



*P. O. Box 1948  
Austin, Texas 78767-1948  
Phone: 512-326-8880  
e-mail: lauren@glenrose.com*

June 15, 2014

Chair Sharlene Leurig  
Commission Members  
Austin Water Resource Planning Task Force  
Via email: sleurig@gmail.com

**Subject: DRAFT: Estimate of Austin's Water Needs**

Dear Chair Leurig and Fellow Commissioners:

As requested by our group, I have used Austin's historical water utility use data, industry standards for indoor water conservation, and an analysis of modeled landscape water demands to generate a model for predicting disaggregated water needs for the City of Austin.

The model is based on a simple assumption regarding water demands per person, assuming efficient residential plumbing and appliances, elimination of all of the losses reported by the utility as avoidable, and very low, but continuing supplemental water for Austin's residential, multifamily, commercial and civic landscapes. The model assumes no changes in the water demand by Austin's six largest customers.

The model suggests that with aggressive but reasonable assumptions for indoor and outdoor water conservation, Austin's sustainable water demand could be 117,000 acre-feet per year to meet the needs of the current population. This compares to the Fiscal Year 2013 demand of 128,000 acre-feet and to the Fiscal Year 2011 demand of 149,000 acre-feet.

The spreadsheet model is flexible. Alternative predictions can be generated based on changes in Austin's population, on landscape areas, and on associated water use factors.

These numbers, and all of the numbers in the tables and figures below are draft, pending completion of quality assurance/quality control checks.

This letter is not my write-up. It is a presentation of the results. I appreciate any feedback you have for me. I will submit the write-up before the meeting tomorrow.

---

***DRAFT: SUBJECT TO CHANGE AND FOR INTERNAL REVIEW ONLY***

*Glenrose Engineering, Inc.  
Texas Board of Professional Engineers Number F4092*

*glenrose.com*

Sincerely,



Lauren Ross, Ph.D, P.E.

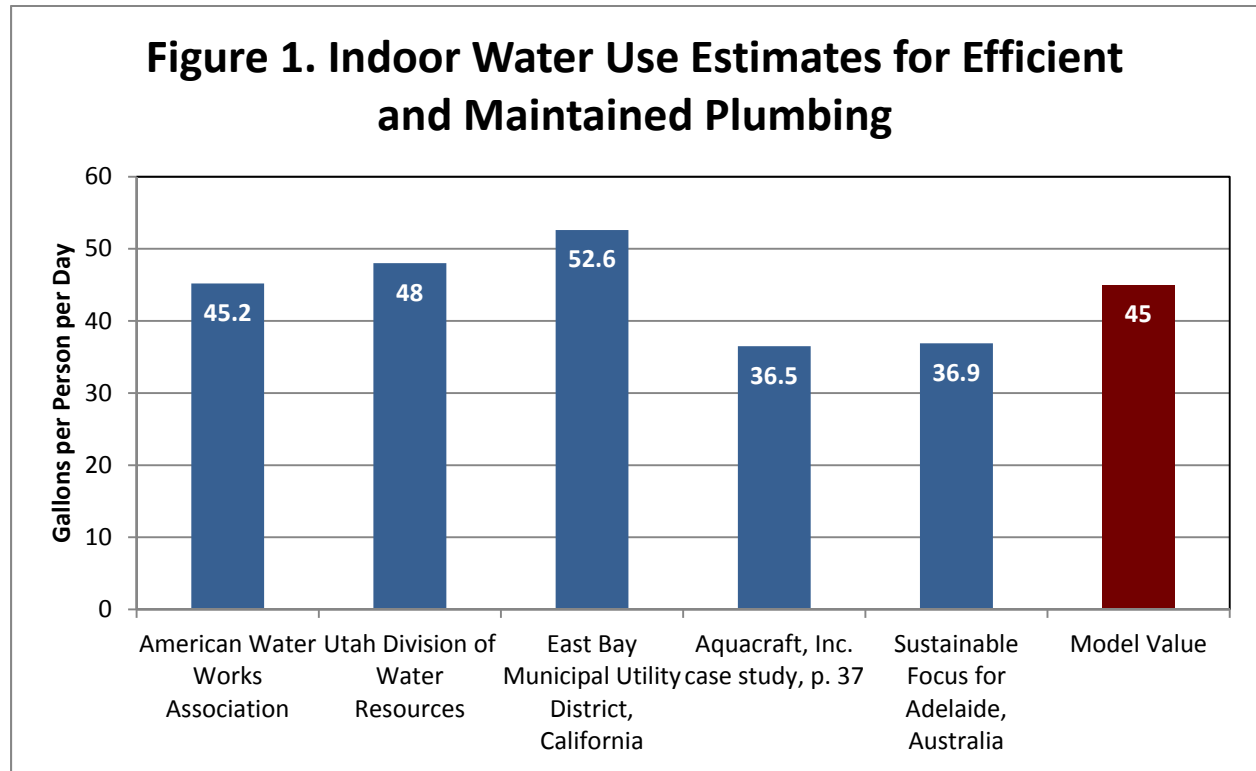
President

Glenrose Engineering

| <b>Table 1. Areas Within Austin Water Utility Service Area</b> |                                  |                                  |
|--|----------------------------------|----------------------------------|
| <b>Land Use</b>  | <b>Pervious Area<br/>(acres)</b> | <b>Building Area<br/>(acres)</b> |
| Single-Family  | 49,741                           | 9,689                            |
| Multi-Family   | 6,187                            | 1,980                            |
| Commercial   | 5,289                            | 1,374                            |
| Industrial   | 8,947                            | 1,324                            |
| Civic  | 8,522                            | 998                              |
| Other  | 227,088                          | 1,809                            |
| Total area   | 305,773                          | 17,174                           |

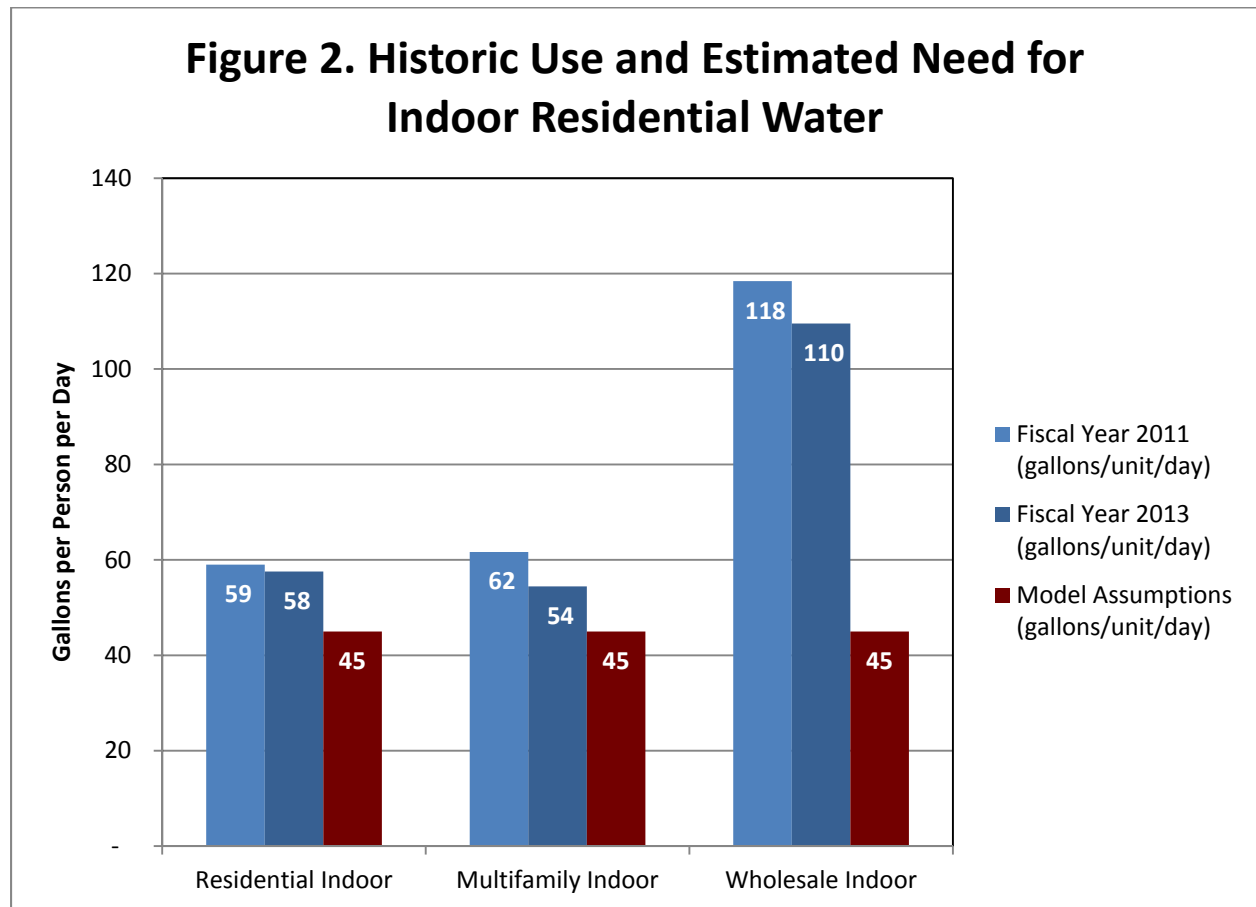
| <b>Table 2. Population Data</b> |                             |                             |                           |
|---------------------------------|-----------------------------|-----------------------------|---------------------------|
| <b>Customer Class</b>           | <b>Fiscal Year<br/>2011</b> | <b>Fiscal Year<br/>2013</b> | <b>Estimated<br/>Need</b> |
| Residential                     | 503,463                     | 536,951                     | 536,951                   |
| Multifamily                     | 336,996                     | 359,412                     | 359,412                   |
| Wholesale                       | 51,538                      | 54,966                      | 54,966                    |

| Table 3. Indoor Water Use Estimates for Efficient Plumbing |   |   |
|--|---|---|
| Estimate (gal/pers on/ day)                                | Source  |   |
| 45.2   | American Water Works Association                | <a href="http://www.drinktap.org/home/water-information/conservation/water-use-statistics.aspx">http://www.drinktap.org/home/water-information/conservation/water-use-statistics.aspx</a>           |
| 48   | Utah Division of Water Resources                | <a href="http://www.conservewater.utah.gov/IndoorUse/SavingsCalc/">http://www.conservewater.utah.gov/IndoorUse/SavingsCalc/</a>   |
| 52.6   | East Bay Municipal Utility District, California | <a href="http://www.ebmud.com/sites/default/files/pdfs/residential_indoor_wc_study_0.pdf">http://www.ebmud.com/sites/default/files/pdfs/residential_indoor_wc_study_0.pdf</a>                       |
| 36.5   | Aquacraft, Inc. case study, p. 37               | <a href="http://www.aquacraft.com/sites/default/files/pub/Indoor%20Water%20Use%20Report%20MASCO.pdf">http://www.aquacraft.com/sites/default/files/pub/Indoor%20Water%20Use%20Report%20MASCO.pdf</a> |
| 36.9   | Sustainable Focus for Adelaide, Australia       | -   |
| <b>43.84</b>   | <b>Average of Above</b>                         |   |
| 45   | Model Value                                     |   |

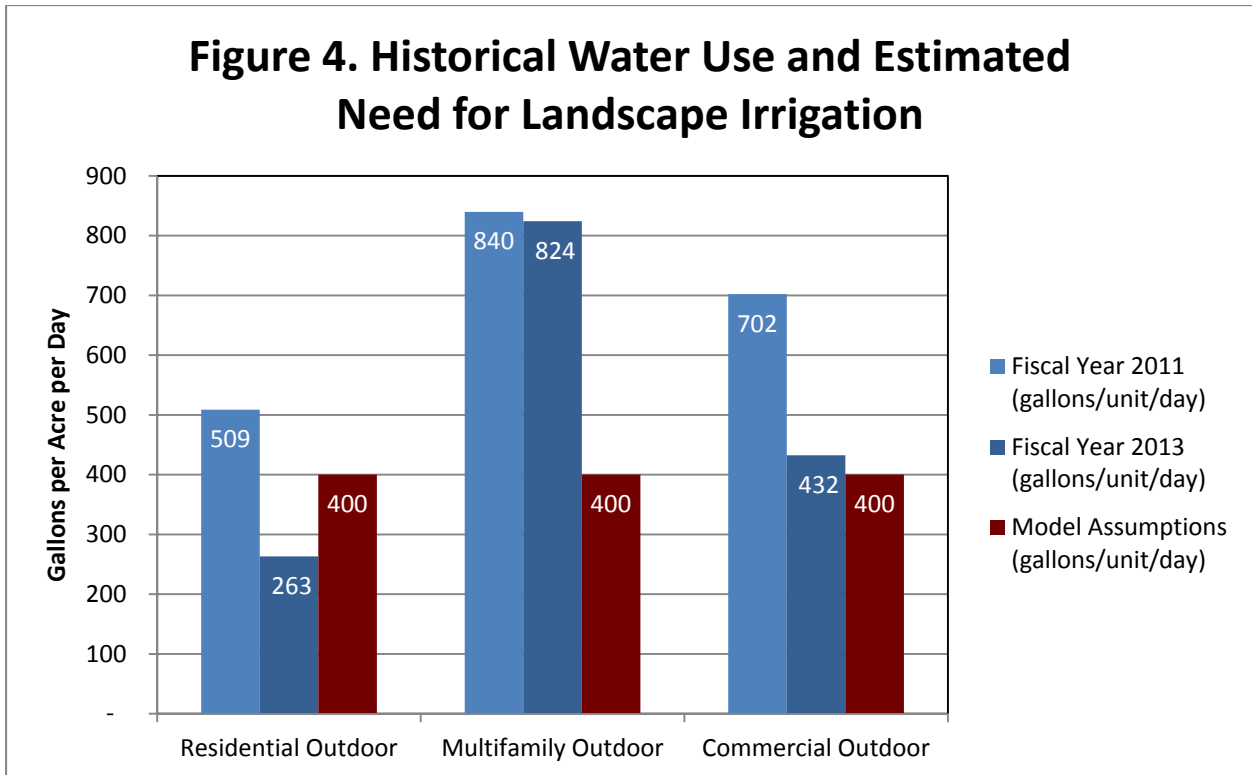
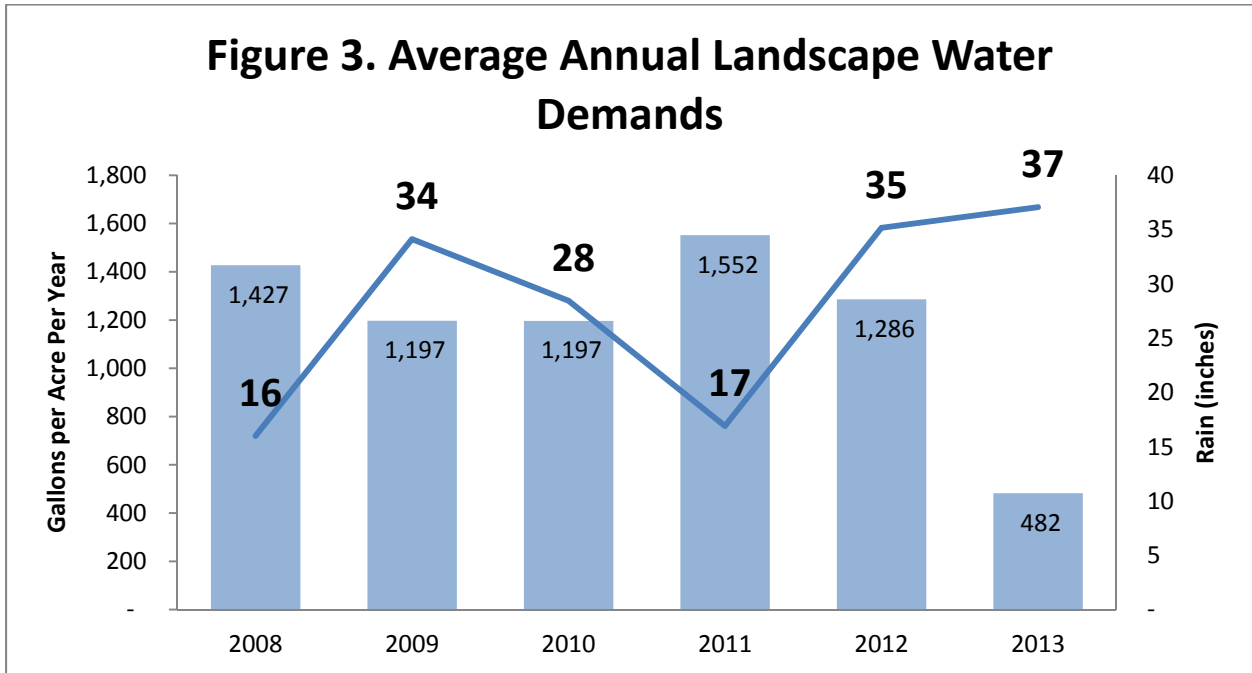


**DRAFT: SUBJECT TO CHANGE AND FOR INTERNAL REVIEW ONLY**

| <b>Class</b>        | <b>Unit</b> | <b>Fiscal Year 2011<br/>(gallons/unit/day)</b> | <b>Fiscal Year 2013<br/>(gallons/unit/day)</b> | <b>Model<br/>Assumptions<br/>(gallons/unit/day)</b> |
|---------------------|-------------|--|--|---|
| Residential Indoor  | person      | 59   | 58   | 45  |
| Residential Outdoor | acre        | 509  | 263  | 400   |
| Multifamily Indoor  | person      | 62   | 54   | 45  |
| Multifamily Outdoor | acre        | 840  | 824  | 400   |
| Wholesale Indoor    | person      | 118  | 110  | 45  |
| Commercial Outdoor  | acre        | 702  | 432  | 400   |



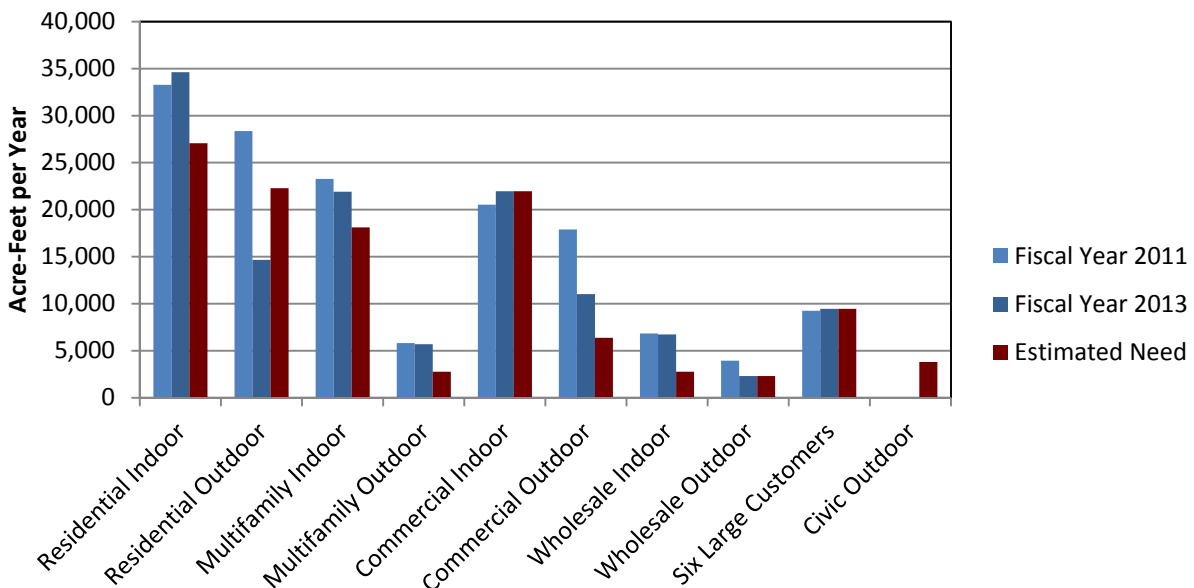
**DRAFT: SUBJECT TO CHANGE AND FOR INTERNAL REVIEW ONLY**



**DRAFT: SUBJECT TO CHANGE AND FOR INTERNAL REVIEW ONLY**

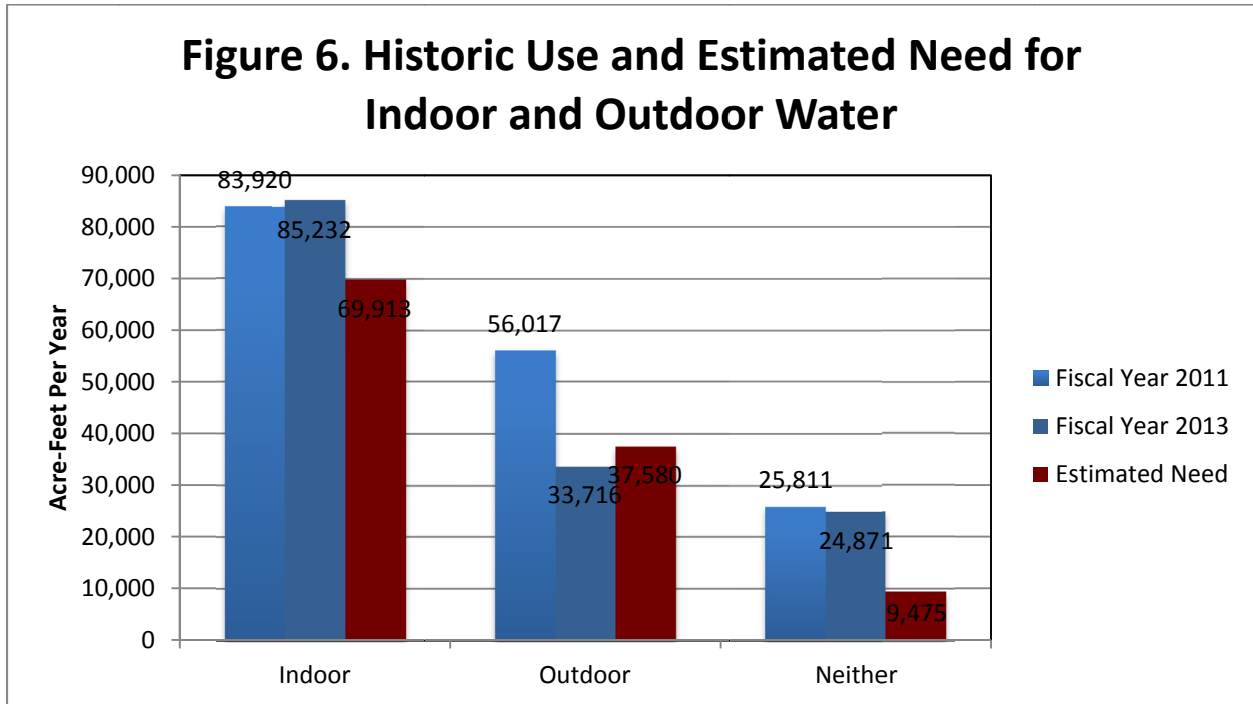
| <b>Table 5. Historical Water Use and Estimated Need by Customer Class</b> |                         |                         |                       |
|---|-------------------------|-------------------------|-----------------------|
| <b>Class</b>  | <b>Fiscal Year 2011</b> | <b>Fiscal Year 2013</b> | <b>Estimated Need</b> |
| Residential Indoor  | 33,275                  | 34,619                  | 27,068                |
| Residential Outdoor   | 28,353                  | 14,661                  | 22,288                |
| Multifamily Indoor  | 23,270                  | 21,913                  | 18,118                |
| Multifamily Outdoor   | 5,819                   | 5,711                   | 2,772                 |
| Commercial Indoor   | 20,538                  | 21,956                  | 21,956                |
| Commercial Outdoor  | 17,895                  | 11,022                  | 6,379                 |
| Wholesale Indoor  | 6,836                   | 6,744                   | 2,771                 |
| Wholesale Outdoor   | 3,950                   | 2,323                   | 2,323                 |
| Six Large Customers   | 9,254                   | 9,463                   | 9,463                 |
| Civic Outdoor   |                         | -                       | 3,819                 |
| <b>Total Customer Demand</b>  | <b>149,191</b>          | <b>128,411</b>          | <b>116,956</b>        |
| Unavoidable Losses  | 12                      | 12                      | 12                    |
| Avoidable Losses  | 16,544                  | 15,396                  | 0                     |
| <b>System Input Volume</b>  | <b>165,748</b>          | <b>143,819</b>          | <b>116,968</b>        |

**Figure 5. Historical Water Use and Estimated Need by Customer Class**



**DRAFT: SUBJECT TO CHANGE AND FOR INTERNAL REVIEW ONLY**

**Figure 6. Historic Use and Estimated Need for Indoor and Outdoor Water**



**DRAFT: SUBJECT TO CHANGE AND FOR INTERNAL REVIEW ONLY**