Drought Contingency Project Helps Two Cities Maintain Water Supply

Aaron D. Archer, P.E., *HDR*

Shay Roalson, P.E., *HDR*

Kenneth Wheeler, P.E., *City of Cedar Park*

Wayne Watts, P.E., *City of Leander*

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City of Leander

HDR

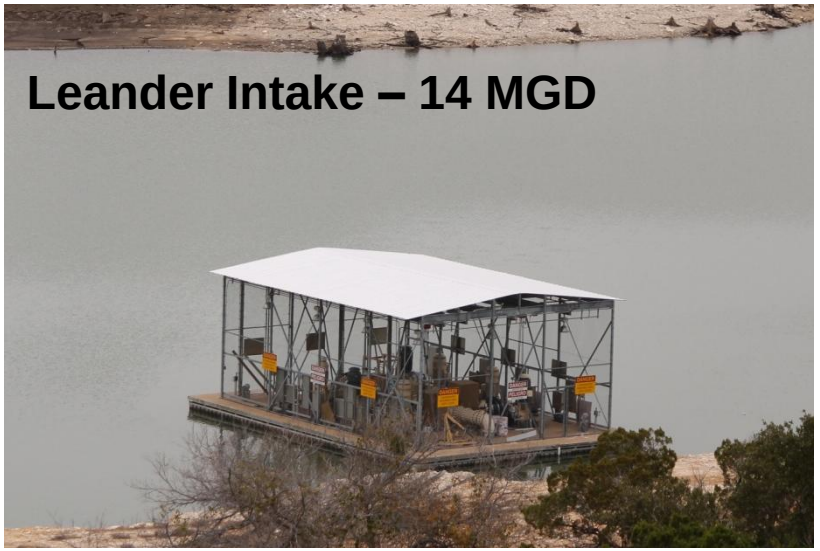
Synopsis

- Background
  - Cedar Park and Leander WTPs
  - Lake Travis
- Design (Phase A & B)
- Schedule
- Financing
- Conclusions

Lake Travis, Austin, Texas (PHOTO BY CHASE A. FOUNTAIN/TEXAS PARKS AND WILDLIFE)
http://www.flickr.com/photos/texasparkswildlife/with/6195917758/

The Setting

- Cedar Park and Leander operate floating raw water intakes on Sandy Creek arm of Lake Travis
- The intakes are steel structures with polyethylene floats, deck, superstructure, vertical turbine pumps, and discharge hoses
- Combined firm capacity = 40 MGD
- Operation likely to begin to become impaired when water depth falls below 15 feet (WSE 615 ft-msl)



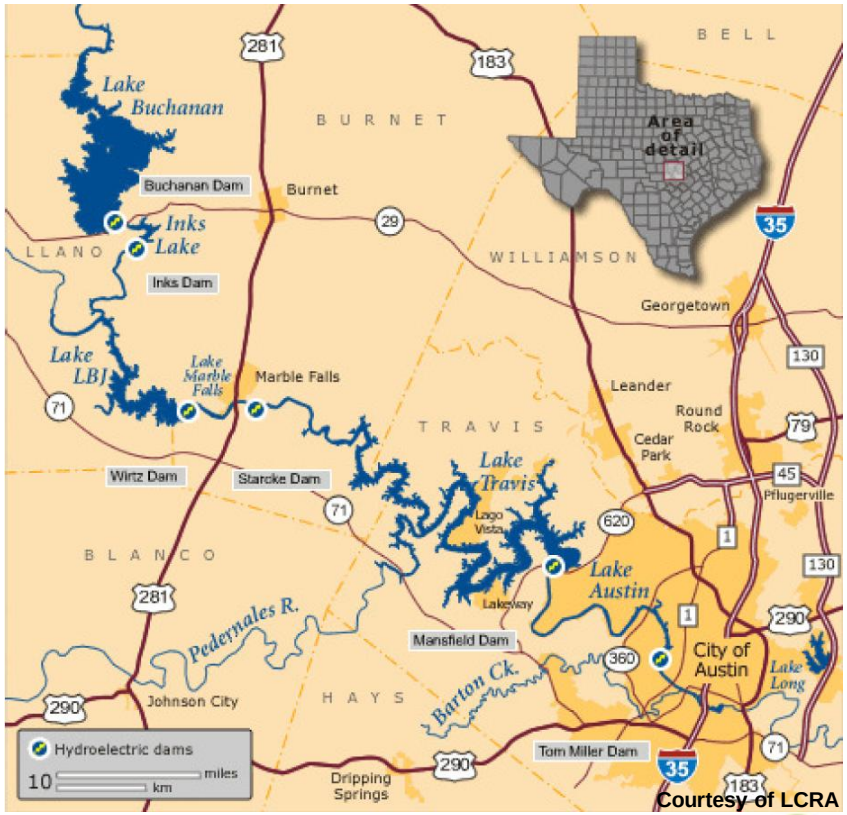
The Setting

~ 675 ft-msl
(6 ft below conservation pool)

~ 629 ft-msl
(52 feet below conservation pool)

Lake Travis

- Mansfield Dam completed in 1941
- Lake Travis is the only Highland Lake specifically designed to contain floodwater
- Volume when full = 1.14 MAF
- Lakes Buchanan and Travis are the region's water supply reservoirs (2.01 MAF)

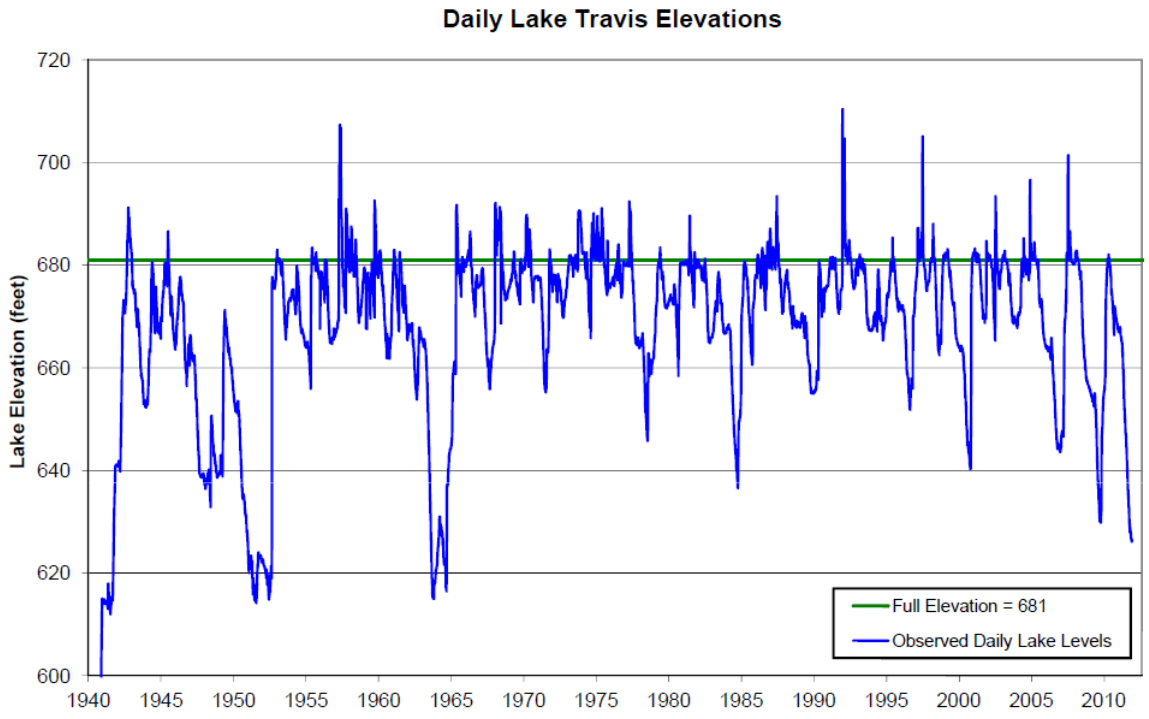


Courtesy of LCRA

Lake Travis Water Management Plan

- LCRA operates the Highland Lakes in accordance with the TCEQ approved Water Management Plan (WMP)
- Key elements of the WMP:
  - Views Lakes Travis and Buchanan as a single water system
  - Determines the amount of firm and interruptible supply
  - Establishes Drought Management and Contingency Plans to define criteria for curtailment

Historical Lake Travis Water Level



All-time Low Lake Levels

Year	Lake Level (ft-msl)
1951	614.2
1963	615.0
2011	626.1
2009	629.8
1984	636.6
2000	640.2
2006	643.6

All-time Low Monthly Inflows

Month	Inflow (ac-ft)
1952 - Aug	210
1964 - July	347
2011 - Aug	403
2011 - July	734
2011 - Sept	922
2011- Jun	1,341
1954 - Aug	1,592

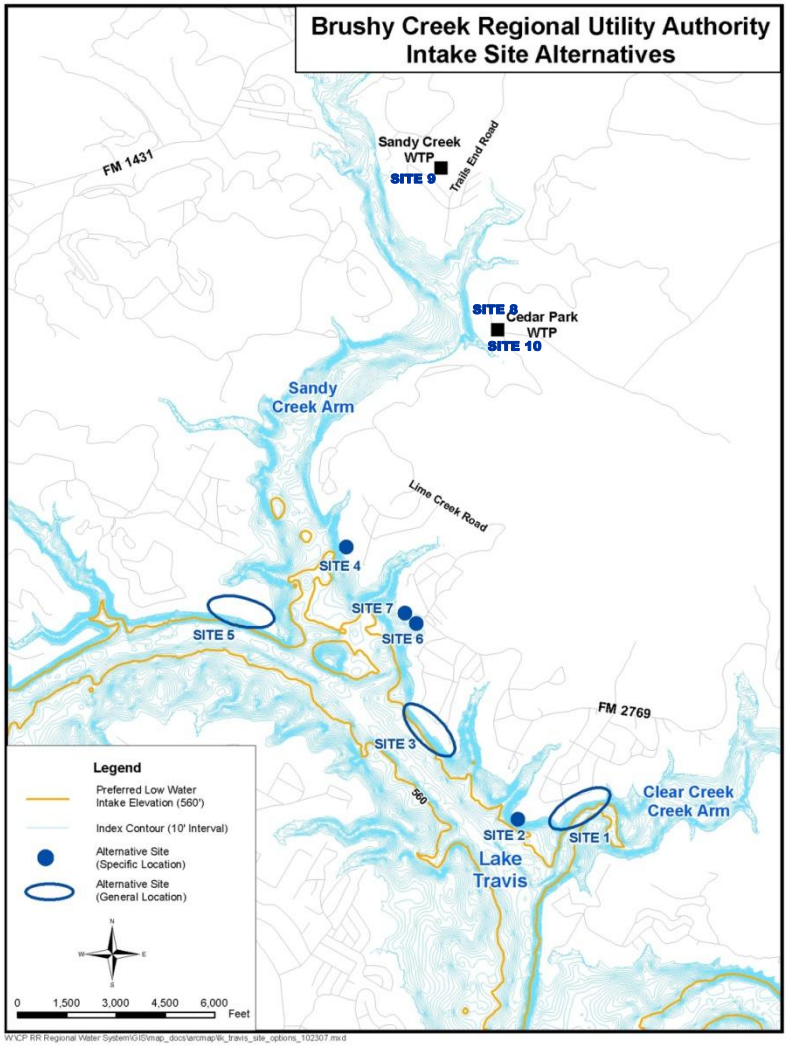
Level on January 24, 2012: 626.1 ft-msl (37% capacity)

LCRA Response: Drought Relief Plan

- TCEQ approved a LCRA petition to deviate from the WMP
- Prevents irrigation releases if combined storage is below 850,000 acre-feet on March 1, 2012
- Reduced release will be available for the first crop if combined storage is above 850,000 acre-feet on March 1
  - Releases only for first crop (second crop release subject to Board approval)
  - Releases would not begin till April 1 and not exceed 125,000 acre-feet
- Current combined storage is approximately 738,000 acre-feet

Long-term Solution

- Preliminary planning for a deep water intake started in 1998
- Brushy Creek Regional Utility Authority (BCRUA) – a regional partnership of the cities of Cedar Park, Round Rock, and Leander – created in 2006
- Phase 1 (floating intake, raw water transmission line, WTP) will be completed Spring 2012
- Phase 2 consists of a deep water intake to serve the BCRUA, Cedar Park, and Leander WTPs
- The deep water intake will secure access to a lakebed depth lower than the lowest level predicted by the LCRA WMP
- Due diligence is underway to finalize selection of a site for the deep water intake



Interim Solution

- Drought contingency plan needed
- Two-fold objective: reduce demand and maintain uninterrupted supply

Demand reduction:

- *Quantitative conservation goals*
- *Inclined water use rate structure*
- *Leak detection/repair program*
- *Record management system*
- *Rebate/incentives program*
- *Water reuse program*
- *4-stage drought response plan*
- *Education and public outreach*
- *Ad campaign*
- *Water conservation coordinator*
- *Best management practices*

Uninterrupted water supply:

- *Modify existing barges to operate at lowest possible lake level*
- *Develop plan for a contingency raw water pump station and transmission pipeline*
- *Cedar Park and Leander partnership*

CEDAR PARK

City of Leander

Implementation Considerations

- Easement acquisition
- Public perception
- Safety
- Cost and cost-sharing
- Technical:
  - Pump station location
  - Pipeline alignment
  - Capacity
  - Maintaining operation of existing intakes during construction and startup

Location

- Principal drivers: depth and availability of power supply
- Lakebed bathymetry shows 20 ft additional depth gained moving 1 mile downstream.
- Additional 2 miles downstream (main lake body) for considerable depth gains (20+ ft)
- 3-phase power required for the selected raw water pumps
- Only one location on this arm of Lake Travis with existing three phase power – the same location as added 20 ft depth

Capacity

- Capacity should be selected with consideration of the demand it is likely to serve
- Implementation is made necessary by prolonged drought conditions so some level of demand management is anticipated
- LCRA cannot invoke mandatory curtailment of firm water demand unless a drought event is worse than the drought of record
- Nevertheless, the cities will have implemented mandatory drought response measures before it becomes necessary to pump from the contingency intake
- Studies on water use restrictions suggest a 20% demand reduction should be achievable
- Design pump station capacity = 30 MGD (Ultimate = 40 MGD)

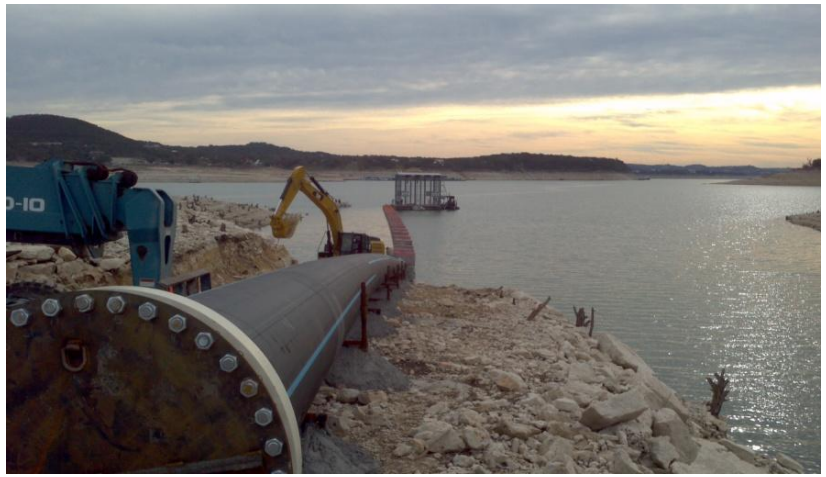
Regulatory Approval

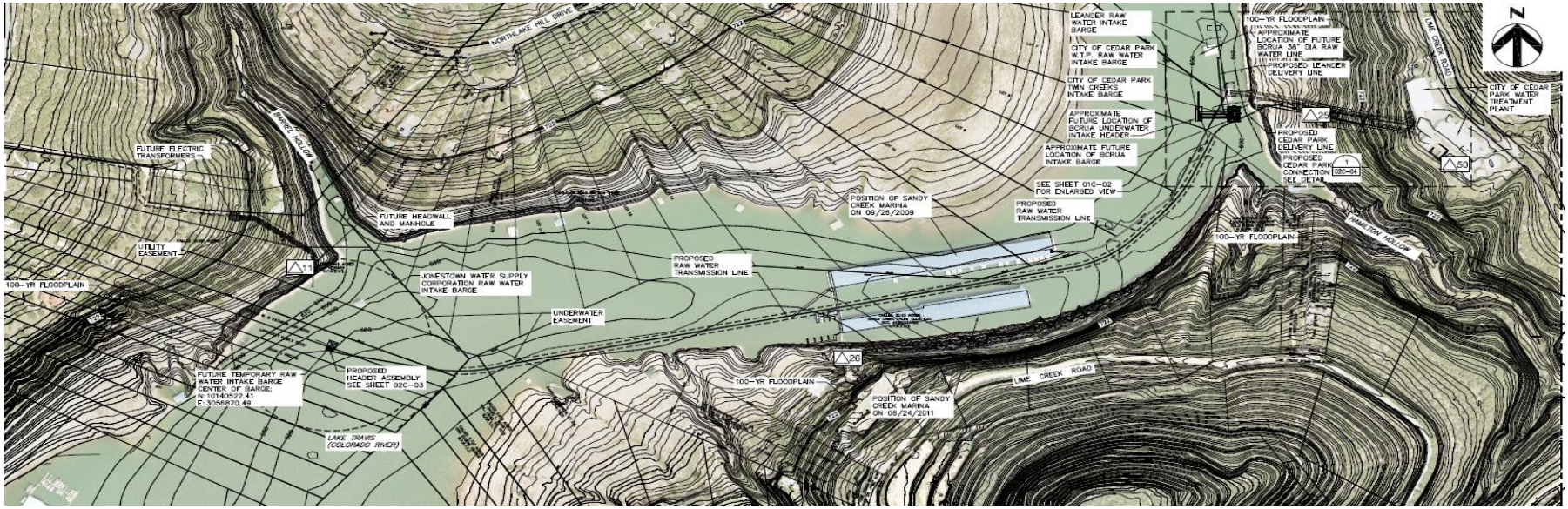
- Approvals required from the following:
  - ✓ LCRA
  - ✓ TCEQ
  - ✓ USACE
  - ✓ JWSC
  - ✓ COJ
- Performed habitat and archeological evaluations
- Notified agencies at the earliest possible date
- Met frequently and established clear lines of communication to ascertain major areas concern (e.g., navigational impacts)

Phase A Design

Phase A – Underwater Pipeline:

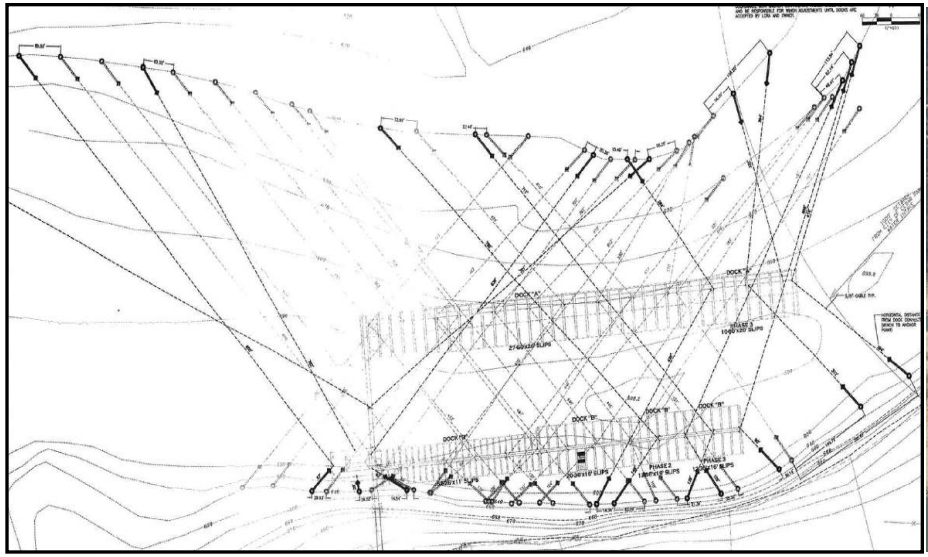
- Underwater steel header assembly
- Submarine transmission pipeline: 4,200 42-IN HDPE (DR 11)
- Concrete pipeline ballasts
- Initial delivery connections





Phase A Challenges

1. Header thrust restraint
2. Fusion joint integrity testing
3. Sandy Creek Marina
4. Submerged cliff transition



Phase B Design

Phase B– Floating Raw Water Intake:

- Produced in 4 Design Packages
- DP1: Modular barge, pumps and barge appurtenances
- DP2: Shoreside electrical
- DP3: Instrumentation and control
- DP4: Delivery connections

Phase B Challenges

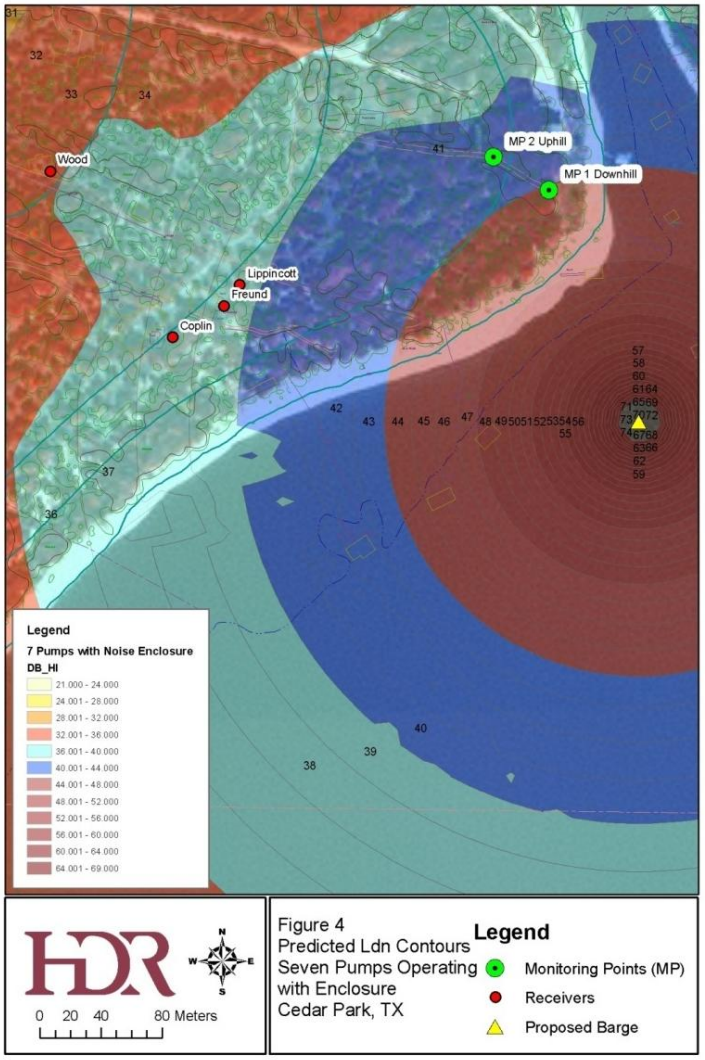
1. Owner/Contractor Agreement
   - Phase B done in accordance with Chapters 252.021 and 252.022 of Texas Local Government Code with an exemption to the competitive bidding requirements due to a procurement necessary to preserve or protect the public health
   - Contact price based on preliminary schedule of values determined by HDR and Contractor
   - Open book policy
   - Competitive pricing obtained for major purchases and subcontracts and submitted for review/approval
   - Contractor's fee set (payroll, material/equipment, subcontracts)

Phase B Challenges

2. Control strategy
   - Delivering water to two WTPs at different hydraulic gradelines
   - Cannot overflow the raw water tanks at either WTP
   - Operate system by a pressure set point at higher elevation Leander WTP
   - Influent level control valve at Leander WTP to prevent raw water tank overflows
   - PRV/PSV at Cedar Park

Phase B Challenges

3. Public perception
   - Noise emissions
   - Title encumbrance
   - Limited boat dock and water use due to restricted zone radius
   - Permanent placement



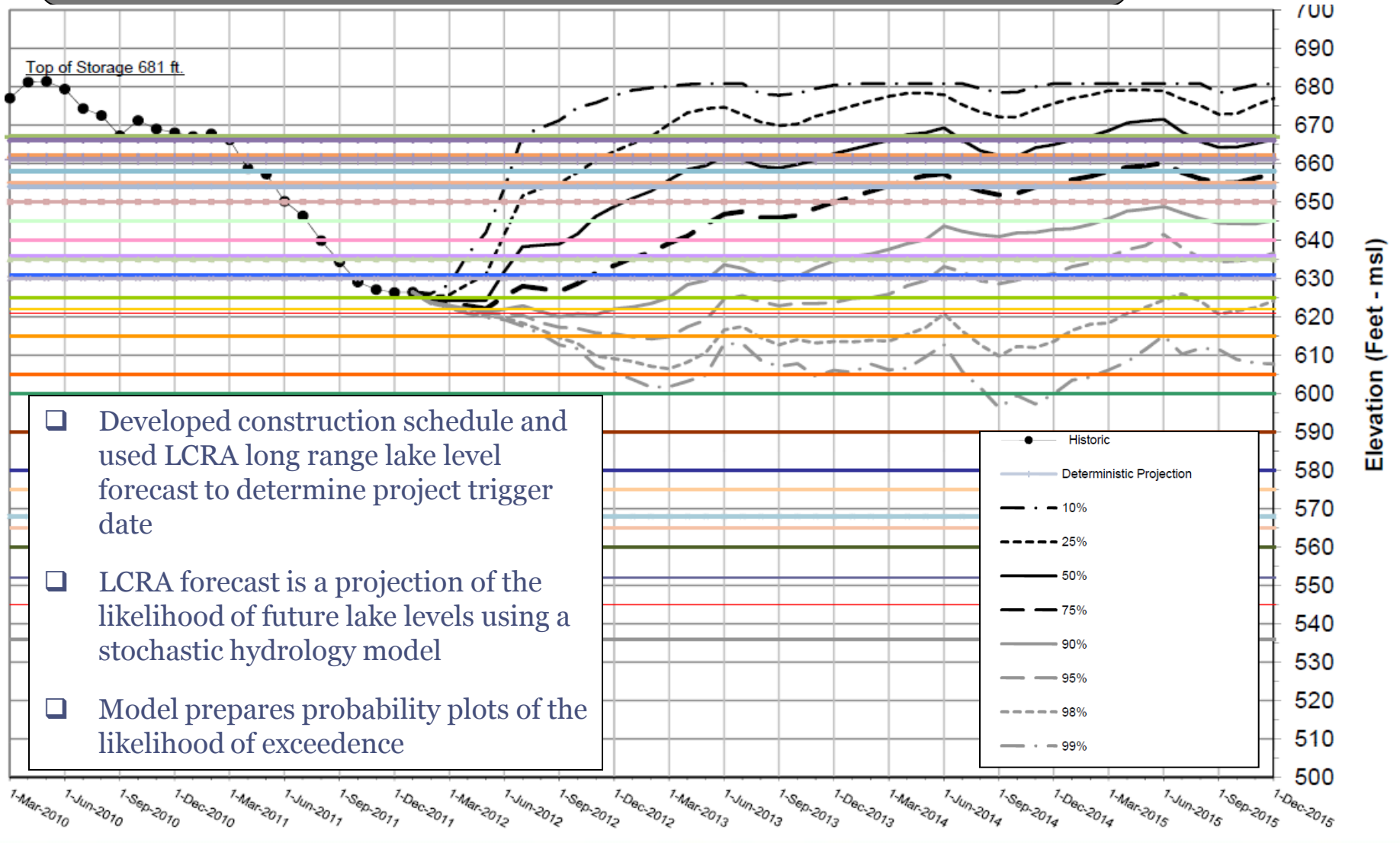
Phase B Challenges

4. Pump procurement
   - Solicited quotations via the contractor from Godwin and Pioneer
   - Bid included lease and outright purchase options
   - Lease bid based on initial 3 month period with buyout option or new rental rate after 3 months
   - Negotiated percent of monthly lease rate to be applied to subsequent purchase after 3 months
   - Negotiated cancellation fee schedule

godwin
a xylem brand

PIONEER PUMP
PERFORMANCE THROUGH INNOVATION™

Timing and Schedule



- Developed construction schedule and used LCRA long range lake level forecast to determine project trigger date
- LCRA forecast is a projection of the likelihood of future lake levels using a stochastic hydrology model
- Model prepares probability plots of the likelihood of exceedence

Timing and Schedule

- Current drought tracked the worst-case line so used this curve to establish the trigger date
- Substantial Completion: Phase A – April 16

  Phase B – Dynamic (presently July 1)
- Deferred Phase B rental components
- Monthly hold and place charge negotiated with Godwin to extend cancellation fee schedule and secure equipment for allocation to the project
- Constructing all permanent underground infrastructure components

Financing

- Interlocal cost share agreement
- Cost allocation was based upon the pro-rata share of the design capacity
- Cedar Park managed administration of the project
- Funds contributed to a construction fund administered by Cedar Park
- System operated and maintained by Cedar Park upon completion
- O&M costs paid in accordance with pro-rata share

Summary Remarks

- Plan for the worst
- Design content must be complete but don't go beyond what is required
- Communication and cross-discipline coordination must be automatic
- In a case where competitive bidding is bypassed:
  - Pick the right contractor
  - Insure competition on major work items
  - Promote collaboration between designer and constructor
- Involve high-level decision makers early and often

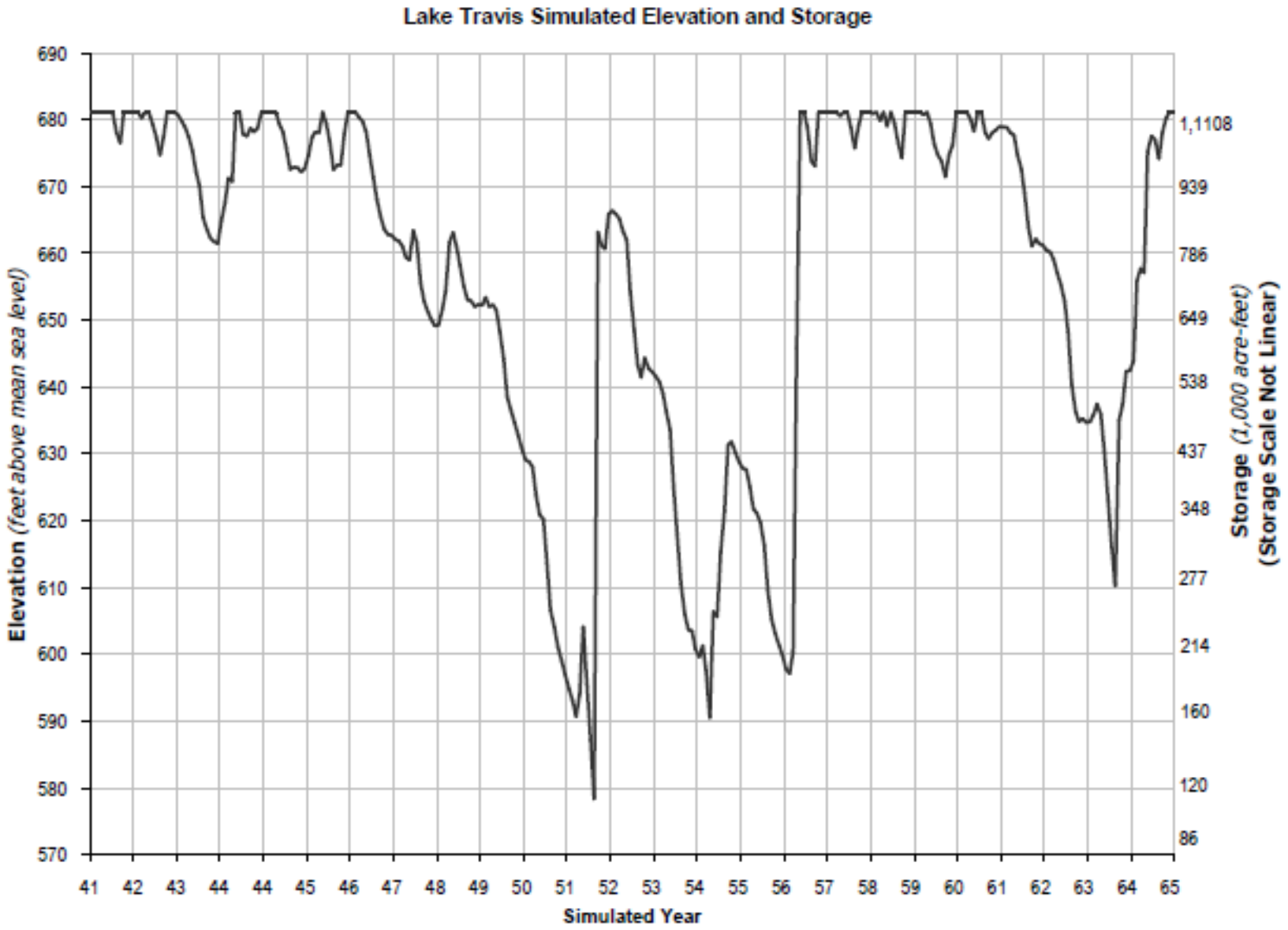
Questions?

Aaron Archer, P.E.
HDR Engineering
aaron.archer@hdrinc.com

Extra Slides…

Project Costs

- Phase A – Underwater Pipeline: 3.6 MUSD
- Phase B – Floating Pump Station:
  - 3.0 MUSD (3 month rental)
  - 3.6 MUSD (6 month rental)


Lake Travis Simulated Elevation and Storage
Elevation (feet above mean sea level)
690
680
670
660
650
640
630
620
610
600
590
580
570
Storage (1,000 acre-feet)
(Storage Scale Not Linear)
1,1108
939
786
649
538
437
348
277
214
160
120
86
41 42 43 44 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65
Simulated Year