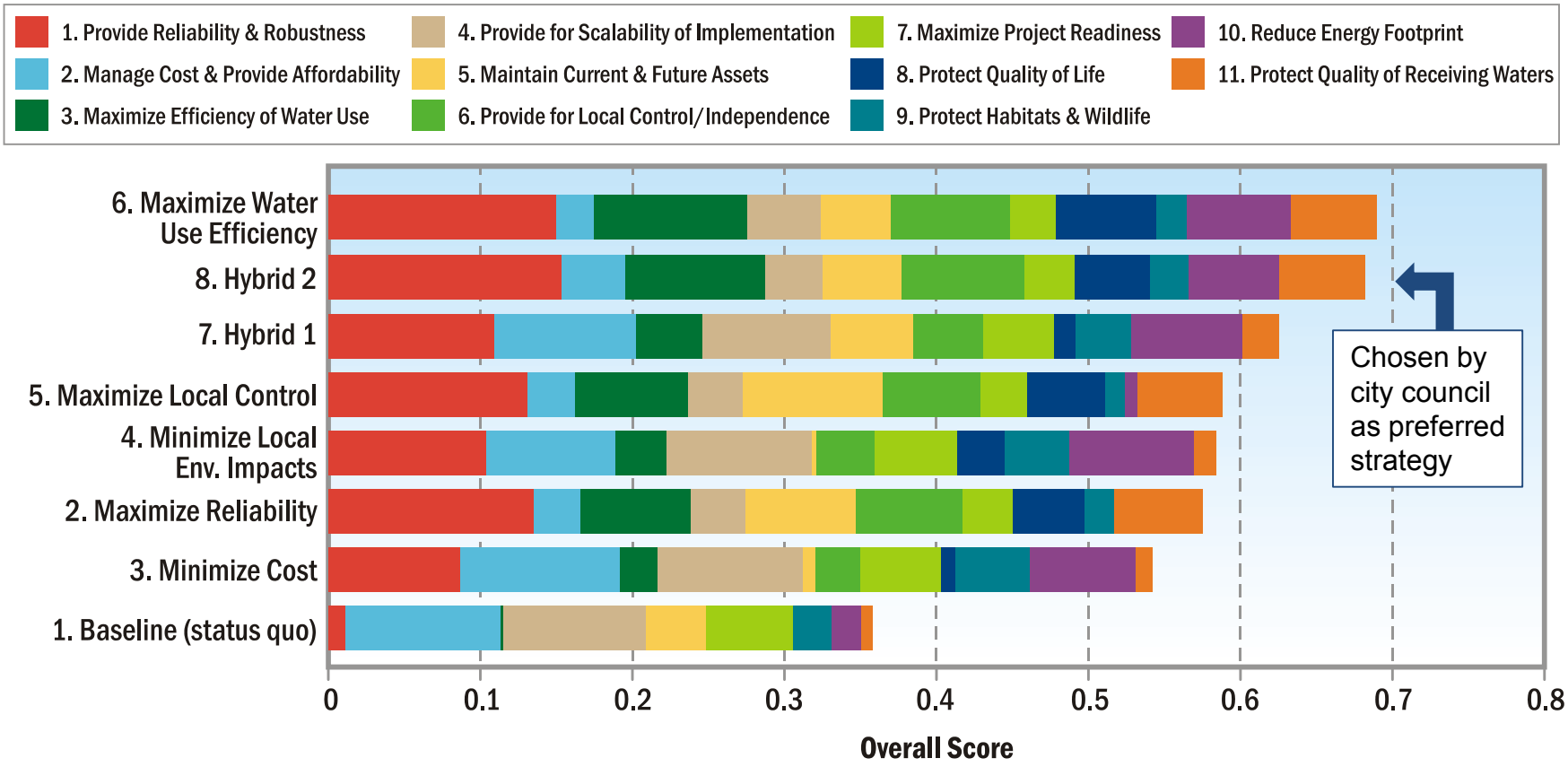
- Portfolio Evaluation Process Overview
- Objectives and Sub-objectives Weighting Survey Feedback
- Task Force Discussion and Input

Multi-Criteria Decision Analysis (MCDA) approach in ranking portfolios





Example Use of Multi-criteria Software to Rank Alternatives



Ranking sensitivity can help determine which portfolios are more robust

Ranking Sensitivity	Portfolio Rankings (1 = best, 5 = worst)				
	High Resiliency	Low Cost	Most Sustainable	Low Risk	Hybrid
Baseline Weights	4	5	2	3	1
Equal Weight	5	1	3	4	2
Implementation Weight	2	5	3	4	1
Economic Weight	1	4	2	5	3
Average Ranking	**3.2**	**4.2**	**2.0**	**3.8**	**1.8**

Two Most Robust Portfolios

Draft Water Forward Objectives and Sub-objectives Weighting

Primary Objective	Objective Weight	Sub-Objective	Sub-Objective Weight	Defining Question	Performance Measure	Overall Weight
Water Supply Benefits	30%	Maximize Water Reliability	50%	How does the portfolio perform in terms of reliability (how often is there shortage), vulnerability (how large is the shortage), recovery (how fast is the recovery from shortages) under various hydrologic conditions, including climate change scenarios?	Water Supply Index (0 to 1) based on WAM modeling results	15%
		Maximize Local Control	25%	To what extent does AW have control over the quantity and storage of water and operation of options (especially during drought periods) included in the portfolio?	Proportion of total supply yield from locally controlled sources	7.5%
		Maximize Supply Diversification	25%	How many independent water supply and demand-side management options above a minimum yield threshold are included in the portfolio?	# of supply/demand-side management sources (above minimum yield threshold)	7.5%
Economic Impacts	20%	Maximize Cost-Effectiveness	75%	What is the total capital (construction) and operations/maintenance costs of all projects/programs in the portfolio over the lifecycle, divided by the sum of all water yield produced by the portfolio?	Unit cost ($/AF) expressed as a present value sum of all costs over the lifecycle, including utility and customer costs.	15%
		Maximize Advantageous External Funding	25%	Does the portfolio have an opportunity for advantageous external funding from Federal, State, local, and private sources?	External Funding Score (1-5), where 1 = low potential and 5 = high potential	5%
Environmental Impacts	20%	Minimize Ecosystem Impacts	40%	To what extent does the portfolio positively or negatively impact receiving water quality (e.g., streams, river, lakes), terrestrial and aquatic habitats throughout Austin, and net streamflow effects both upstream and downstream from Austin?	Ecosystem Impact Score (1-5), where 1 = high combined negative impacts and 5 = high combined positive impacts	8%
		Minimize Net Energy Use	30%	What is the net energy requirement of the portfolio, considering energy generation?	Incremental net change in kWh	6%
		Maximize Water Use Efficiency	30%	What is the reduction in potable water use from water conservation, reuse and rainwater capture for the portfolio?	Potable per capita water use (gallon/person/day)	6%
Social Impacts	15%	Maximize Multi-Benefit Infrastructure/Programs	35%	To what extent does the portfolio provide secondary benefits such as enhanced community livability/beautification, increased water ethic, ecosystem services, or others?	Multiple Benefits Score (1-5), where 1 = low benefits and 5 = high benefits	5.25%
		Maximize Net Benefits to Local Economy	35%	To what extent does the supply reliability and water investments of the portfolio protect and improve local economic vitality, including permanent job creation?	Local Economy Score (1-5), where 1 = high negative impact and 5 = high positive impact	5.25%
		Maximize Social Equity and Environmental Justice	30%	To what extent does the portfolio support social equity and environmental justice, with emphasis on underserved communities?	Social Equity and Environmental Justice Score (1-5), where 1 = significant support and 5 = minimal support	4.5%
Implementation Impacts	15%	Minimize Implementation Challenges	35%	What implementation challenges will the portfolio face in terms of public acceptance, regulatory approval, and legal/institutional barriers?	Implementation Uncertainty Score (1-5), where 1 = high combined challenges and 5 = low combined challenges	5.25%
		Maximize Scalability	35%	To what extent can the portfolio be incrementally sized over time in terms of supply capacity and demand management?	Scalability Score (1-5), where 1 = small incremental sizing potential and 5 = high incremental sizing potential	5.25%
		Minimize Technical Feasibility Challenges	30%	To what extent does the portfolio rely on emerging and/or unproven technologies?	Technical Feasibility (1-5), where 1 = high reliance on emerging or unproven technologies and 5 = low reliance on emerging or unproven technologies	4.5%

Water Supply Benefits

Objective	Objective Weight	Sub-Objective	Sub-Objective Weight	Overall Weight	Comment Summary
Water Supply Benefits Comment Summary: Support higher weight for objective (x1)	**30%**	**Maximize Water Reliability**	**50%**	**15%**	Support higher weight for sub-objective (x1)
		Maximize Local Control	**25%**	**7.5%**	
		Maximize Supply Diversification	**25%**	**7.5%**	Support lower weighting for this sub-objective (x2)

Economic Impacts

Objective	Objective Weight	Sub-Objective	Sub-Objective Weight	Overall Weight	Comment Summary
Economic Impacts	**20%**	**Maximize Cost-Effectiveness**	**75%**	**15%**	Support lower weight for this sub-objective (x1) Support higher weight for this sub-objective (x1)
		Maximize Advantageous External Funding	**25%**	**15%**	Support higher weight for this sub-objective (x1) Support lower weight for this sub-objective (x1)

Environmental Impacts

Objective	Objective Weight	Sub-Objective	Sub-Objective Weight	Overall Weight	Comment Summary
Environmental Impacts Comment Summary: Support higher weight for objective (x1)	**20%**	**Minimize Ecosystem Impacts**	**40%**	**8%**	Potentially support higher weight for sub-objective (x1)
		Minimize Net Energy Use	**30%**	**6%**	Support lower weight for sub-objective (x1)
		Maximize Water Use Efficiency	**30%**	**6%**	Support higher weight for sub-objective (x1) Potentially support higher weight for sub-objective (x1)

Social Impacts

Objective	Objective Weight	Sub-Objective	Sub-Objective Weight	Overall Weight	Comment Summary
Social Impacts	**15%**	**Maximize Multi-Benefit Infrastructure/Programs**	**35%**	**5.25%**	Support evenly distributing weight among sub-objectives (x1)
		Maximize Net Benefits to Local Economy	**35%**	**5.25%**	Support evenly distributing weight among sub-objectives (x1)
		Maximize Social Equity and Environmental Justice	**30%**	**4.5%**	Support evenly distributing weight among sub-objectives (x1)

Implementation Impacts

Objective	Objective Weight	Sub-Objective	Sub-Objective Weight	Overall Weight	Comment Summary
Implementation Impacts	**15%**	**Minimize Implementation Challenges**	**35%**	**5.25%**	Support evenly distributing weight among sub-objectives (x1)
		Maximize Scalability	**35%**	**5.25%**	Support evenly distributing weight among sub-objectives (x1)
		Minimize Technical Feasibility Challenges	**30%**	**4.5%**	Support evenly distributing weight among sub-objectives (x1)

Next Steps

- Input will be compiled and revised weightings will be presented at June Task Force meeting

Questions and Discussion

Water Forward
Austin's Integrated Water Resource Plan

Screening of Austin Water Supply Side Options

Tina Petersen, Ph.D., P.E. and Chris Kurtz, P.E., CDM Smith

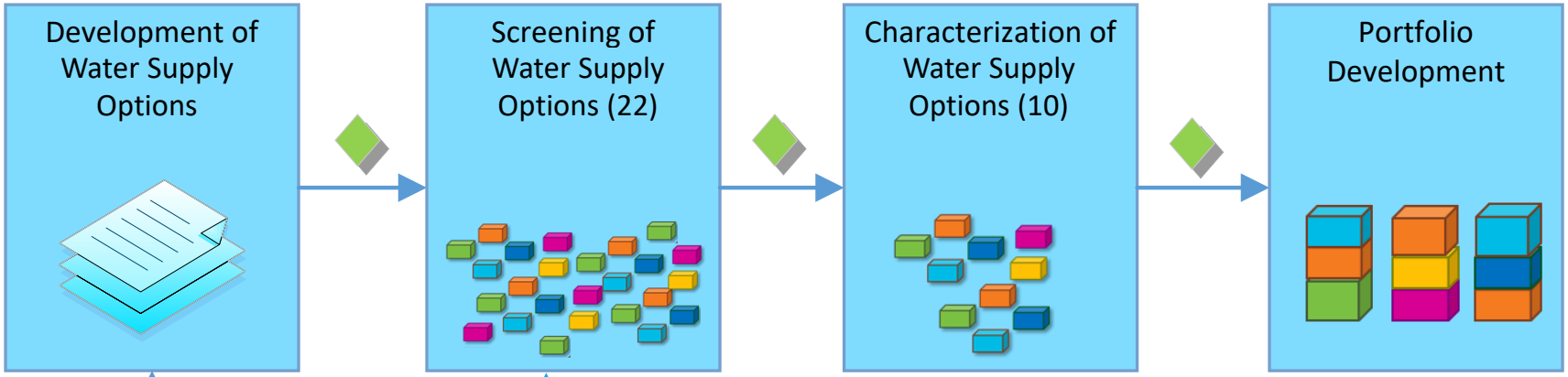
Presentation Plan

- Objectives
- Review of IWRP Process
- Screening Process
  - Approach
  - Performance Score
- Preliminary Supply Side Options Screening Results
- Discussion and Next Steps

Objectives

- Communicate difference between demand management and water supply options screening process
- Discuss preliminary results being presented today

Supply Side Options Selection Process



Input:
- Austin Water
- Task Force
- Public

Previous Studies/Task Force Efforts:
- Feasibility studies
- Previous task force reports
- Other supply studies

Task Force Presentation

October 4 – Initial Blue Sky List of Supply Options
January 17 – Revised Blue Sky List of Supply Options
April 3 – List of 21 Supply Options to be Screened
June 6 – Preliminary Supply Options Screening Results
July 11 – Refined Supply Options Screening Results
August 1 – Supply Options Characterization

Screening Criteria - Demand Management vs Water Supply Options

Demand management screening focused on assigning an overall score for define which projects moved forward.

- Implementation ability (0 = difficult, 5 = easy)
- Customer cost (0 = low, 5 = high)
- Utility cost (0 = low, 5 = high)
- Water Savings (0 = low, 5= high)

Water supply option screening will focus on a range of screening factors to reflect the more diverse options that are being considered:

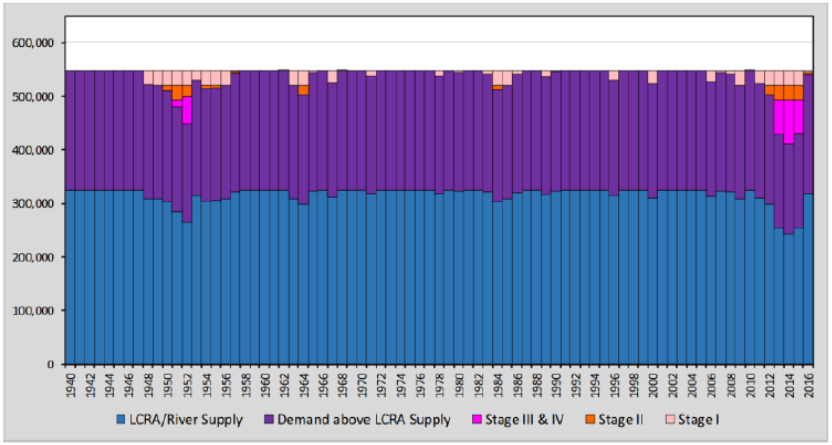
- Yield of the supply option
- Diversification of supply options and types
- Unit Cost Bin
- Performance Bin

Preliminary Needs Analysis – 2115 City of Austin Needs Summary

Presented February 2017

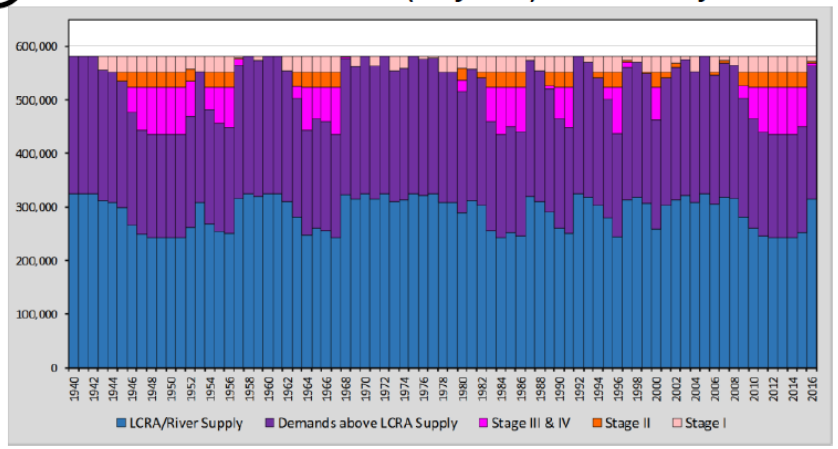
A

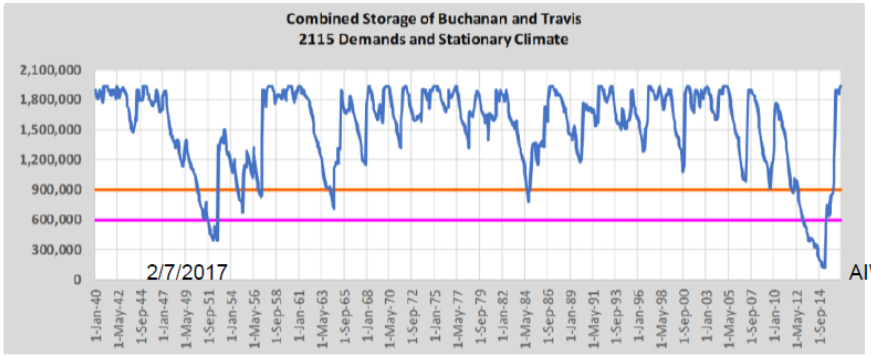
Period of Record (77 years)

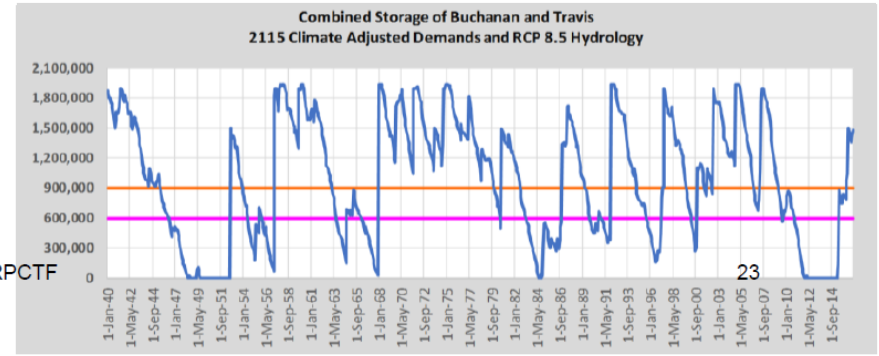


B

Period of Record (77 years) Climate-Adjusted







Supply Option Types

Description	Decent.	Desal	GW	Reuse	Storage	Surface
1 - ASR in Northern Edwards / Trinity (FEA 5)					●	
2 - Direct non-potable reuse				●		
3 - Lake Austin Operations						●
4 - Stormwater Harvesting	●					
5 - Rainwater Harvesting (community scale)	●					
6 - Sewer mining (wastewater skimming)	●					
7 - Distributed Wastewater Systems	●					
8 - Capture Lady Bird Lake Inflows (FEA 4)						●
9 - IPR – bed and banks				●		
10 - IPR – Lady Bird Lake (FEA2)				●		
11 - IPR – Alluvial Aquifer				●		
12 - Direct Potable Reuse				●		
13 - Brackish Groundwater Desal		●				
14 - Seawater Desal		●				
15 - Lake Evaporation Suppression					●	
16a - Conventional Groundwater (Developed)			●			
16b - Conventional Groundwater (Purchased)			●			
17 - Additional supply from LCRA						**TBD**
18a - Carrizo-Wilcox ASR (Infiltration)					●	
18b - Carrizo-Wilcox ASR (Conventional)					●	
19 - Regional partnerships						
20 - Interbasin transfers	AIWRPCTF					●
21 - Off Channel Reservoir					●	

Annual Unit Cost

- **Total Annual Cost ($/yr) –** sum of all annual capital, debt service, upfront, and O&M costs
- **Annual Unit Cost ($/AF/yr) –** total annual cost of the option (in current dollars) divided by the new supply yield.

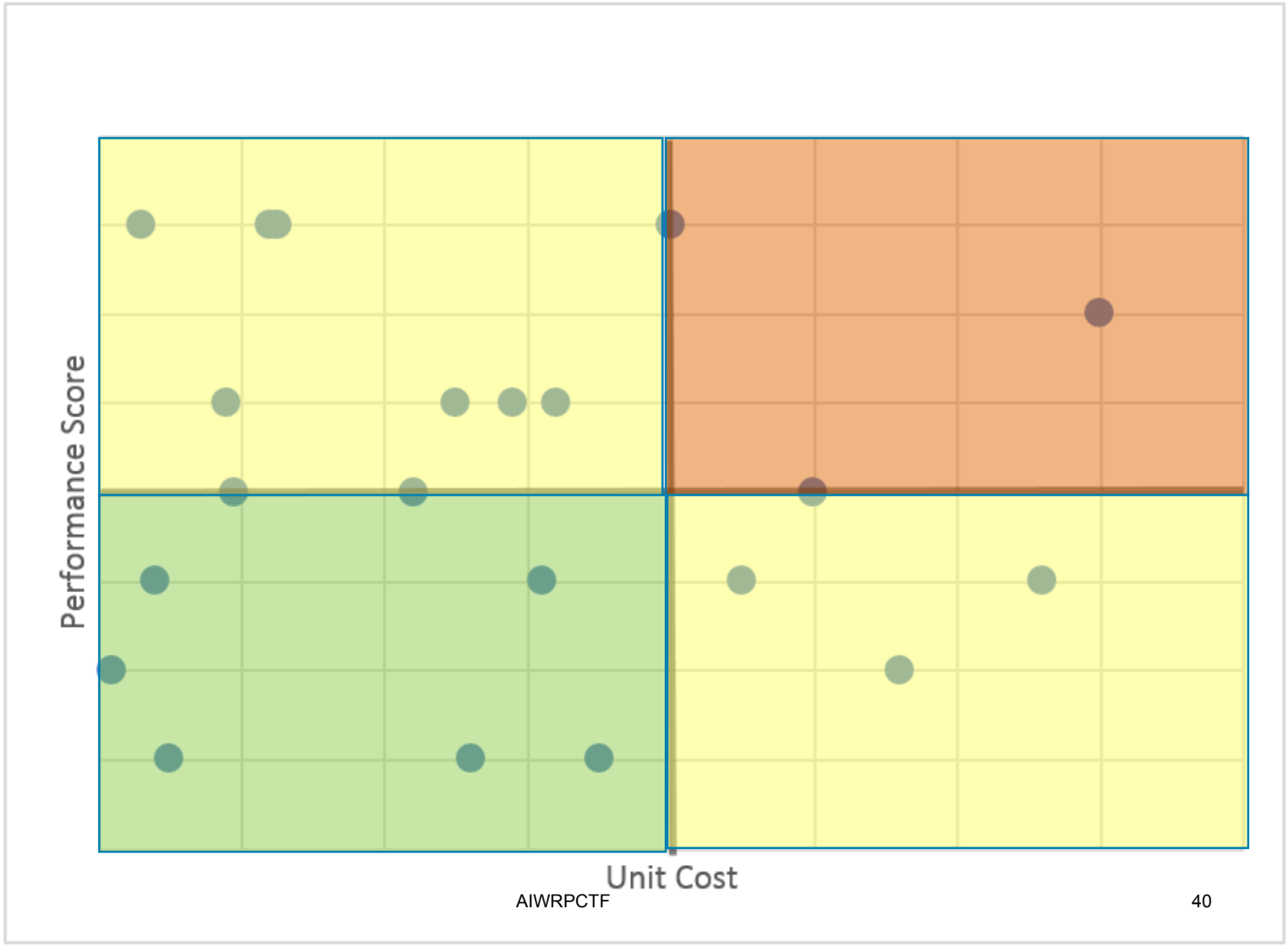
Annual Cost	Bin
$0/AF to $500 / AF	3
$500/AF to $2,000 / AF	2
$2,000 / AF and above	1

Yield Metric

- **Yield (AF) –** the estimated incremental average annual new supply to Austin Water
- Yield bin reflects an estimated maximum potential yield for each option

Yield	Bin
0 – 10,000 AF	1
10,000 AF to 35,000 AF	2
35,000 AF and above	3

Supply Options Visualization Tool



Draft Water Supply Options with Cost and Yield Information	Cost Bin	Yield Bin
1 - ASR (FEA 5)	2	2
2 - Direct non-potable reuse	2	3
3 - Lake Austin Operations	3	1
4 - Stormwater Harvesting (community scale)	1	2
5 - Rainwater Harvesting (community scale)	1	1
6 - Sewer mining (wastewater skimming) (community scale)	1	2
7 - Distributed Wastewater Systems (community scale)	1	2
8 - Capture Lady Bird Lake Inflows (FEA 4)	2	1
9 - IPR – bed and banks	2	2
10 - IPR – Lady Bird Lake (FEA2)	2	2
11 - IPR – Alluvial Aquifer	2	2
12 - Direct Potable Reuse	1	2
13 - Brackish Groundwater Desal	1	2
14 - Seawater Desal	1	3
15 - Lake Evaporation Suppression	3	1
16a - Conventional Groundwater (Developed)	2	3
16b - Conventional Groundwater (Purchased)	2	3
17 - Additional supply from LCRA	TBD	TBD
18a - Carrizo-Wilcox ASR (Infiltration)	3	2
18b - Carrizo-Wilcox ASR (Conventional)	2	2
19 - Regional partnerships	TBD	TBD
20 - Interbasin transfers	2	3
21 - Off Channel Reservoir	2	2

Lot-Scale Decentralized Options on Demand Management List

- All lot scale decentralized options are being characterized as Demand Management Options as part of three options:
  - Alternative water - Ordinances (Rainwater, Stormwater, Graywater, and Blackwater)
  - Alternative Water – Incentives (Rainwater and Stormwater)
  - Alternative Water Incentives (Graywater and Blackwater)

- Lot-scale Decentralized Options that will be considered for inclusion in portfolios
  - Rainwater Harvesting
  - Stormwater Harvesting
  - Blackwater Reuse
  - Graywater Reuse

Performance Score

- Performance Score based on two sub-criteria
  - Implementation Challenges
  - Resiliency

- Weights have been established for each sub-criteria
  - Implementation Challenges – 50%
  - Resiliency – 50%

Implementation Challenge Score

Little to no implementation challenges

Moderate implementation challenges

Significant implementation challenges and uncertainties exist

Incorporates legal, permitting challenges, public acceptance and scalability

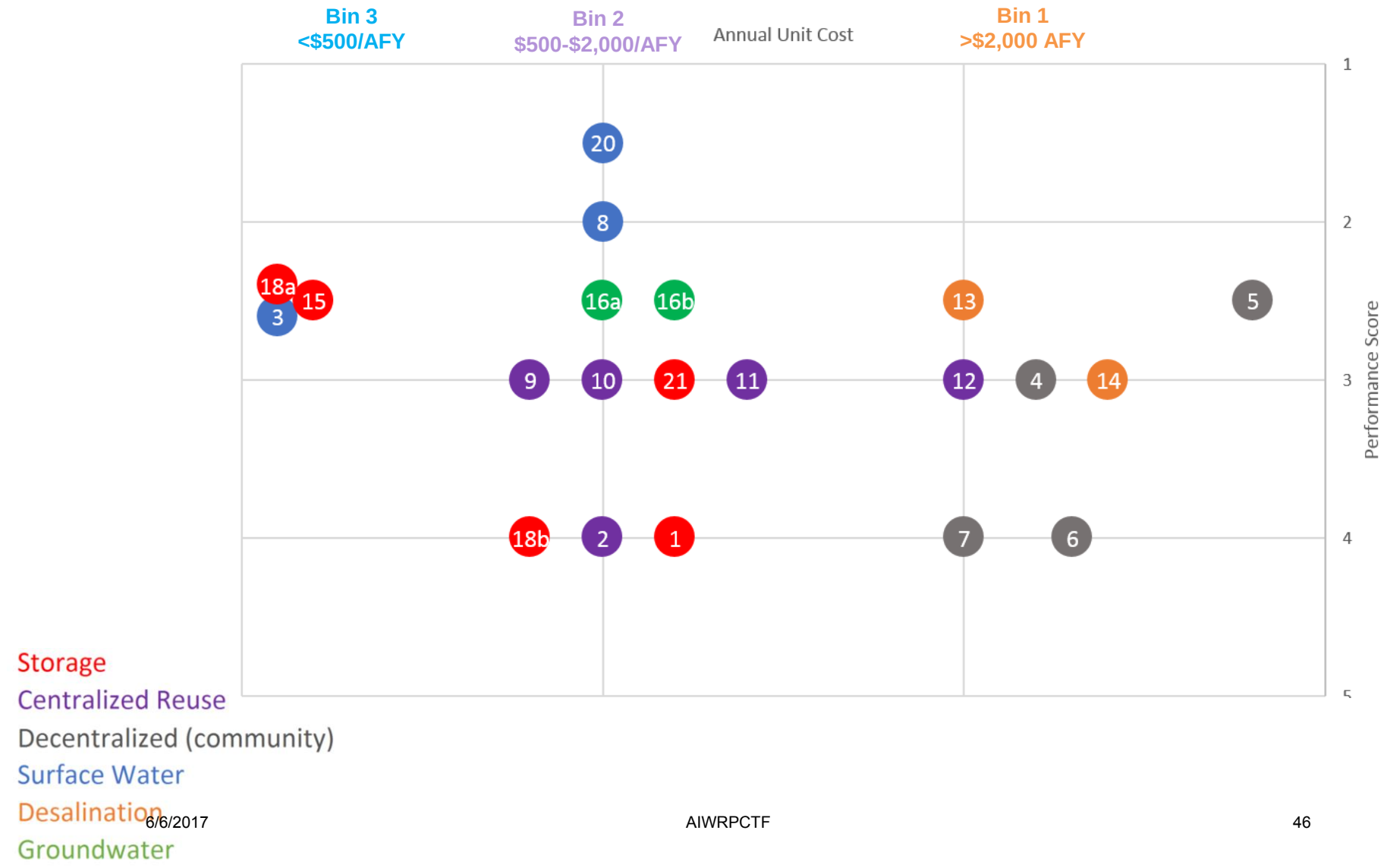
Resiliency Score

Option performance is highly impacted by variations in hydrology and climate

Option performance is moderately impacted by variations in hydrology and climate

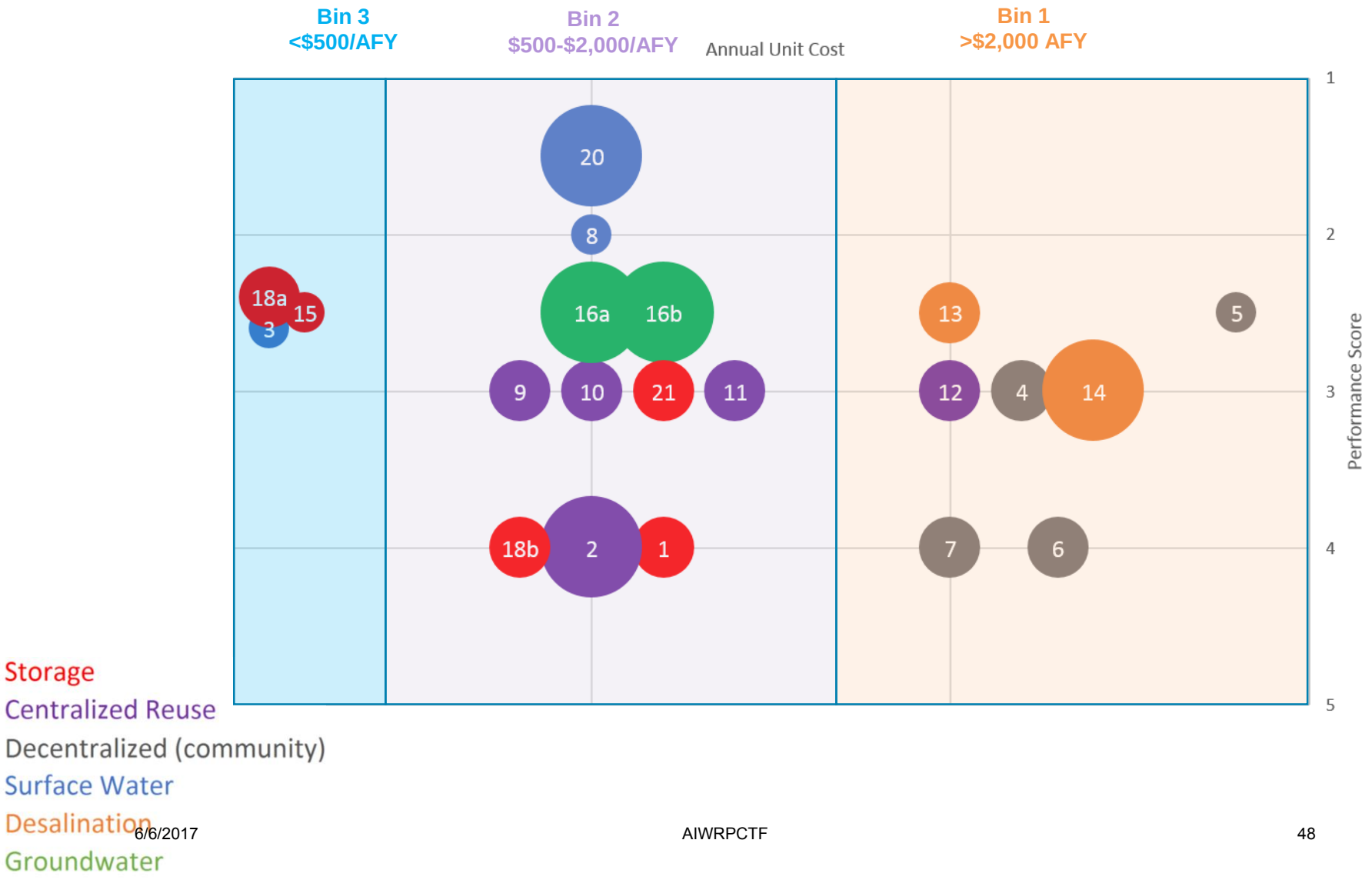
Option performance is not impacted by variations in hydrology and climate

Draft Total Performance Score vs Annual Unit Cost



Draft Total Performance Score vs Annual Unit Cost

Draft Yield Bins



Next Steps

- Within the next week
  - Task Force input on Preliminary Screening Results
- Before the next Task Force Meeting
  - Document Screening Process and Preliminary Results
  - Assess Supply Option Combination and Recategorization Opportunities
  - Potential Special Called Task Force Meeting or Subcommittee Meeting
- Presented at the July 11th Task Force Meeting
  - Refined Screening Results and Initial List of Top 10 Options to carry forward through IWRP process
  - Task Force input on refined screening and initial list of top 10 options
- Presented at the August 1st Task Force Meeting
  - Characterization of selected supply side options

Thank you!

Tina Petersen, Ph.D., P.E.
Chris Kurtz, P.E.

Questions and Discussion

Austin WATER

BACKUP MATERIALS

Objective and Weight	Subobjective and Weight	Clint Dawson	Robert Mace	William Moriarty	Sarah Richards	Perry Lorenz	Diane Kennedy	Jennifer Walker
Water Supply Benefit Objective Weight - 30%	Maximize Water Reliability Subobjective Weight - 50% Overall Weight - 15%	15	Should be a higher % of the score; it's the key metric.				The studies seem to support this weighting	
	Maximize Local Control Subobjective weight - 25% Overall weight - 7.5%	7.5	This is fine.				I think there needs to be more control over the quantity and storage of water.	
	Maximize Supply Diversification Subobjective weight - 25% Overall weight - 7.5%	7.5	This is fine. Support diversification.	1%			I can't think of many that have been proven effective beyond conservation efforts.	I do not think that supply diversification need to weighted this high. Decrease slightly. Also need to define diversification. Many of the strategies we are discussing might not be diversification based on some definitions.
	Comments on the Weighting of this Objective as a Whole		Need more weight for reliability.	I think diversification should be weighted much less.	In agreement that this primary objective should be the most heavily weighted, at 30%	I have no reason to question any of these weightings.	The overall weighting seems okay	I am fine with this objective being weighted at 30%
Economic Impacts Objective Weight - 20%	Maximize Cost-Effectiveness Subobjective weight - 75% Overall weight - 15%	18			I don't think that the overall weight of this subobj should be equal to 'maximize water reliability'; i'd prefer that the subobj weight should be dropped to 60% and increase 'advantages external funding' to 40%; also energy use costs should be included in the O&M costs and this cost effectiveness unit cost should take into consideration external funding that lowers cost to AW			
	Maximize Advantageous External Funding Subobjective weight - 25% Overall weight - 5%	2					Yes, it does, should any exist	
	Comments on the Weighting of this Objective as a Whole		These relative weights are fine.	OK with this.		I have no reason to question any of these weightings.	Overall this is good	I am fine with the how Economic Impacts are weighted.
	Minimize Ecosystem Impacts Subobjective weight - 40% Overall weight - 8%	8					I believe the impact should be very minimal	
	Minimize Net Energy Use Subobjective weight - 30% Overall weight - 6%	6						could be lower, if so would add to minimize ecosystem impacts or maximize water use efficiency

Environmental Impacts Objective Weight - 20%	Maximize Water Use Efficiency Subobjective weight - 30% Overall weight - 6%	6			I think this subobj should be more heavily weighted such that the overall weight of this subobj is on par with local control & maximize diversification (7.5%); 'minimize net energy usage' weight could be decreased or overall weight of enviro impacts could be increased			
	Comments on the Weighting of this Objective as a Whole		These relative weights are fine.	OK	I'd prefer that enviro impact obj be weighted higher than economic impacts by at least 5% (esp since negative enviro impacts negatively impact the city's economic potential and success	I have no reason to question any of these weightings.	These weightings seem okay	20% is good for this objective.
Social Impacts Objective Weight - 15%	Maximize Multi-Benefit Infrastructure/Programs Subobjective weight - 35% Overall weight - 5.25%	5						
	Maximize Net Benefits to Local Economy Subobjective weight - 35% Overall weight - 5.25%	5						
	Maximize Social Equity and Environmental Justice Subobjective weight - 30% Overall weight - 4.5%	5						
	Comments on the Weighting of this Objective as a Whole		These relative weights are fine.	OK		I have no reason to question any of these weightings.	These weights seem fine to me	I like these objectives/sub-objectives and am fine with how they are weighted. I am glad that our community is prioritizing these in looking at water supply options
Implementation Impacts Objective Weight - 15%	Minimize Implementation Challenges Subobjective weight - 35% Overall weight - 5.25%	5						
	Maximize Scalability Subobjective weight - 35% Overall weight - 5.25%	5						
	Minimize Technical Feasibility Challenges Subobjective weight - 30% Overall weight - 4.5%	5	Is this worded properly? More points for unproven tech?					
	Comments on the Weighting of this Objective as a Whole		Overall, need more weight on reliability.	OK		I have no reason to question any of these weightings.	Okay weighting	I am fine with these as weighted.

Water Forward Task Force: 85th Legislative Session Bill Report

Last Update: 06/06/17

List of filed bills selected as being potentially relevant to the planning process.

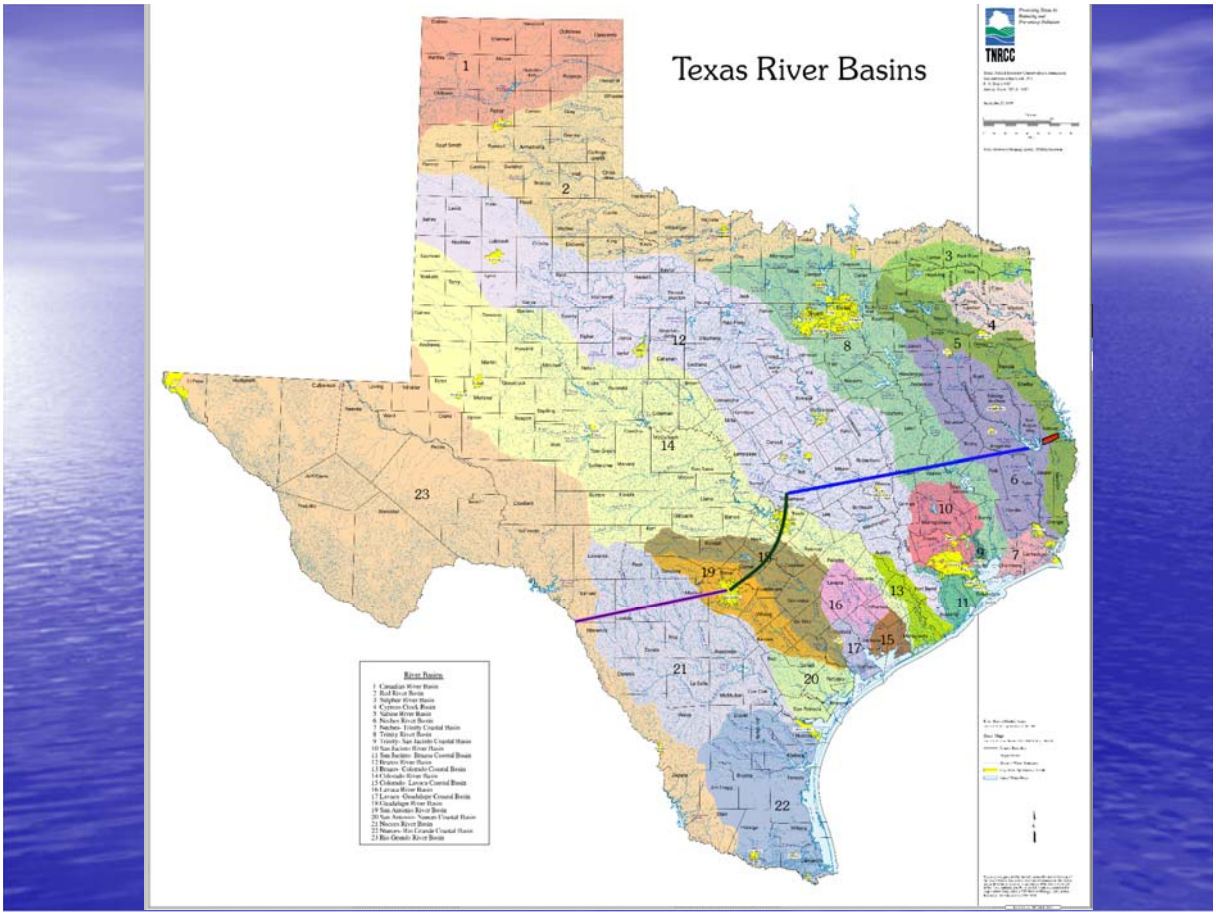
Bill #	Bill Author	Description	Last Action
PASSED *(subject to June 18 veto deadline)*			
HB 2377	Larson	Groundwater Conservation Districts (GCD) located over a TWDB designated brackish water zone must adopt rules for brackish water permits for drinking water projects. This bill also includes permit rules for specific types of brackish groundwater projects for persons interested in developing a new water source. In addition, these projects require a monitoring system to monitor water levels and water quality in the same or adjacent aquifer.	**Passed House & Senate. Finalized in Conference Committee.**
SB 1511	Perry	State climatologist to prepare a report every two years on weather changes, water availability and climate variability. The bill also requires all climate related state agencies to prepare strategic plans for managing risk and to identify financial resources needed.	**Passed House & Senate. Finalized in Conference Committee.**
SB 1525	Perry	TWDB to study the state's water needs and availability, including any obstacles and associated costs, and to produce a comprehensive water resources map. The study must include opportunities and state any barriers to developing desalinated and brackish water sources. Added Amendment: In addition, TWDB to work with interested parties and conduct a study of ASR projects identified in the state water plan.	**Passed House & Senate. House added 1 amendment.**
NOT PASSED			
Water Conservation			
HB 1536	Farrar	TCEQ required to produce a biannual report on storm water managed via green infrastructure, any barriers to the process, and recommendations to increase installations and usage.	**Failed on House Floor 3rd Reading.**
HB 2005	Larson	TX Water Development Board (TWDB) to conduct studies of ASR projects identified in the state water plan or by interested persons and report the results to regional water planning groups or interested persons.	**Passed the House. Stalled in the Senate.**
HB 3991	Larson	ASR projects may use water sources derived from multiple sources as long as it does not interfere with or negatively affect existing water rights in the same river basin.	**Passed the House. Stalled in the Senate.**
State Planning			
HB 2948	Larson	An Interregional Planning Council to be created to facilitate dialogue on water planning strategies that could affect multiple regions and shared best practices, and prepares a report for the TWDB.	**Passed the House. Never progressed in Senate Ag, Water & Rural Affairs.**
Water Availablity Modeling			
HB 4006	Larson	Requires TCEQ to obtain or develop updated water availability models (WAMs) for all basins by Dec 1, 2020.	**Never progressed in House Natural Resources.**
SB 0696	Perry	Requires TCEQ to obtain or develop updated water availability models (WAMs) for Brazos, Guadalupe, San Antonio, and Trinity River basins by Dec 1, 2020.	**Passed in Senate. Stalled in House Natural Resources.**
Groundwater			
HB 0031	Larson	A groundwater district is limited to what it can required for a permit application to be considered administrative complete. This bill includes additional regulation for limits on permit moratoriums, and for groundwater exporting that may affect on the aquifer conditions.	**Passed the House. Failed to leave on Senate Intent Calendar.**
SB 0189	Uresti	Requires TCEQ and the Railroad Commission to expand notification to GCDs for permit applications to drill water injection wells located within 10 miles of GCD boundary. Aquifer Storage and Recovery injection well permit applications are exempt from this statue.	**Never progressed in Senate Ag, Water, & Rural Affairs.**

Water for Texans

Interconnect of Surface Water
Using
ZoomHydro WaterBeads Project

Goal

- Link all Texas major flows into one flexible resource where we can lower lake evaporation while still maintaining prudent reserves
- Lower the power industry impact of surface water through selling thermal energy in addition to electric energy



Outline

- Introductions
- Stated Goal
- History water transport engineering dates back 2400 years in 2005 laws changed
- Proposed Solution

Energy -Air Pollution -Evaporation Loss Reduction -CHP -Transportation Resource Sharing

- Call to action

Micro step – get included on the state plans
Demonstration in Comfort Texas on the Guadalupe River
Implement

- Q&A

H.B. No. 2702

AN ACT

relating to the construction, acquisition, financing, maintenance, management, operation, ownership, and control of transportation facilities and the progress, improvement, policing, and safety of transportation in this state; providing a penalty.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:

ARTICLE 1. RAIL FACILITIES

SECTION 1.01. Section 91.001, Transportation Code, is amended by amending Subdivision (6) and adding Subdivision (13) to read as follows:

(6) "Rail facility" means real or personal property, or any interest in that property, that is determined to be necessary or convenient for the provision of a freight or passenger rail facility or system, including commuter rail, intercity rail, [~~and~~] high-speed rail, and tri-track. The term includes all property or interests necessary or convenient for the acquiring, providing, using, or equipping of a rail facility or system, including rights-of-way, trackwork, train controls, stations, and maintenance facilities.

(13) "Tri-track" means a triangular monorail beam guideway:

(A) constructed at a grade above surface modes oftransportation;

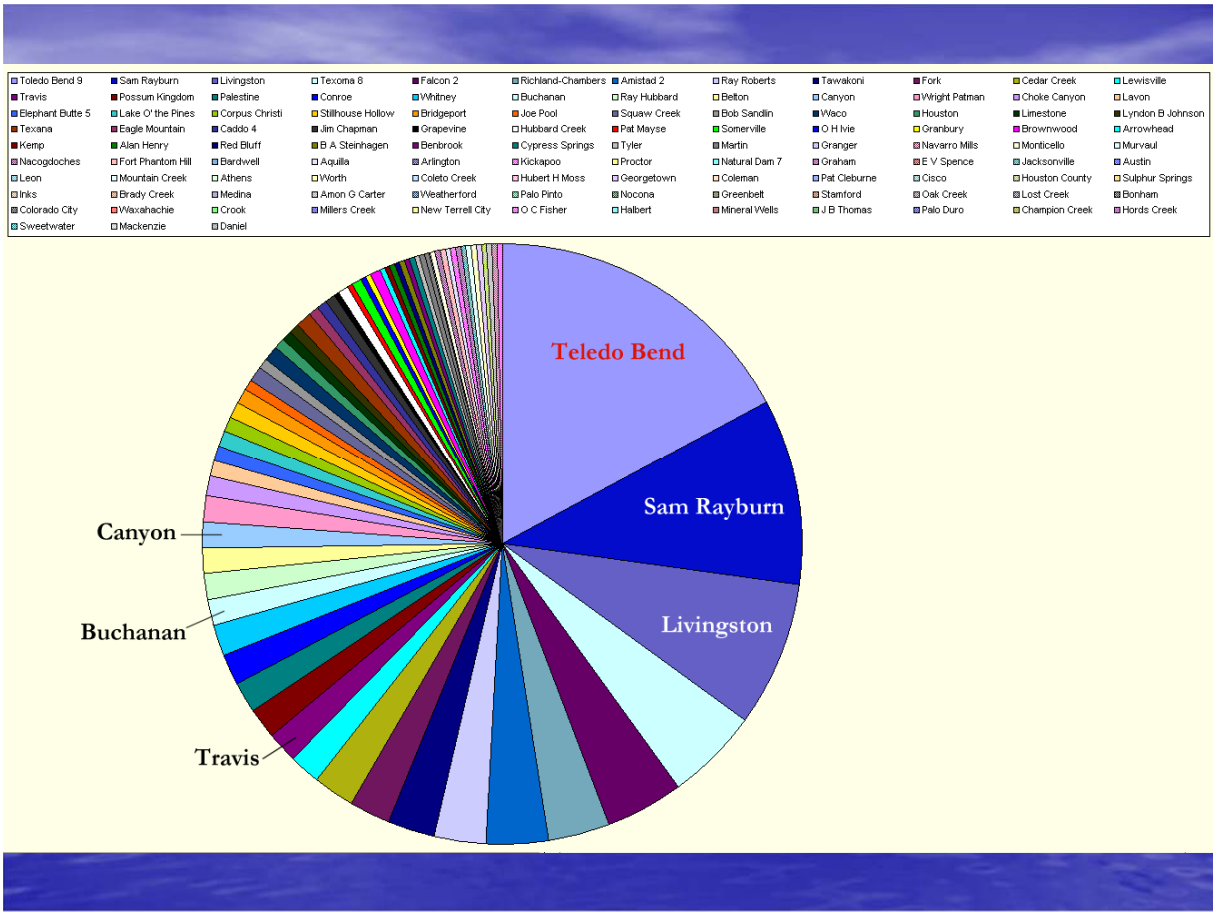
(B) for use by dual-mode vehicles capable of using the guideway or a highway; and

(C) with entrances accessible from and exits accessible to highways.

Texas House Bill 2702 79th legislature May 2005

Texas has Enough Water

- We do not have that water in the right places
- We can move water but at what cost?
- Will a traditional pipeline suffice?
- What other solutions are at the patent office?



Texas Continued Drought

- Is this year three of a five year cycle?
- Can we act now to provide all Texans water?
- How soon can water be shifted across all the Major Texas River Basins?
- Will the cost be comparable with water rates now?

Exploring Traditional Solutions

- 54” diameter pipeline from Sam Rayburn to Georgetown (213 miles) estimated at 25,000 horsepower and 2.4 billion dollars for laying the pipe.
- The daily energy cost to supply electricity for 43,000 gpm is significant

Jensen Pump Engineering Experts

Dan Graffam, P.E and Stephen Pottey Project Manager

Jerry,

Dan got pulled away for a few days, so he's having me take over this one for him. Most of the jobs we do designs for have a pretty quick turnaround, so my supervisor was worried that maybe we should pass on this one. We really like the work you've done though. This is one of the most innovative transportation designs I have ever seen, and I love the idea of coupling it with water transportation. Hopefully it will lead to a great partnership between us.

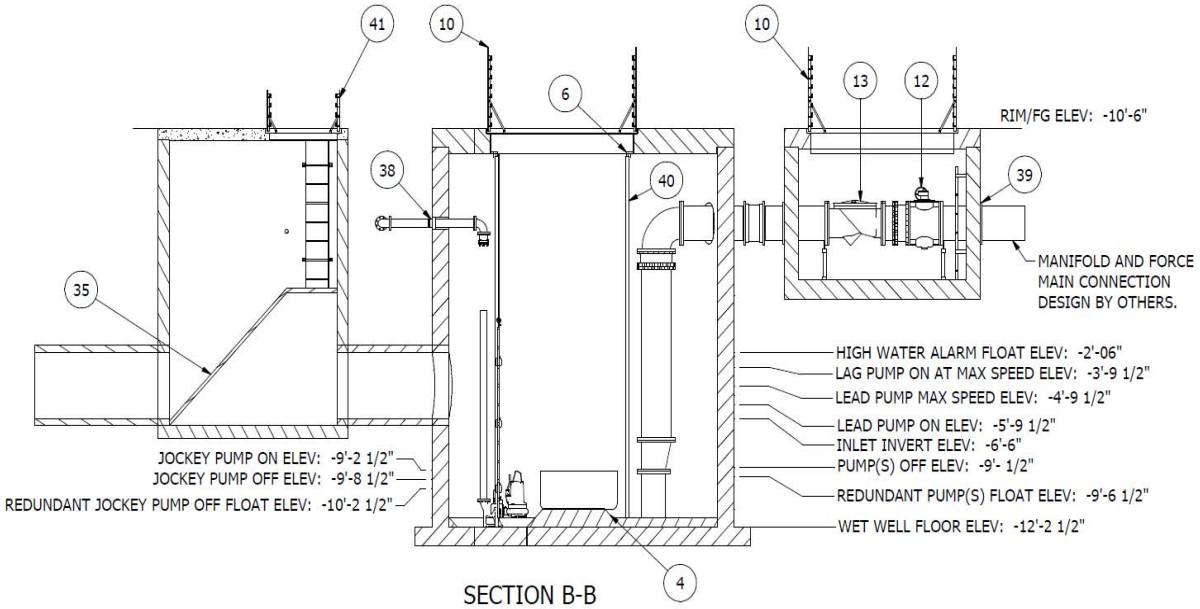
That being said, my boss is still a little hesitant. Since our designs are free, and this project could be a ways out, the only way I could convince him to let us do the design is if you send us some free sweatshirts. What do you think? Sound like a deal?

Stephen Pottey
Project Manager
Direct: (775) 352-6346

JENSEN ENGINEERED SYSTEMS
825 Steneri Way - Sparks NV, 89431
(855) 468-5600 - FAX: (775) 359-6364

Jensen pump station filter feed stations with water treatment

needed 3 per staging lake @$1.5 million each

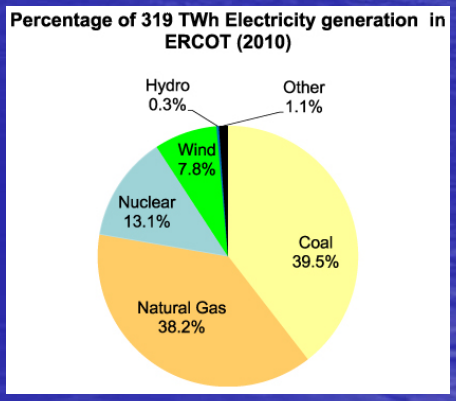


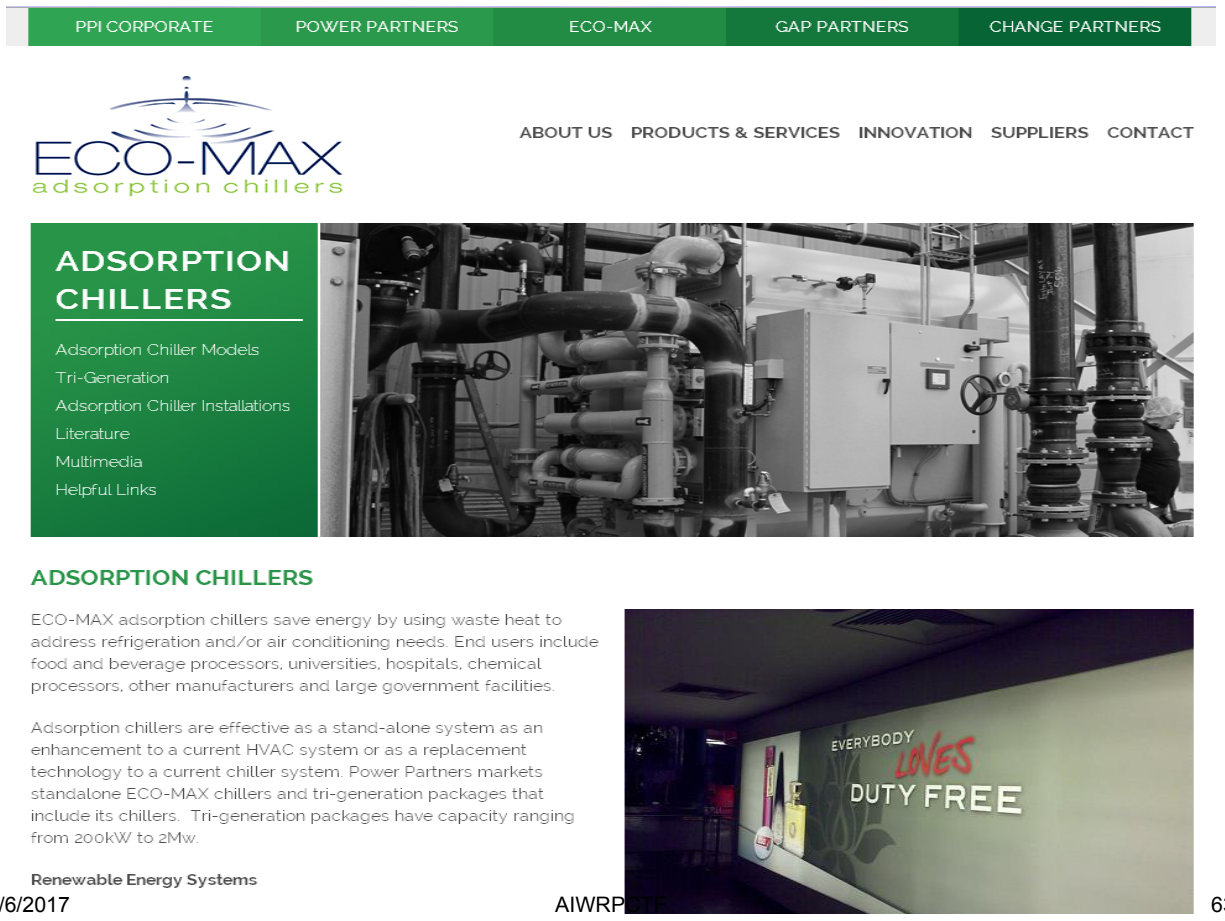
TCEQ historically comes from water conservation

- To give an example of how much water can be “lost” to the atmosphere in one day from Lake Sam Rayburn - Example - On August 25th, 2008 a half of an inch of the lake’s surface level evaporated. Sam Rayburn is roughly 110,000 acres, with a half inch being 0.042 feet at the lake’s size this equates to about 4,620 acre-feet of water that evaporated on a single day in August. An acre-foot is 325,800 gallons of water so multiply that by the 4,620 acre-feet of water that was “lost” and you come up with over a billion gallons of water.

Nexus Between Water and Energy

- For every kilowatt hour of generated electricity = loss of .6 gallons of surface water for nuclear and .23 to .7 for CHP natural gas and coal.
- For every unit of burned fuel, power companies ship 1/3 of that unit of electric energy. They lose 2/3rds of all energy they burn up
- CHP can run up to 2/3 efficient reversing this statistic
- Hope lies in change. Change HOW we convert energy to electricity and how or why we dam rivers





Proposal - Free to the State as PPP

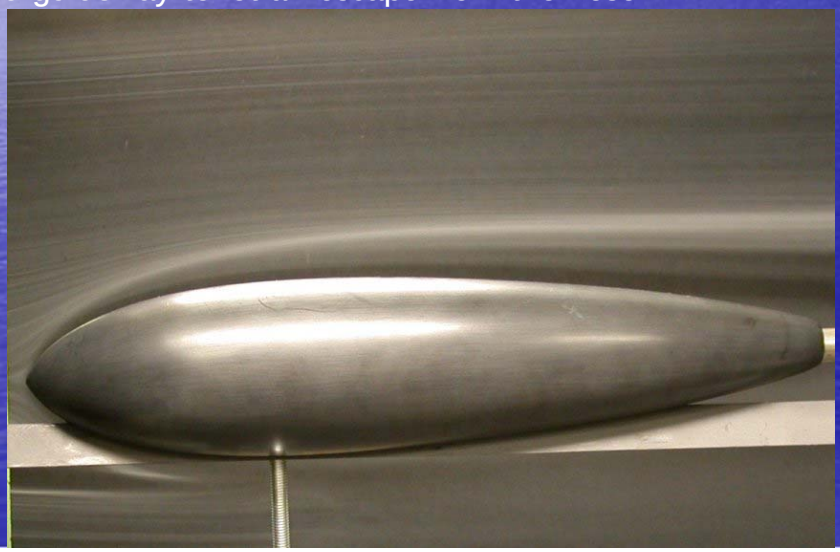
- Build WaterBeads across Texas
- Link 1 - Sam Rayburn to San Antonio (includes I35 corridor)
- Link 2 - San Antonio to the Rio Grand
- Link 3 - Sam Rayburn to Toledo Bend

Engineering Details

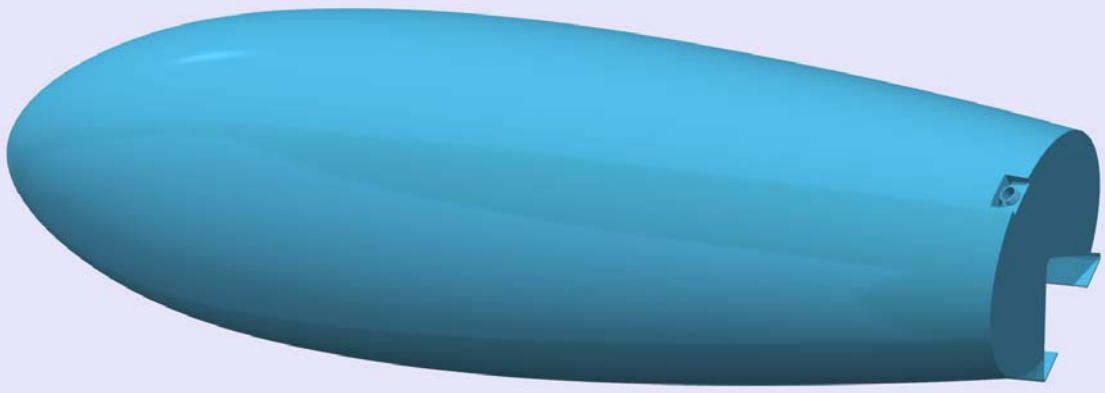
- Pipelines have been built since Roman times for cities SR to GT 25,000 horsepower required
- ZoomHydro pushes slick aerodynamic beads through less viscous air rather viscous water pushed down pipe walls at 5 to 6 mph
- 3.0 horsepower at 65 mph or 2.1 horsepower at 50 mph .9 or .5 horsepower (respectively) for empty tank return

Wind Tunnel Test Cd .07

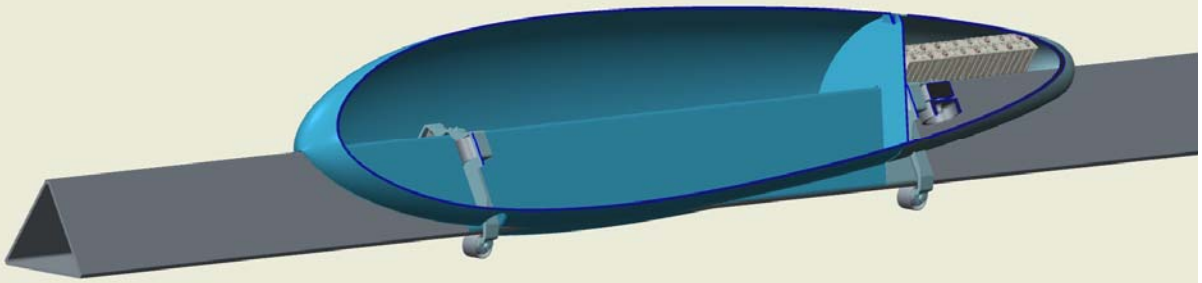
- UT Austin wind tunnel test confirms historical data of class C Airship shape
- Patented shape has advantage and it interfaces with the three sided guideway to let air escape from the nose

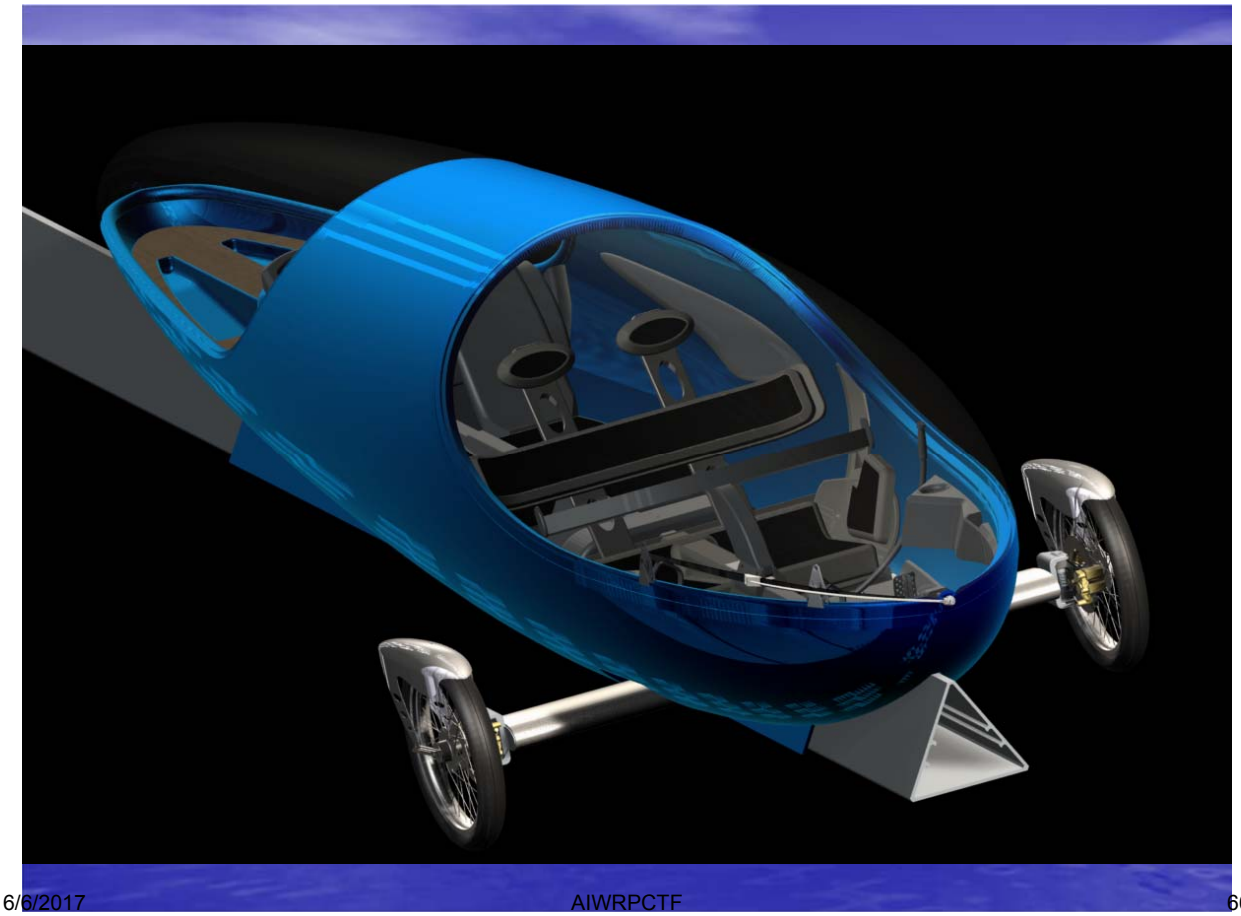


Rotational Molded Plastic Tank



Cd = .07 5.71 square feet frontal area
359.48 gallons 3,000 pounds water

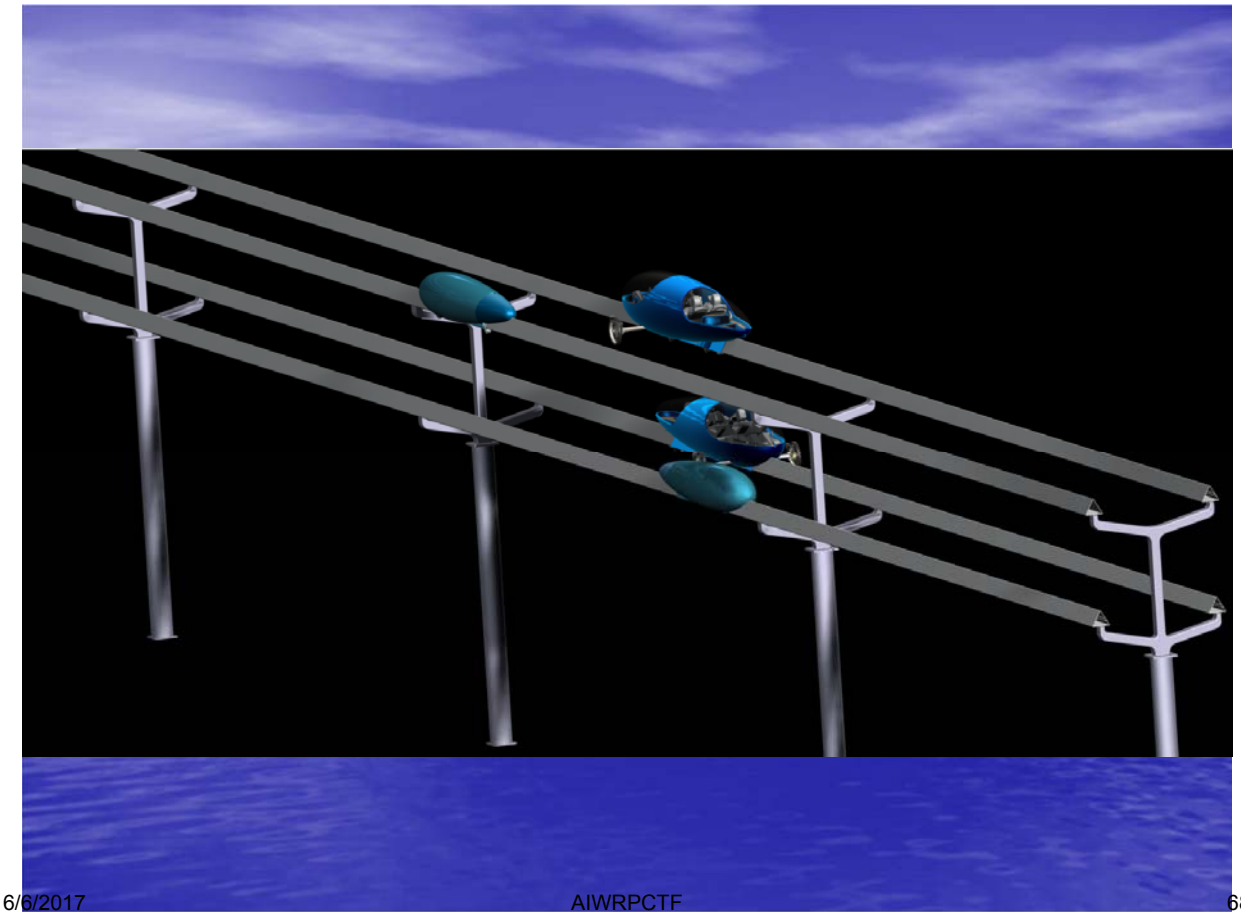




Crossing Ranches

Lake Granger

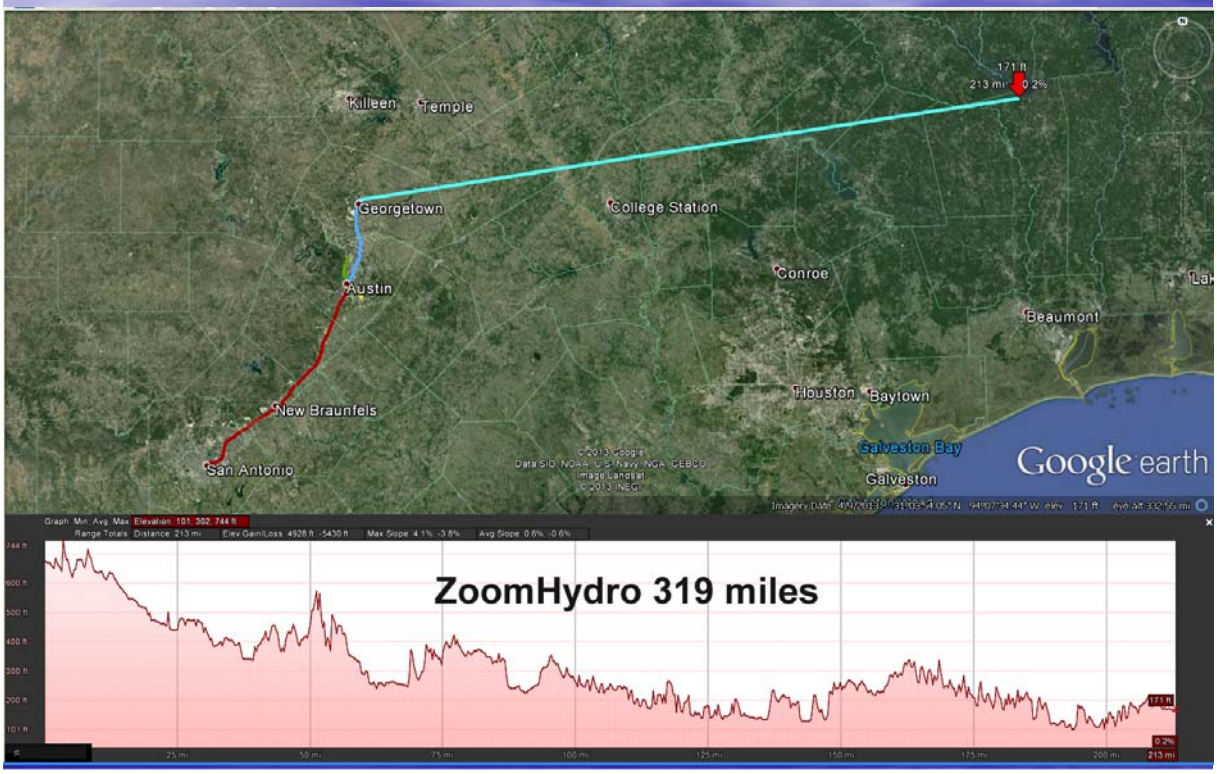
Texas Flyer I35 Corridor




SPLASHTOWN

	A	B	C	D	E	F
182	**ZoomHydro**					
183	bottom wheel	$ 35.00	each	2	$ 70.00	
184	top wheel	$ 30.00	each	4	$ 120.00	
185	front bogie	$ 85.00	each	1	$ 85.00	
186	rear bogie	$ 100.00	each	1	$ 100.00	
187	motor 2.3 kilowatt	$ 230.00	each	1	$ 230.00	
188	traction tire	$ 40.00	each	1	$ 40.00	
189	tank 3000 pounds water capacity	$ 600.00	each	1	$ 600.00	
190	water mule housing	$ 50.00	each	1	$ 50.00	
191	latch	$ 20.00	each	1	$ 20.00	
192	cap	$ 2.00	each	1	$ 2.00	
193	motor controler	$ 99.00	each	1	$ 99.00	
194	battery Li Iron Phosphate 100 Amp-hour 3.2 VDC	$ 130.00	each	25	$ 3,250.00	
195	wiring	$ 30.00	set	1	$ 30.00	
196	emergency brakes	$ 40.00	lot	1	$ 40.00	
197	reaction plates	$ 100.00	each	1	$ 100.00	
198						
199	total minitanker small quantity				$ 4,836.00	
200	large build				$ 1,612.00	
201						
202	Tooling					
203	rotomold mold for water tank	$ 90,000.00	each	1	$ 90,000.00	
204	rear cowl mold	$ 20,000.00	each	1	$ 20,000.00	
205	extrusion belly open triangle	$ 17,000.00	each	1	$ 17,000.00	
206						
207	total one time tooling				$ 127,000.00	
208						
209	ZoomHydro mini-tank cars	$ 1,612.00	each	70560	$ 113,742,720.00	
210	**System cost total 213 mile extension**				$ 267,321,081.39	
211						
212	Guideway ZoomHydro separate from I35					
213	extrusion	$ 46.50	foot	2249280	$ 104,591,520.00	
214	steel	$ 13.00	foot	2249280	$ 29,240,640.00	
215	ductile	$ 2.00	foot	2249280	$ 4,498,560.00	
216	poles galvanized steel	$ 971.27	each	37488	$ 36,410,969.76	
217	foundations and setting	$ 400.00	each	37488	$ 14,995,200.00	
218	XYZ positioner	$ 200.00	each	37488	$ 7,497,600.00	
219	IP license	$ 1.36	foot	2249280	$ 3,059,020.80	
220	solar panels	$ 190.00	each	37488	$ 7,122,720.00	
221	station parking	$ 500,000.00	each	2	$ 1,000,000.00	
222	pump prefab stations Jensen	$ 1,200,000.00	each	9	$ 10,800,000.00	
223						
224	total guideway sans land small purchase				$ 219,216,230.56	
225	total guideway sans land large purchase				$ 153,451,361.39	
226						
227						
228	PPP cost to Texas free					
229	payback cost of a gallon of transportated water	$ 0.002	gallon	61920000	$ 123,840.00	per day
230				gallons per day		
231	national average is $2.00 per 1000 gallons				$ 45,201,600.00	per year sales
232	treatment is 15% of $2.00 or 30 cents per 1000 gallons					

WaterBeads PPP



WaterBeads

When the well's dry, we know the worth of water.
—BENJAMIN FRANKLIN (1706-1790), POOR RICHARD'S ALMANAC, 1746