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

August 2, 2016

IMAGINE AUSTIN SPEAKER SERIES

Water Forward:
Planning for the Next 100 Years

Wednesday, August 3, 2016
Registration 6:30pm; Event 7:00pm - 8:30pm
Thompson Conference Center Auditorium, The University of Texas
2405 Robert Dedman Drive, Austin, TX

Greg Meszaros
Director, Austin Water

Is responsible for leading a team dedicated to providing high quality drinking water, wastewater, and reclaimed water services to nearly 1 million people in the Austin metro area.

Sharlene Leurig
Director, Texas Environmental Flows Project

Works to purchase water for the environment in the state of Texas. She serves on the Board of Directors of the Hill Country Alliance and Chairs the Austin Integrated Water Resource Planning Community Task Force.

An Integrated Water Resource Plan to Meet Our Community's Future Water Needs

Austin is one of the fastest growing cities in the country. With a rapidly growing city and a changing climate, Austin Water is working with other City departments, a citizen task force, and the community to develop a water plan for the next century. This 100 year water plan will help ensure a diversified, sustainable, and resilient water future while maintaining a strong emphasis on conservation.

Austin Water Director, Greg Meszaros and Integrated Water Resource Plan Community Task Force Chair, Sharlene Leurig will share insights on the process and the importance of creating a long-term plan that will help secure Austin's water supply for future generations.

Public Outreach Update

- Imagine Austin Speaker Series
- Final Brochure and Survey
- Draft Public Outreach Action Plan
  - Review by Public Outreach Subcommittee late August
  - Presented at September Task Force meeting
- Save the Date for Sept. 7th Public Workshop
  - IWRP Overview
  - Mission Statement, Guiding Principles, Objectives, and Sub-Objectives

Project Status Update

Consulting Team Progress to Date

Task	Progress
Task 1 - Public Outreach and Participation	• Meeting held in July with public outreach team • Draft public outreach plan in preparation • Planning for Public Workshop 1
Task 2 – Methodology	• Meeting held in July to review methodology • Objectives, subobjectives drafted for AW, Task Force Review
Task 3 – Disaggregated Water Demand	• Meeting held in July with Water Demand Team • Reviewing demand model • Initiated end use research
Task 4 – Water Conservation Potential	• Program benchmarking initiated • Preparing summary of AW conservation progress • Initial review of preliminary draft demand management options
Task 5 – Climate Change	• Meeting held in June to update consulting team on status

Consulting Team Next Steps

Task	Progress
Task 1 - Public Outreach and Participation	• Revise public outreach plan after review and input • Conduct Public Workshop 1
Task 2 – Methodology	• Revise Draft Task 2 Memorandum after review and input
Task 3 – Disaggregated Water Demand	• Initiate statistical modeling • Continue end use research
Task 4 – Water Conservation Potential	• Continued program benchmarking initiated • Summary of AW conservation progress • Continued review of demand management options
Task 5 – Climate Change	• Progress meeting with consulting team
Task 6 – Supply Options	• Initiate supply and decentralized analyses

Objectives and Sub-Objectives Task Force Survey Feedback Presentation

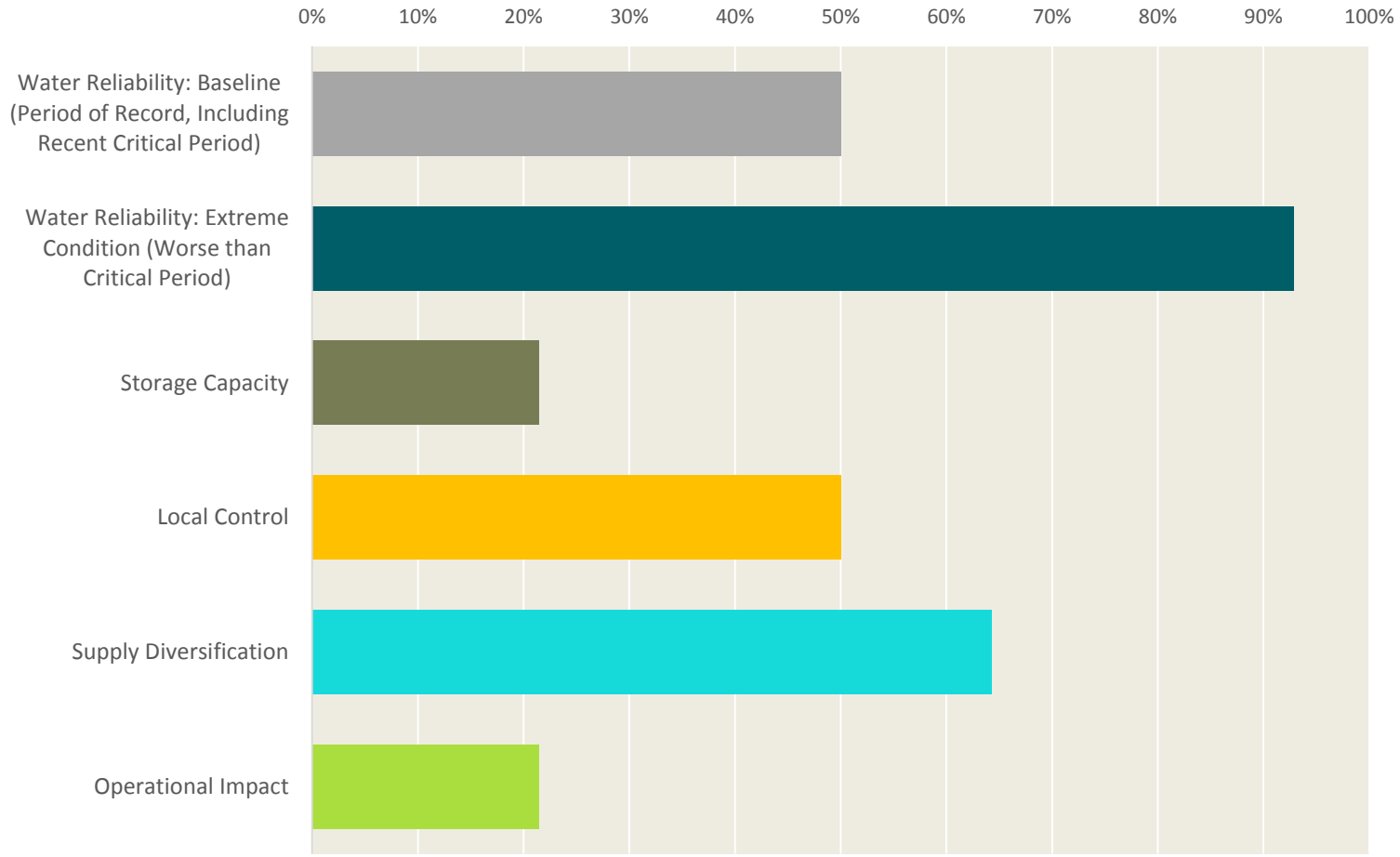
Survey Feedback

- Online survey provided to Task Force for feedback on top 3 sub-objectives within each objective category
- 14 total Task Force responses
  - 10 Voting Members
  - 4 Ex Officio Members
- Plan to gather additional feedback at this meeting

Objective – Water Supply Benefit

Sub-Objective	Defining Question
Water Reliability – Baseline (Period of Record, Including Recent Critical Period)	How does the portfolio perform in terms of reliability (how often is there shortage), vulnerability (how large is the shortage), resilience (how fast is the recovery from shortages) throughout baseline hydrologic period record (including the recent critical period of 2008-2016)?
Water Reliability – Extreme Condition (Worse than Critical Period)	How does the portfolio perform in terms of reliability (how often is there shortage), vulnerability (how large is the shortage), resilience (how fast is the recovery from shortages) throughout an extreme condition (which may include climate change-adjusted and synthetic hydrology that represents back to back droughts)?
Storage Capacity	How much storage is in the portfolio for use by AW?
Local Control	To what extent does AW have control over the quantity and storage of water and operation of strategies (especially during drought periods) included in the portfolio?
Supply Diversification	How many independently managed water supply and demand-side management options are included in the portfolio?
Operational Impact	To what extent does the portfolio increase the operational complexity of Austin's water infrastructure, conveyance, treatment, and distribution?

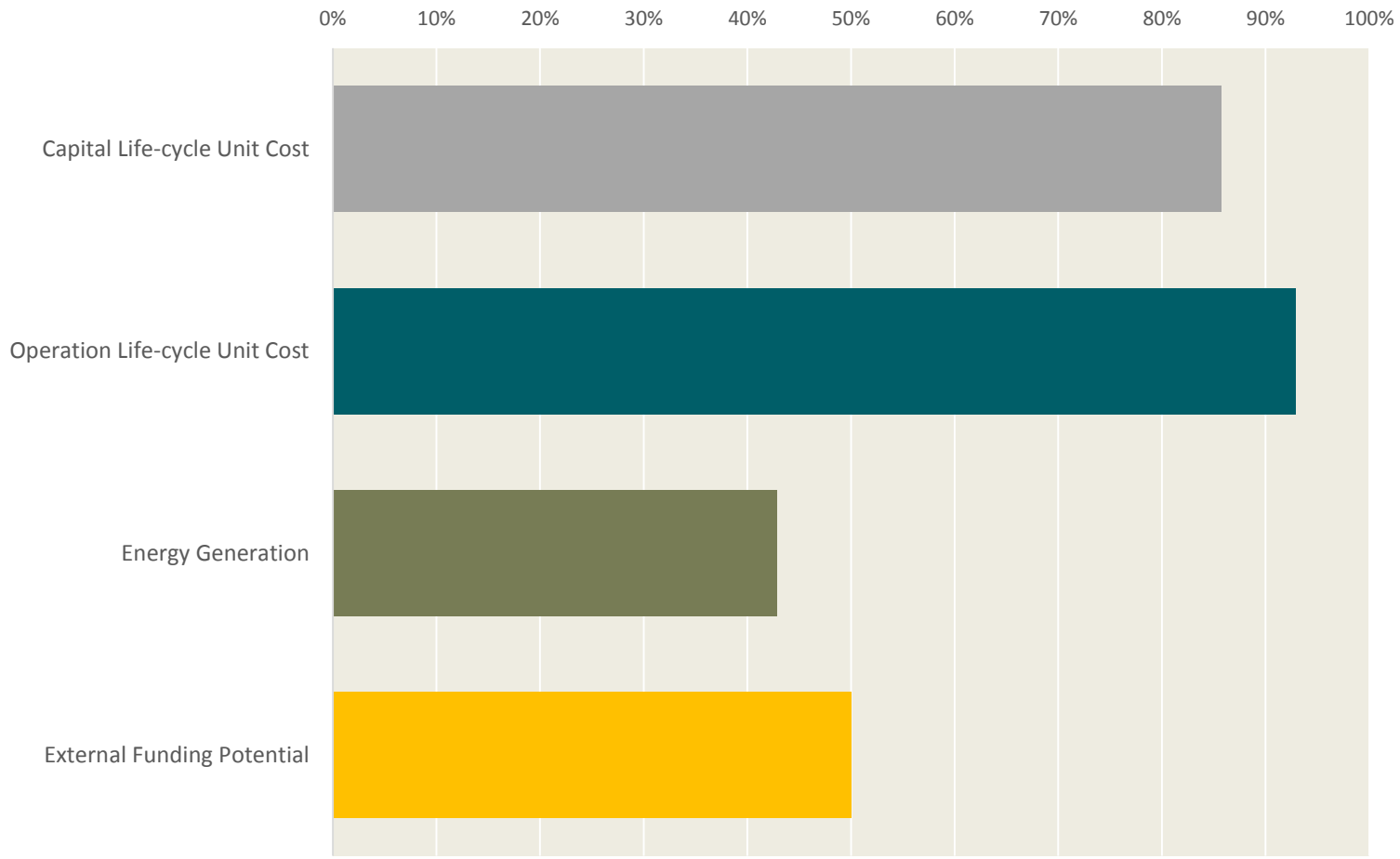
Objective – Water Supply Benefit



Objective – Economic Impacts

Sub-Objective	Defining Question
Capital Life-cycle Unit Cost	What is the total capital (construction) cost of all projects/programs in the portfolio over the lifecycle, divided by the sum of all water yield produced by the portfolio?
Operation Life-cycle Unit Cost	What is the total operations and maintenance costs of all projects/programs in the portfolio over the lifecycle, divided by the sum of all water yield produced by the portfolio?
Energy Generation	Does the portfolio have an opportunity for energy generation/energy offset?
External Funding Potential	Does the portfolio have an opportunity for external funding such as Federal, State, local, and private sources?

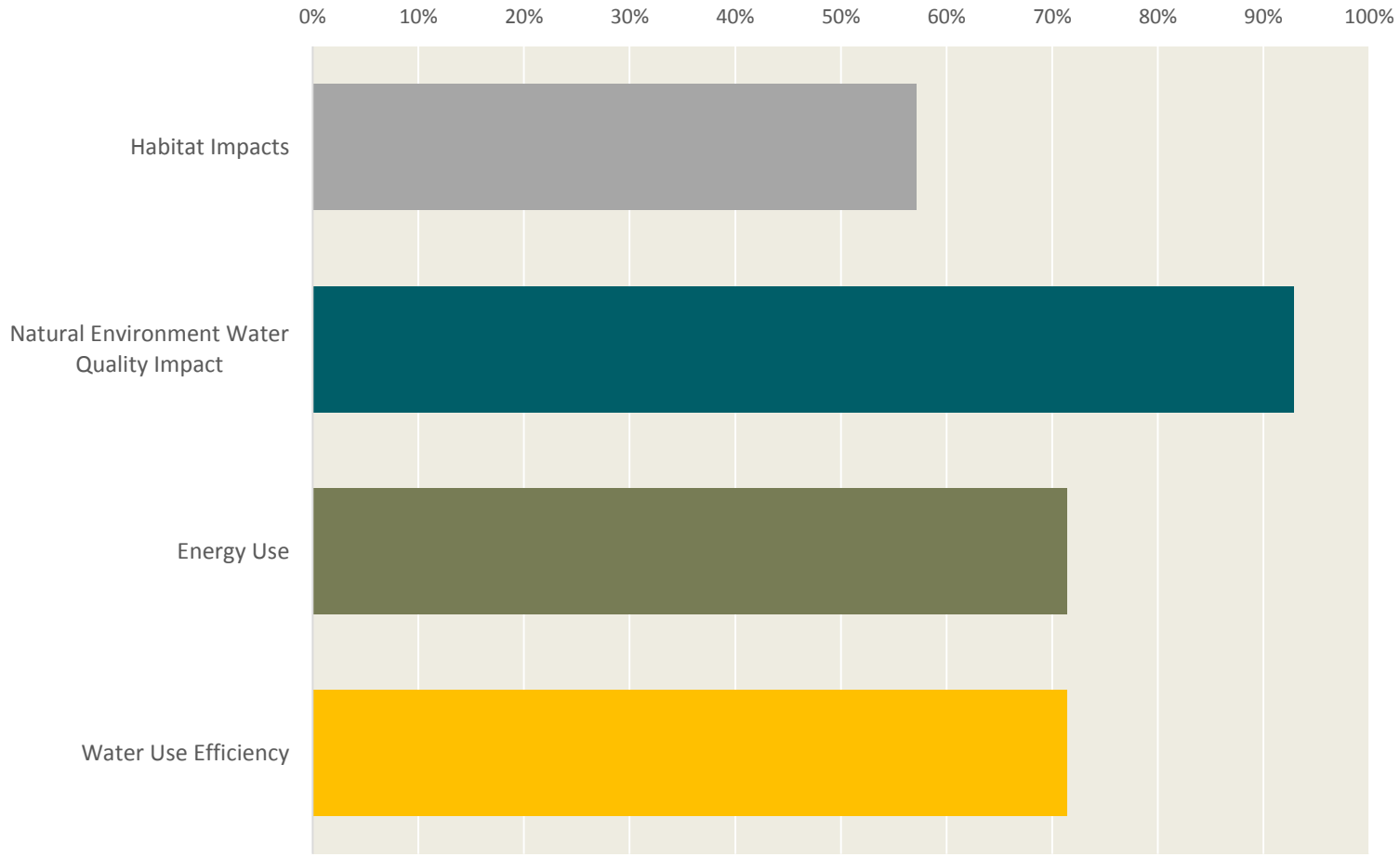
Objective – Economic Impacts



Objective – Environmental Impacts

Sub-Objective	Defining Question
Habitat Impacts	To what extent does the portfolio positively or negatively impact habitats throughout Austin (terrestrial or aquatic)?
Natural Environment Water Quality Impact	Does the portfolio positively or negatively impact water quality in the natural environment, including local streams and creeks?
Energy Use	What is the net energy requirement of the portfolio?
Water Use Efficiency	What is the water use reduction from strategies (i.e. water conservation, reuse and rainwater capture, etc.) for the portfolio?

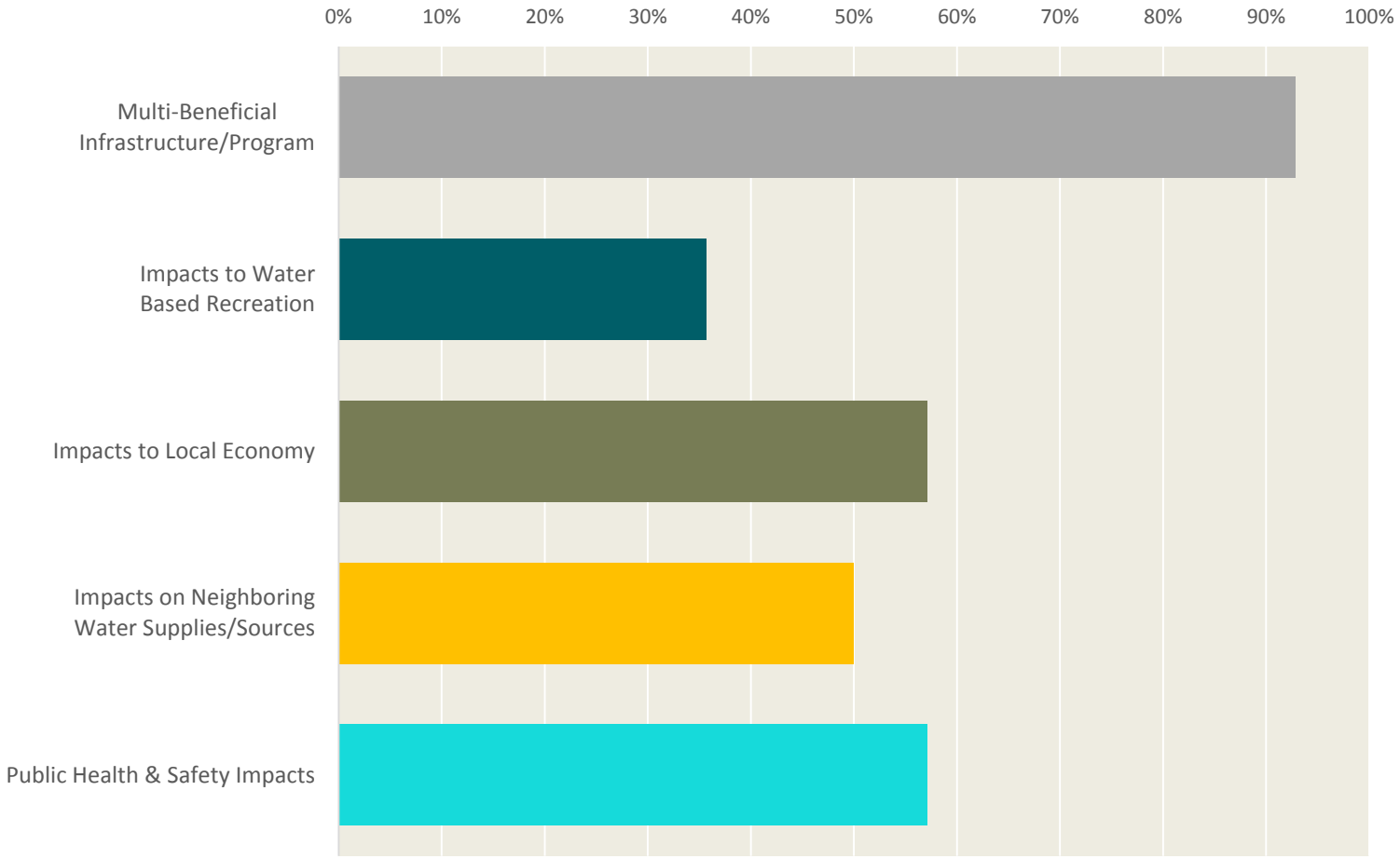
Objective – Environmental Impacts



Objective – Social Impacts

Sub-Objective	Defining Question
Multi-Beneficial Infrastructure/Program	To what extent does the portfolio provide secondary benefits such as enhanced community livability/beautification, increased water ethic, ecosystem services, or others?
Impacts to Water Based Recreation	To what extent does the portfolio positively or negatively impact water-based activities (i.e. boating, kayaking, swimming, fishing, etc.)?
Impacts to Local Economy	To what extent the portfolio have a positive or negative impact on the local economy, including job creation?
Impacts on Neighboring Water Supplies/Sources	To what extent does the portfolio have positive or negative impacts to the water quantity of another municipal provider's existing water supply or other domestic water supplies?
Public Health & Safety Impacts	To what extent does the portfolio increase the complexity of AW's requirements to meet all Federal, State, and local public health and safety regulations?

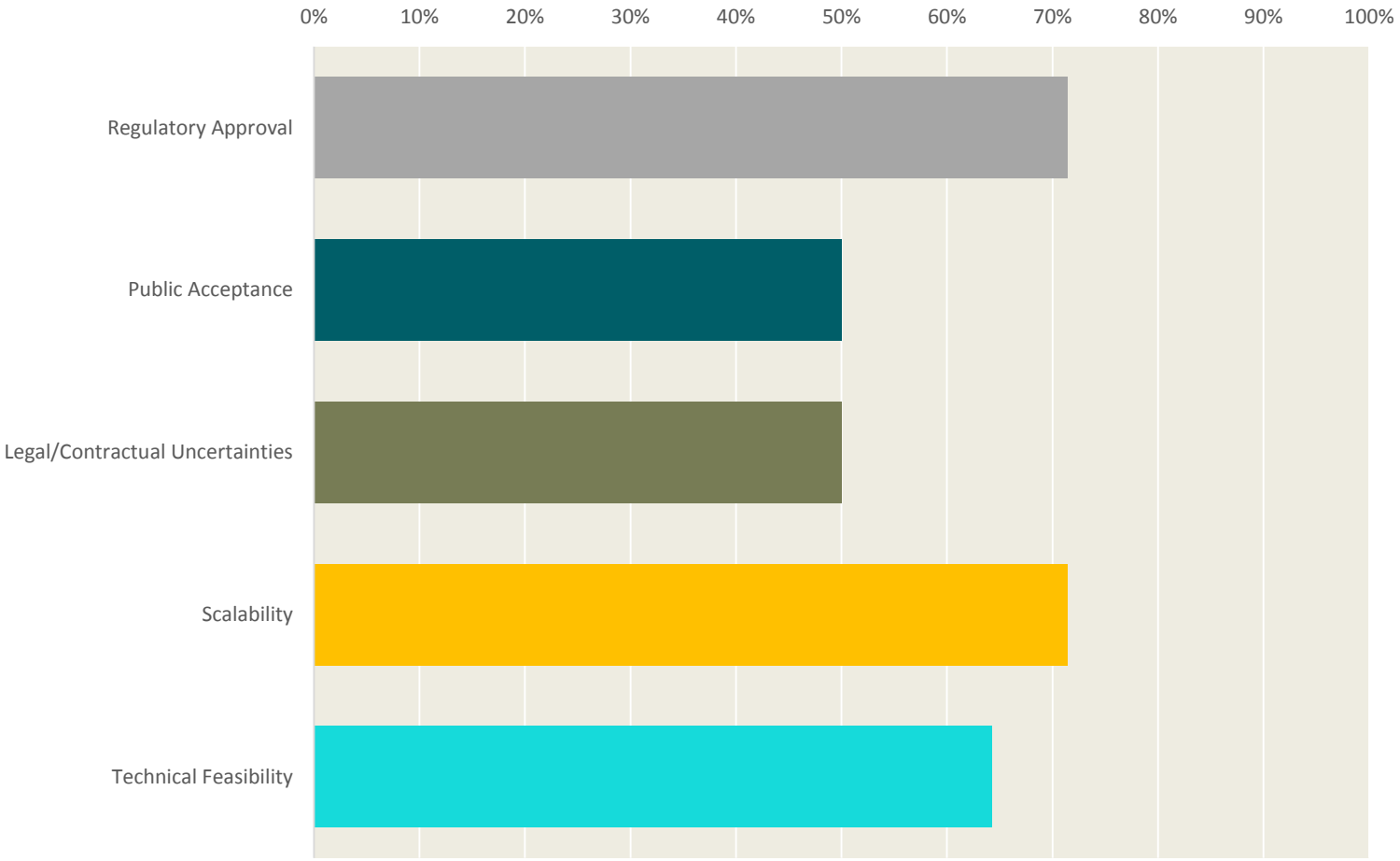
Objective – Social Impacts



Objective – Implementation Impacts

Sub-Objective	Defining Question
Regulatory Approval	How difficult will the portfolio be in obtaining regulatory approval, i.e. environmental and water rights permitting?
Public Acceptance	What level of public support is anticipated for the portfolio?
Legal/Contractual Uncertainties	To what degree may legal or contractual issues hamper the portfolio in delivering the water supply?
Scalability	To what extent can the portfolio be incrementally sized over time in terms of supply capacity and demand management?
Technical Feasibility	To what extent does the portfolio rely on emerging and/or unproven technologies?

Objective – Implementation Impacts



Next Steps

- Staff and consultant will work together to refine sub-objectives
  - Task Force feedback will inform refinement process
  - Refined sub-objectives may be combinations of more than one sub-objective
- Draft Task 2 – Evaluation Methodology Technical Memo to be delivered late August
  - Will be provided to Task Force for review and input
  - Consultant presentation and Task Force discussion at September meeting

Questions and Discussion

City of Austin
Feasibility and Engineering Analyses For Supply Side Strategies
Aug 2, 2016

Austin WATER

ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL ENGINEERS AND SCIENTISTS

Outline

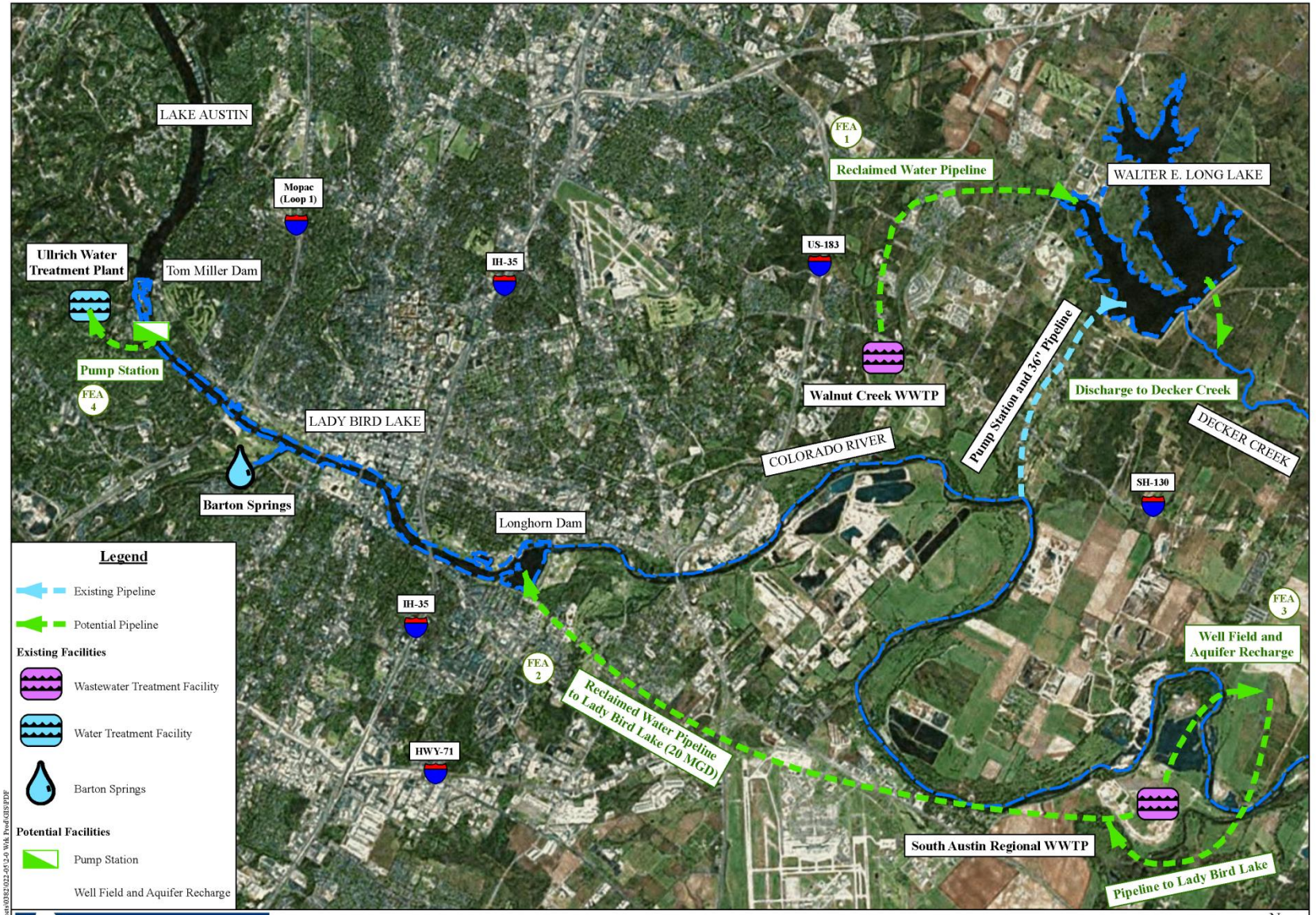
1. Introduction
2. Overview of Water Supply Options (FEA 1 to 4)
3. Draft results of study
4. Summary of results

Feasibility and Engineering Analyses

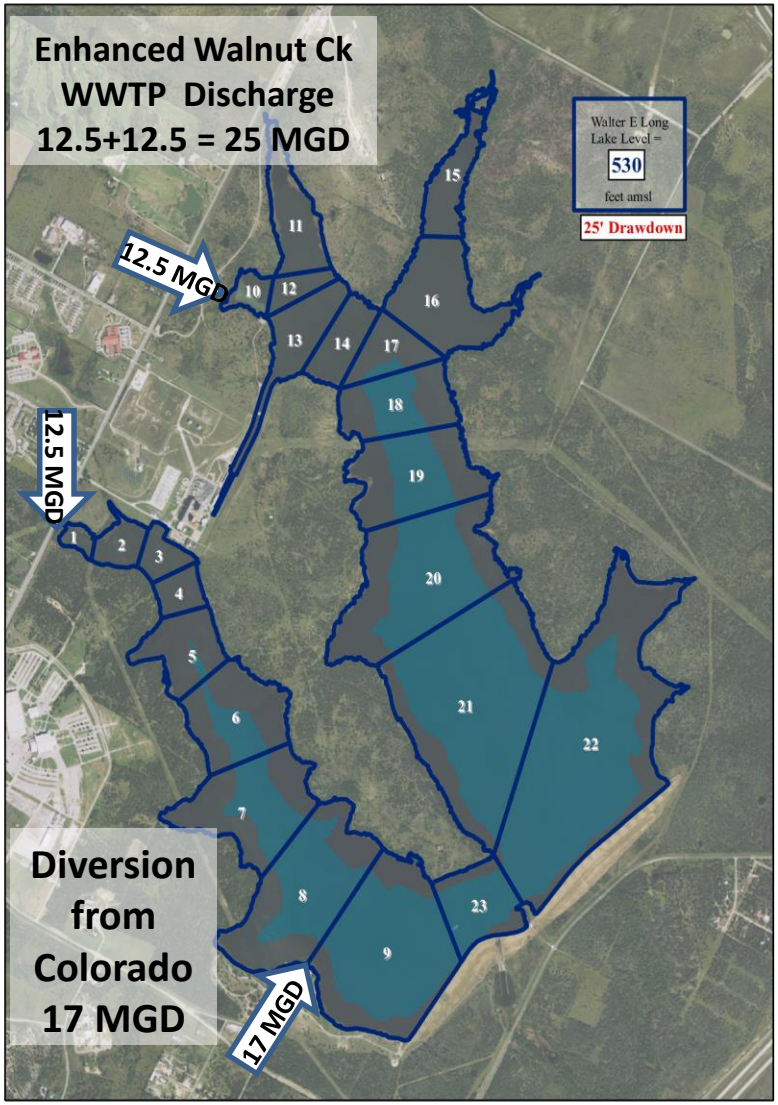
- Four water management strategies being studied through a contract with Alan Plummer Associates, Inc. (APAI)
- Recommended for additional study in the 2014 report of the Austin Water Resource Planning Task Force
- FEA results will be folded into the current Water Forward IWRP process in developing options for screening and evaluation

Overview of Water Supply Options (FEAs)

Water Supply Option	Description	Approximate Water Supply Volume (acre-feet/year)
FEA 1	Enhanced off-system storage at Walter E. Long Lake	16,000 ac-ft/yr
FEA 2	Indirect potable reuse from SAR WWTP to Ullrich WTP	22,400 ac-ft/yr
FEA 3	Reclaimed water from SAR to an infiltration basin and subsequent conveyance to Ullrich WTP	11,000 ac-ft/yr
FEA 4	Capture Lady Bird Lake inflows with transmission to Ullrich WTP	TBD


LAKE AUSTIN
Mopac (Loop 1)
Ullrich Water Treatment Plant
Tom Miller Dam
IH-35
US-183
FEA 1
Reclaimed Water Pipeline
WALTER E. LONG LAKE
Pump Station
FEA 4
Walnut Creek WWTP
Pump Station and 36" Pipeline
Discharge to Decker Creek
LADY BIRD LAKE
COLORADO RIVER
DECKER CREEK
SH-130
Barton Springs
Longhorn Dam
IH-35
FEA 3
Well Field and Aquifer Recharge
FEA 2
Reclaimed Water Pipeline to Lady Bird Lake (20 MGD)
HWY-71
South Austin Regional WWTP
Pipeline to Lady Bird Lake
Legend
Existing Pipeline
Potential Pipeline
Existing Facilities
Wastewater Treatment Facility
Water Treatment Facility
Barton Springs
Potential Facilities
Pump Station
Well Field and Aquifer Recharge
ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL ENGINEERS AND SCIENTISTS
CITY OF AUSTIN
FEASIBILITY AND ENGINEERING ANALYSIS FOR SUPPLY SIDE STRATEGIES
FIGURE 1
EXISTING AND POTENTIAL FACILITES
0 0.5 1 2 Miles
N

FEA 1: Enhanced Off-System Storage at Walter E. Long Lake

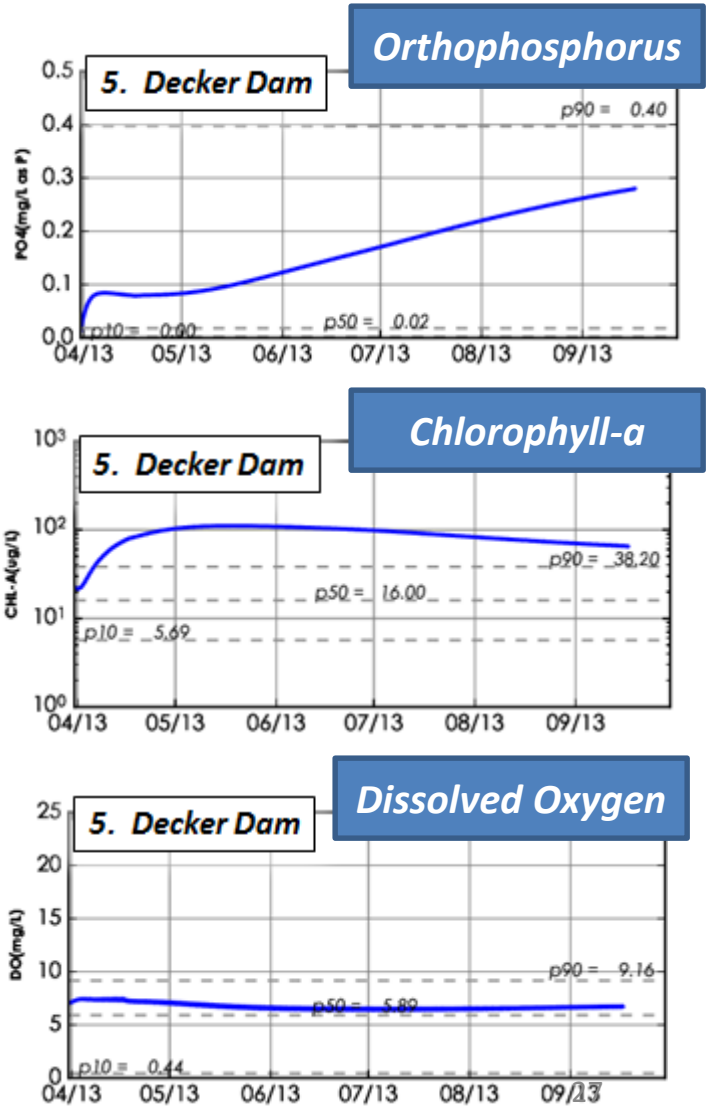


Project components

- Allow lake level to **drop <= 25 feet** to generate 16,000 ac-ft of water supplies
- **Enhanced treatment** at the Walnut Creek WWTP to produce up to 25 MGD of reclaimed project water
- Use **proposed reclaimed water line** in the Reclaimed Water **Master Plan** to convey reclaimed project water to Long Lake.
- Construct **two outfall structures**, one in East Arm and one in West Arm
- Expand existing Austin Energy Colorado River **Pump Station** from **10,000 to 20,000 GPM**.
- **Release** water supplies to **Decker Creek** and into the Colorado River to meet downstream water needs.

FEA 1: Points of consideration (Part I)

- Lake Long Water Quality Impacts
  - Model estimates **ammonia, nitrate** and **phosphorus** concentrations to **climb** steadily during refilling
  - **Chlorophyll-a** concentrations estimated to be in the **eutrophic** range (>20 ug/L) – due to increased phosphorus loads
  - Model estimates **dissolved oxygen** (DO) levels to **meet existing standards** of 5 mg/L during summer critical conditions. However, **accumulated biomass** may pose a potential DO concern when plants **die-off in winter**.

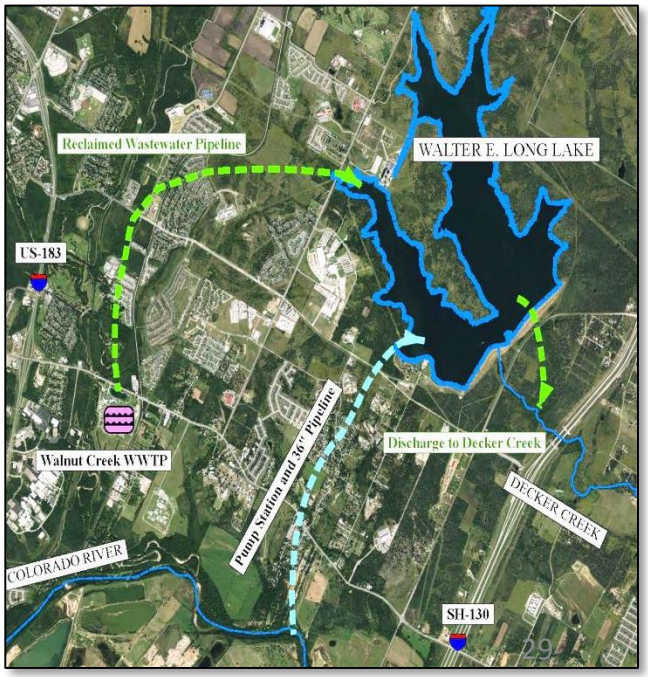


FEA 1: Points of consideration (Part 2)

- Key Regulatory Requirements
  - TCEQ **TPDES** Domestic Wastewater Permit Amendment to discharge effluent into Lake Long
  - Potential for USACE **404** Permit or Nationwide Permit
- Easement/Land Acquisition Requirements
  - Portions of the **reclaimed water line** from Walnut Creek WWTP to Lake Long.
  - Potential expanded easement for the existing water line from the **Colorado River Pump Station** to Lake Long

FEA 1: Projected Time and Costs

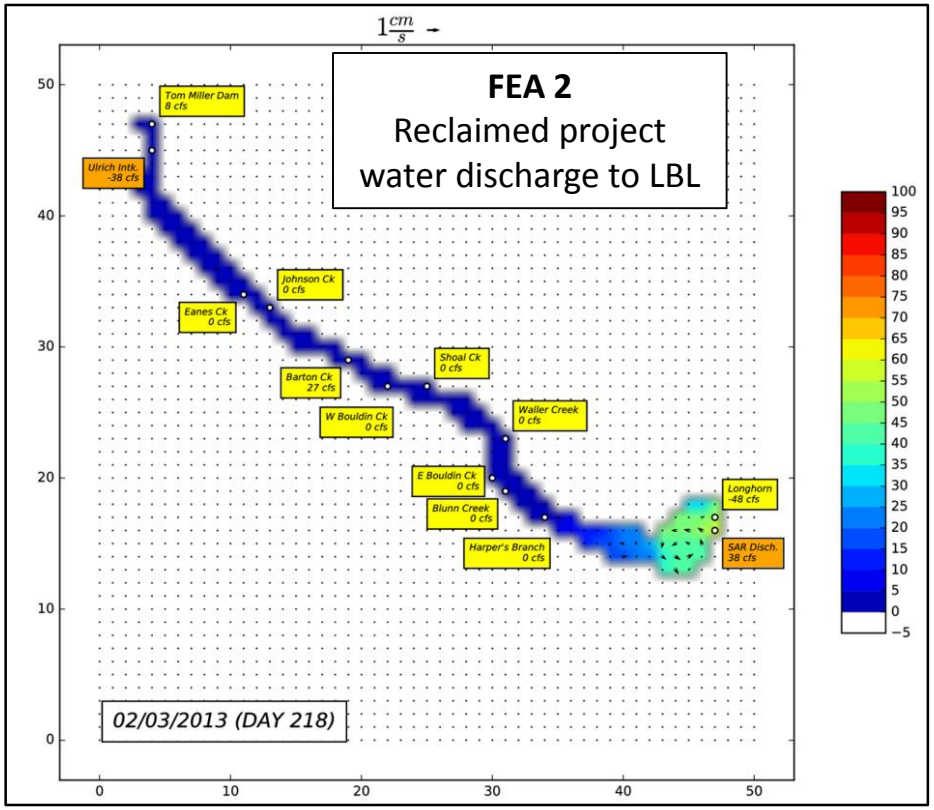
- Development Time — Water Supply – 16 KAFY
  - **Three years plus**
- Estimated Costs
  - **Development** Cost = **$60,000,000**
  - **Annual** operations, maintenance, and capital cost = **$8,000,000**
  - Cost **per acre foot** = $500
  - Cost **per 1,000 gallons** = $1.55



FEA 1: Risks/Challenges

- Potential degraded water quality in Lake Long
  - Variations on the operation of FEA 1 to lessen the impact on **Chlorophyll-a** may be investigated.
    - **Limit the drawdown** in lake level to improve assimilative capacity; and,
    - Include **release events in the model simulation** to consider nutrient transport out of the Lake.
- Time to fill the lake after a drawdown would be longer if reclaimed water was not included as a water source.

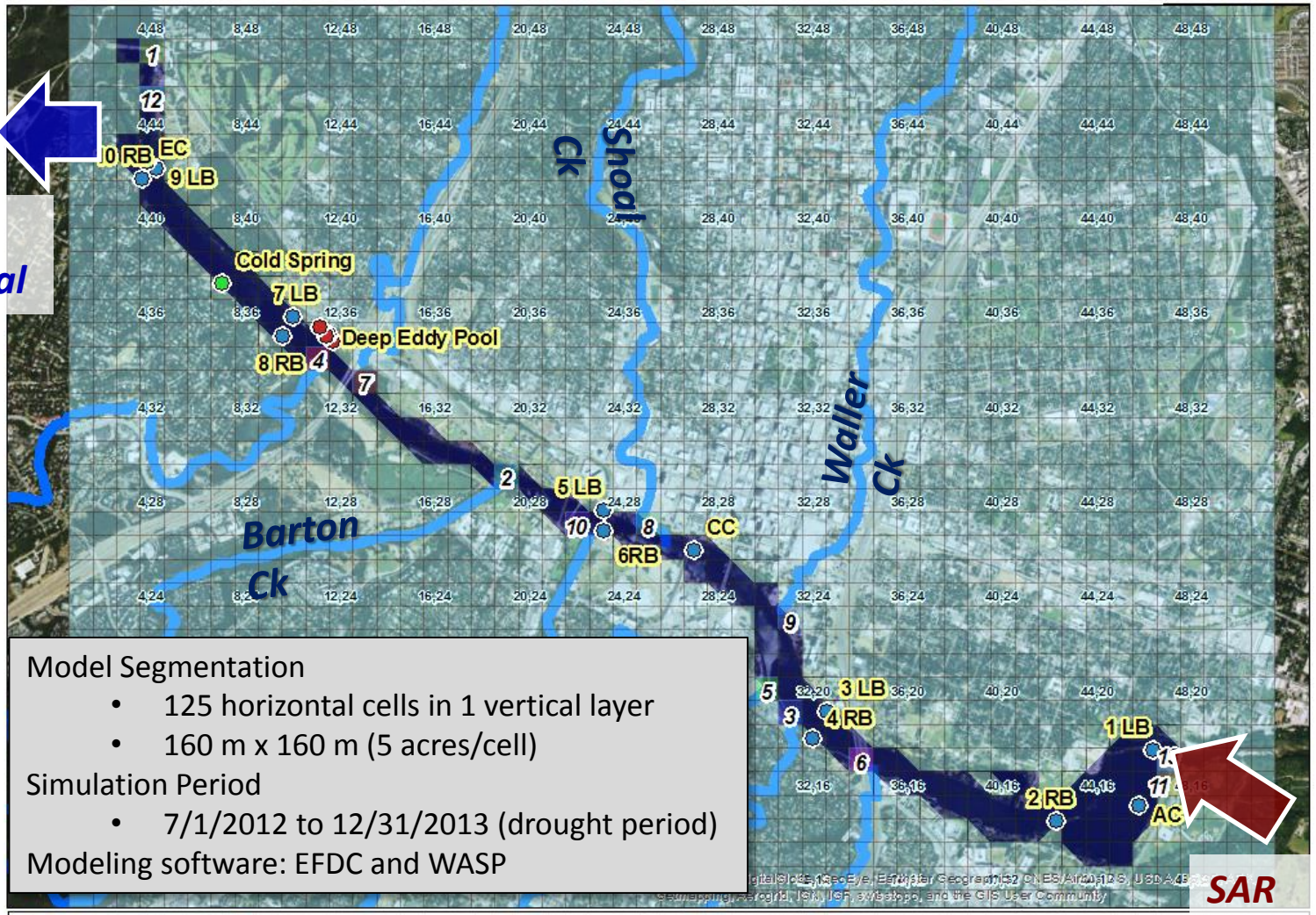
FEA 2: Indirect Potable Reuse to Lady Bird Lake



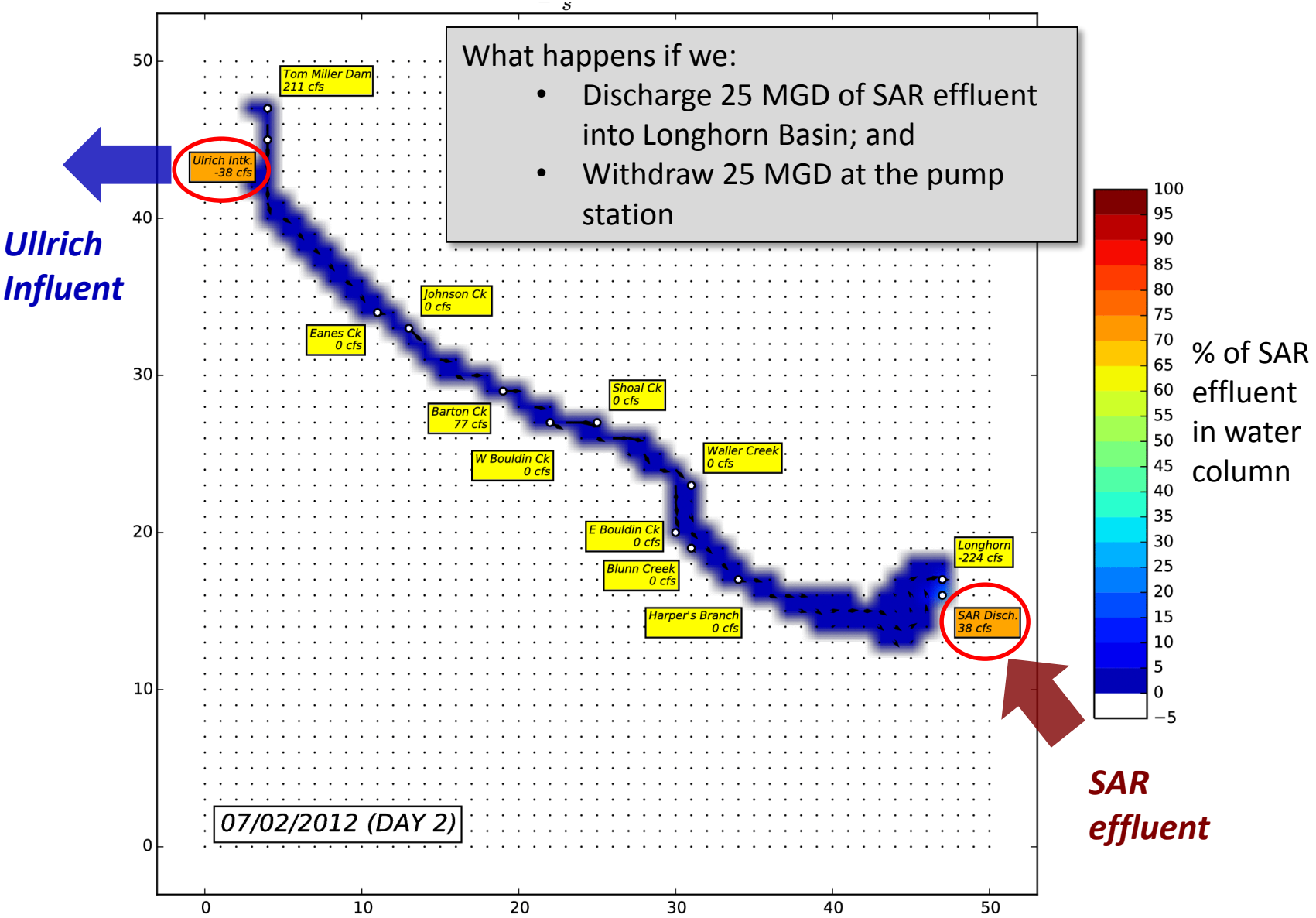
Project components

- Project specific treatment improvements at **SAR WWTP** to produce up to 25 MGD at peak production of enhanced-treated reclaimed project water.
- Implement **proposed reclaimed water line** in the Reclaimed Water Master Plan to convey water from SAR to Lady Bird Lake.
- FEA 2
  - Construct a **reclaimed water outfall** at Lady Bird Lake near **Longhorn Dam**;
  - Construct **pump station** to convey raw water near Tom Miller Dam to Ullrich WTP.

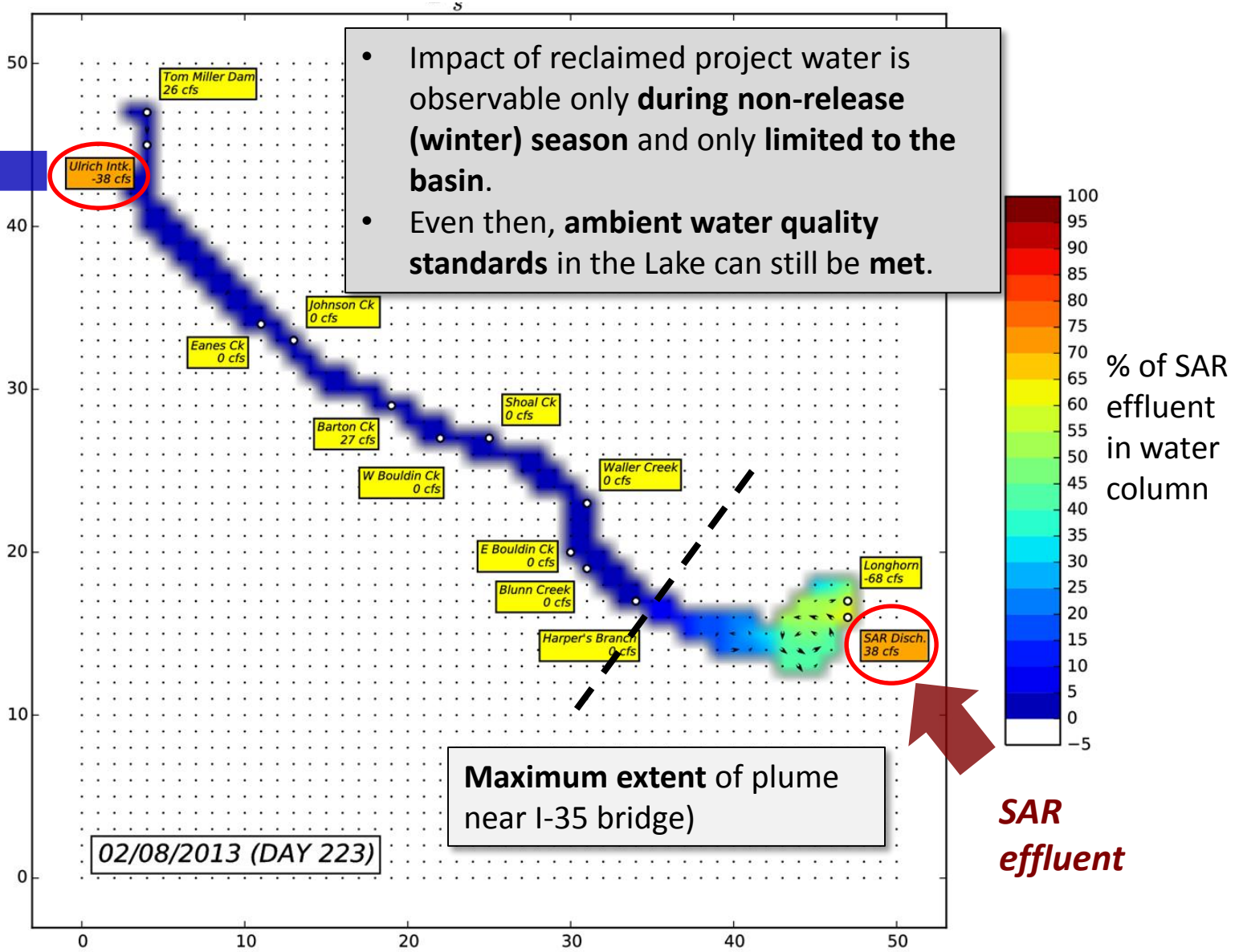
FEA 2: Water Quality Simulation of LBL



FEA 2: Water Quality Simulation of LBL



FEA 2: Water Quality Simulation of LBL



- Impact of reclaimed project water is observable only **during non-release (winter) season** and only **limited to the basin**.
- Even then, **ambient water quality standards** in the Lake can still be **met**.

Ullrich Influent

% of SAR effluent in water column

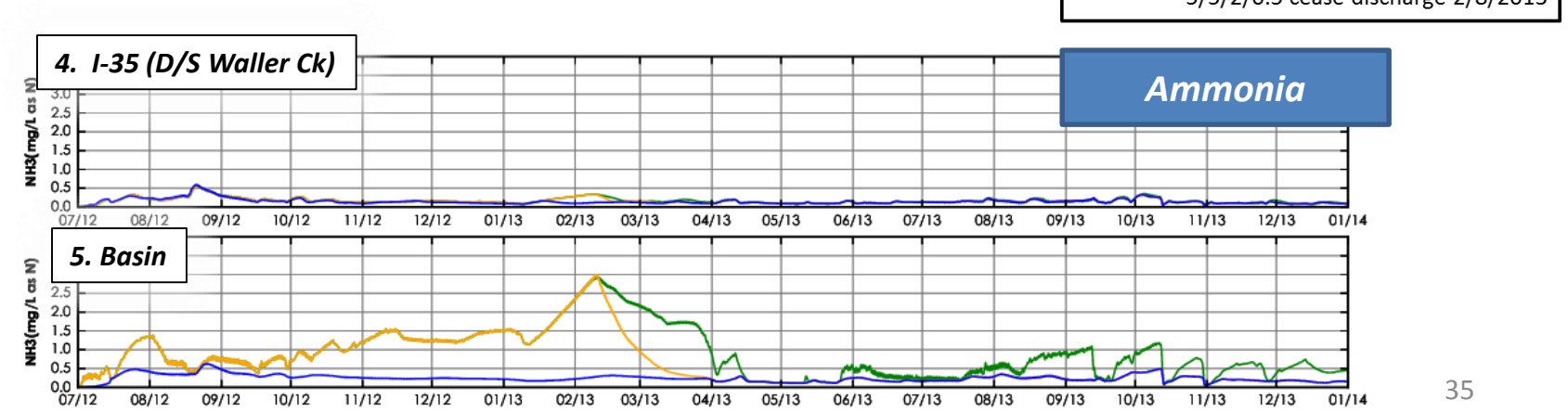
Maximum extent of plume near I-35 bridge)

SAR effluent

FEA 2: Points of consideration (Part I)

Lady Bird Lake Water Quality Impacts

- Even under **continuous discharge**, impact of the effluent would be **limited to the Longhorn Basin** and only during the **non-release (winter) season**;
- Continuous discharge simulation considered **conservative** because proposed trigger for implementing FEA2 is when the **combined capacity** of the Lakes Buchanan and Travis **fall below 20%** of their total capacity (i.e. **400,000 acre-feet**). Such a situation had never occurred;
- Application of **FEA2** would likely be **in short periods** to address extreme water supply shortages; and,
- **WQ impacts** of FEA-2 on LBL **likely to be limited**.



FEA 2: Points of consideration (Part 2)

Potential Water Yield: **22,400 ac-ft/yr**

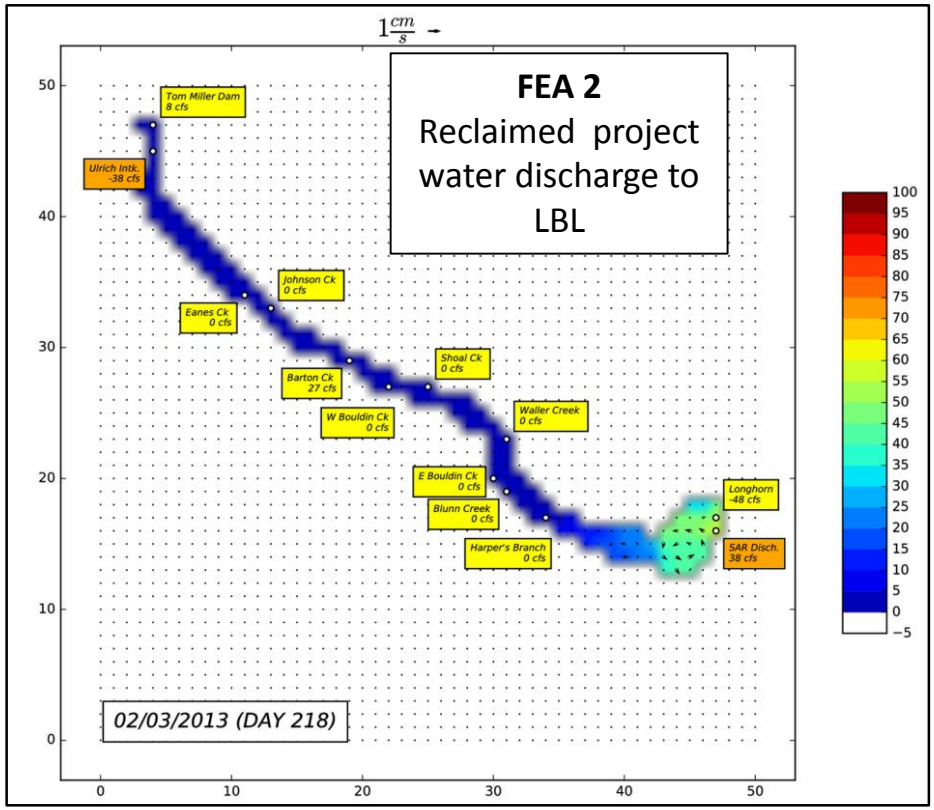
- 2014 Task Force proposed trigger event for implementing FEA2 (i.e. combined storage in Lakes Buchanan and Travis <400,000 ac-ft) expected to be infrequent;
- Therefore, application of **FEA2** would only be in **short periods** to address extreme water supply shortages.

FEA 2: Points of consideration (Part 3)

- Key Regulatory Requirements
  - TCEQ **TPDES** Domestic Wastewater Permit Amendment to discharge highly treated project water into LBL
  - Potential for USACE **404** Permit or Nationwide Permit
- Easement/Land Acquisition Requirements
  - Portions of the **reclaimed water line** from the South Austin Regional WWTP to Lady Bird Lake.
  - **Pump station** downstream of Tom Miller Dam.

FEA 2: Projected Time and Costs

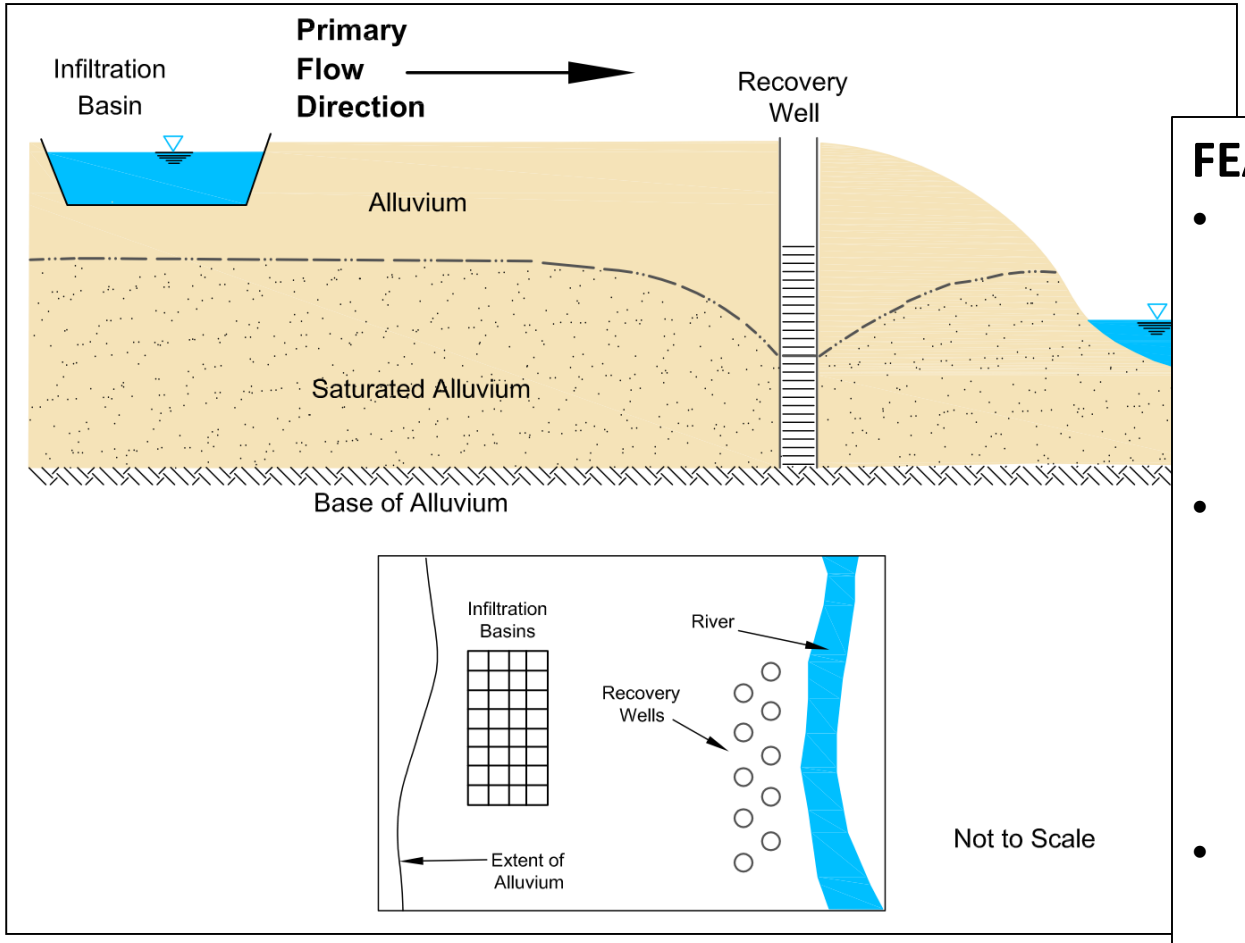
- Development Time
  - **3 years plus**
- Estimated Costs
  - **Development** Cost = **$78,000,000**
  - **Annual** operations, maintenance, and capital cost = **$9,500,000**
  - Cost per **acre foot** = **$425**
  - Cost per **1,000 gallons** = **$1.30**



FEA 2: Risks/Challenges

- Extensive water quality modeling illustrated **minimal short-term changes** during the water supply operation and the changes would be eliminated within about **five weeks after the discharge ceased**.
- **Time required to obtain the TPDES** Domestic Wastewater Permit Amendment could affect implementation during severe drought.
- The ability to quickly implement this project during drought would be improved if the **reclaimed water line from SAR to near Longhorn Dam was in place prior to a severe drought.**

FEA3: Reclaimed Water Infiltration



ALLUVIUM INFILTRATION CONCEPTUAL DIAGRAM

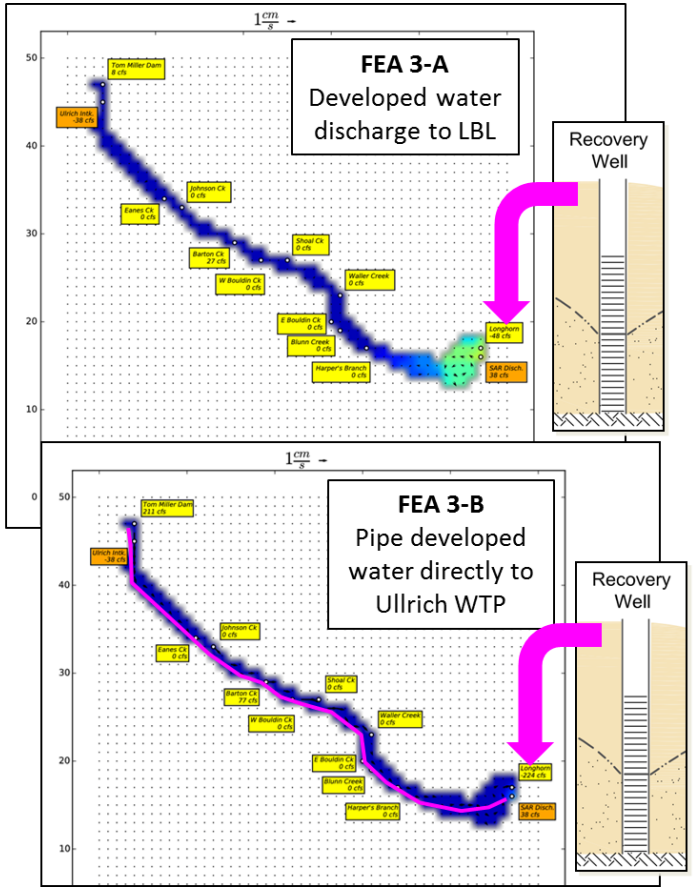
LBG-GUYTON ASSOCIATES

FEA 3 Purpose

- Convey **enhanced-treated reclaimed project water** from **SAR** to an **infiltration basin** within the Colorado River alluvium.
- After a minimum six month retention time, **recovery wells and pump station** would capture and transmit the **project water** to Lady Bird Lake.
- **A pump station** downstream of Tom Miller dam would convey the water to the **Ullrich** Water Treatment Plant.

FEA3: Project Components

- **Project specific treatment improvements** at the **SAR WWTP** to produce up to **25 MGD** at peak production of enhanced-treated reclaimed project water;
- **Construct reclaimed water transmission line** Colorado River crossing to convey water **to an infiltration basin** in the Colorado River alluvium;
- **Construct infiltration basin and recovery wells** to infiltrate and withdraw the water when needed;
- **Upsize proposed water line** in the Reclaimed Water Master Plan to convey developed water to **Lady Bird Lake**;



- FEA 3-A: **Discharge** developed water **into LBL**
  - **Construct outfall** at Lady Bird Lake near Longhorn Dam (similar to FEA 2);
  - **Construct pump station** to convey raw water near Tom Miller Dam to Ullrich WTP
- FEA 3-B: **Pipe** developed water to **Ullrich WTP**
  - **Place 48" diameter pipeline** on the lake bottom for a length of about 6.2 miles

FEA3: Anticipated increase in water supply

Potential Water Yield: 11,000 ac-ft/yr

- **Water quality modeling** would be **needed to assess potential impacts** of FEA 3-A as this study **did not define** the water quality **treatment benefits** of **groundwater infiltration**.
- However, it is anticipated that the developed water produced by this option would be of **higher water quality**, thus, potential water quality **impacts to LBL** would be **less than FEA 2**.
- FEA 3-A and FEA 3-B have potential to be applied on a **longer term basis** than in **FEA 2.**

FEA 3: Points of consideration (Part 1)

- Key Regulatory Requirements
  - **Groundwater infiltration permit**
  - TCEQ **TPDES** Domestic Wastewater Permit Amendment to discharge developed water into Lady Bird Lake.
  - Potential for USACE **404** Permit or Nationwide Permit
  - From a regulatory perspective, the **infiltration basins** are **not considered injection wells** by TCEQ. Similar infiltration basins to those contemplated in this conceptual design are operated by El Paso Water Utilities. Permitting these basins required an **amendment to the wastewater discharge permit** to allow discharge into the basin.

FEA 3: Points of consideration (Part 2)

- Key Regulatory Requirements (continued)
  - There is **no groundwater conservation district** in this region, thus, no permitting is required in this aspect.
  - The recovery wells would need to be permitted as **public water supply wells** by **TCEQ.** The horizontal well, also being considered in this study, is a novel design in Texas, so an exception to certain rules based on conventional vertical well assumptions may be required. Exception requests are usually granted by TCEQ, provided sanitary design and construction procedures are followed.

FEA 3: Points of consideration (Part 3)

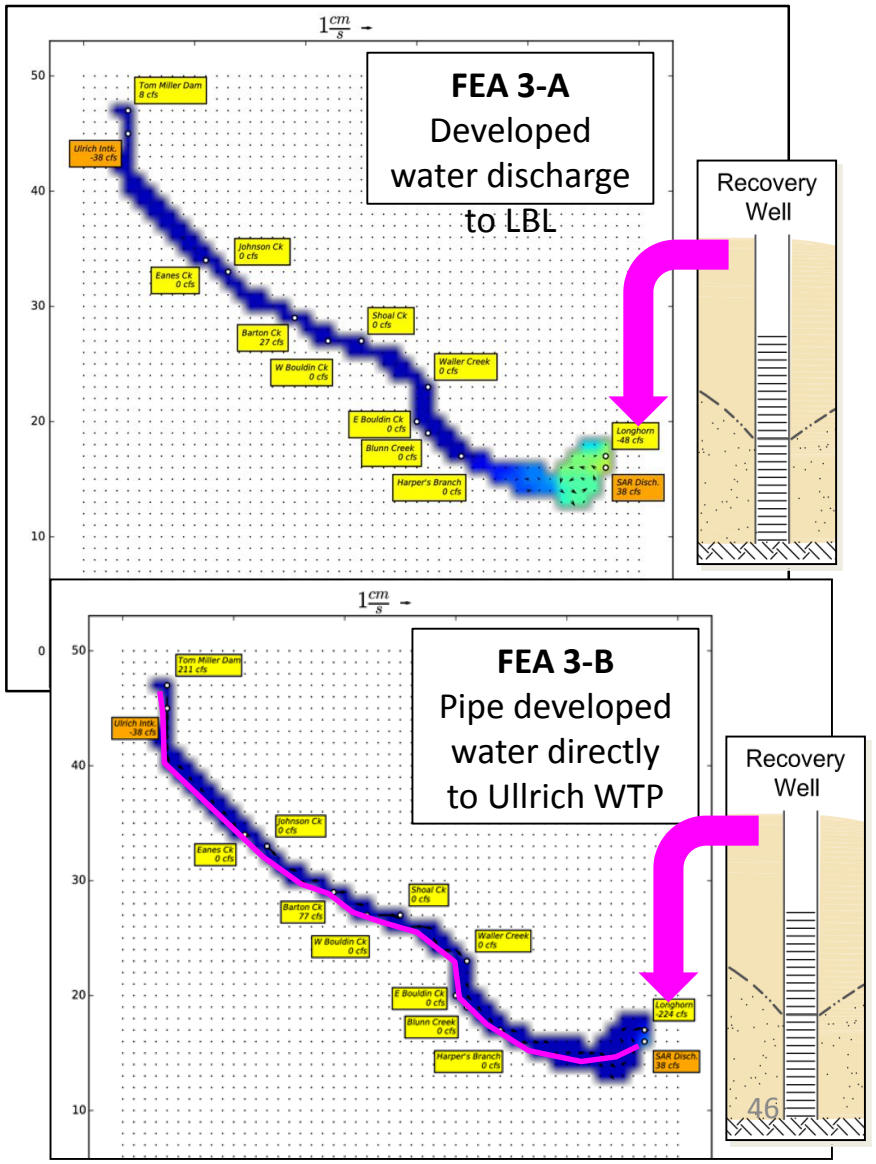
- Easement/Land Acquisition Requirements
  - **Transmission line** from SAR to the infiltration basin.
  - **Infiltration basin** and **recovery well field**.
  - Portions of the **reclaimed water line** from the South Austin WWTP to Lady Bird Lake.
  - **Pump station** downstream of Tom Miller Dam.

FEA 3: Projected Time and Costs

- Development Time
  - Alternative 3-A – **4+ years**
  - Alternative 3-B – **4+ years**
- Estimated Costs

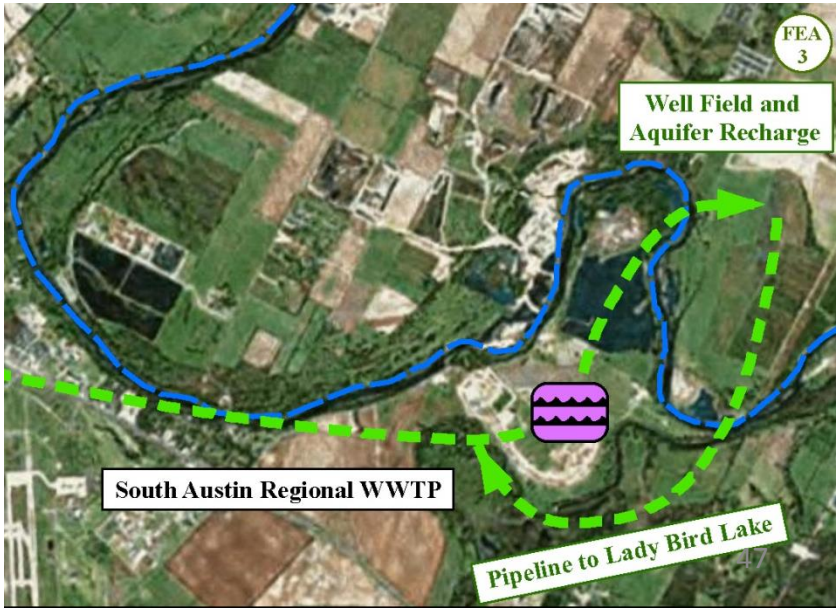
  Alternative **3-A**
  - **Development** Cost = **$150,000,000**
  - **Annual** operations, maintenance, and capital cost = **$15,400,000**
  - Cost per **acre foot** = **$1,400**
  - Cost per **1,000 gallons** = **$4.30**

  Alternative **3-B**
  - **Development** Cost = **$175,000,000**
  - **Annual** operations, maintenance, and capital cost = **$17,000,000**
  - Cost per **acre foot** = **$1,550**
  - Cost per **1,000 gallons** = **$4.75**

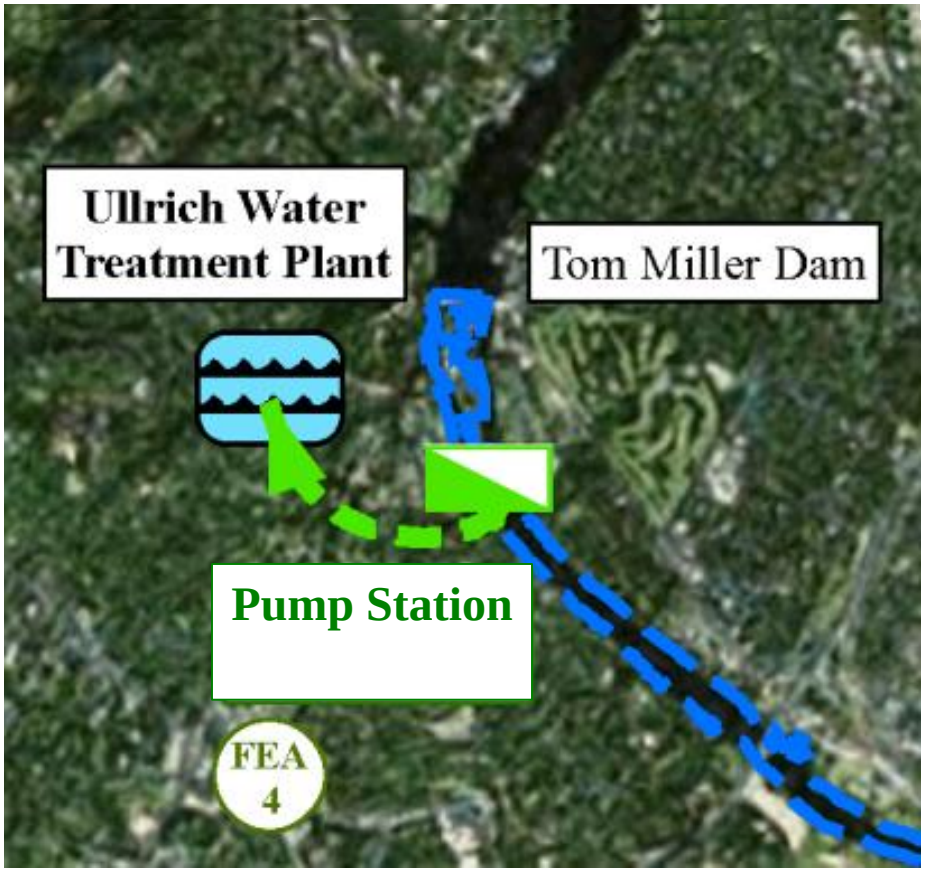


FEA 3: Risks/Challenges

- FEA 3-A: Extensive water quality modeling **in FEA 2** illustrated **minimal short-term changes** during the water supply operation and the changes would be eliminated within five weeks after the discharge ceased. Furthermore infiltration and recovery has potential to **develop water of higher water quality than FEA 2, thus FEA 3** is likely to have **less water quality impacts** on **LBL.**
- Time to obtain the **TPDES** Domestic Wastewater Permit Amendment could **affect implementation** during severe drought.
- The ability to quickly implement this project during drought would be improved if the **reclaimed water line is already in place**.
- Time to **obtain permits** and **construct** the infiltration basin and recovery well system could make this option **difficult to rapidly implement during a drought**.



FEA4: Capture Lady Bird Lake Inflows



Project component:

- Construct a **pump station** on the **west bank** of Lady Bird Lake between **Red Bud Trail** and **Tom Miller Dam** to convey water to the existing raw water line from **Lake Austin** to **Ullrich Water** Treatment Plant.

FEA 4: Points of consideration

- Key Regulatory Requirements
  - Address adding **Lady Bird Lake** as a **water source** for the Ullrich Water Treatment Plant.
- Easement/Land Acquisition Requirements
  - **Pump station** downstream of Tom Miller Dam.

Water Supply Options Summary

Water Supply Option	Approximate Water Supply Volume (acre-feet/year)	Estimated Total Development Cost ($)	Cost per Acre-foot ($)	Estimated Annual Cost ($)	Regulatory Require-ments	Easement/ Land Acquisition	Time to Develop (years)
FEA 1 – Enhanced off-system storage at Walter E. Long Lake	16,000	$60 M	$500	$8.0M	Moderate	Minimal	3+
FEA 2 – Indirect potable reuse water transmission from SAR to Lady Bird Lake and the Ullrich WTP	22,400	$78 M	$425	$9.5M	Significant	Moderate	3+
FEA 3-A – Reclaimed water transmission from SAR to an infiltration basin and subsequent conveyance to Lady Bird Lake and the Ullrich WTP	11,000	$150 M	$1,400	$15.4M	Significant	Significant	4+
FEA 3-B – Reclaimed water transmission from SAR to an infiltration basin and subsequent conveyance to the Ullrich WTP	11,000	$175 M	$1,550	$17M	Moderate	Significant	4+
FEA 4 – Capture of Lady Bird Lake inflows and transmission to the Ullrich WTP	TBD	TBD	TBD	TBD	Minimal	Moderate	TBD

1. Estimated annual costs include annual operations and maintenance cost and capital recovery cost.
2. Project costs include the reclaimed water lines as part of the Reclaimed Water Master Plan . This includes the reclaimed water line from the Walnut Creek WWTP to Lake Long and the line from SAR to Lady Bird Lake. Project costs do not include Austin Energy delivering power to the various project components in each option.
3. Estimated cost per acre-foot is amortized over a 30-year period and includes operation and maintenance costs.

Wrap Up and Next Steps

- FEA Consultant to complete studies and prepare final report

- FEA results to be incorporated into IWRP options screening process

Questions

Austin WATER