

Appendix E

Long Range Water Resources Plan Demand Projection Assumptions Memorandum

Long Range Water Resources Plan
**Town of Cary Reclaimed Water Demand Projection
Assumptions**

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General Assumptions:

1. The future reclaimed water (RCW) demands will be calculated using the demand projection methodology also used for the baseline annual average potable water demands developed for the LRWRP.
2. The assumptions related to the determination of the non-potable water end uses that can potentially be met with RCW within the service areas defined for the RCW scenarios are as follows:

Residential End Uses (Existing and Future):

- Irrigation:
 - Existing Customer Irrigation will be based on the current baseline year meter data (2010) - this only includes the existing customers currently with an irrigation meter.
 - Demand timing will be based on the overall rate of buildout for future parcels by sanitary sewer subbasins (once a subbasin reaches 50 percent built out existing customer irrigation demands will come online) - Assumption is that the Town will build infrastructure to serve future development and IRR meters will be hooked up as the infrastructure builds out.
 - Demands associated with all existing irrigation meters adjacent to the Jordan Lake RCW Phase II infrastructure are assumed to come online in 2015.
 - All meters north of US40 are assumed to not be connected to the RCW system - no RCW infrastructure to be constructed north of US40.
 - If an irrigation meter had a 2010 consumption level less than 50 gpd, this unit demand was increased to 168 gpd (2010 Water Use Analysis)
 - Future Customer Irrigation -
 - Future irrigation customer demands will be based on the LRWRP baseline demand projections SFR unit demand factor and 2010 Water

Use Analysis (168 gpd/residence for accounts with a separate irrigation meter).

- 35% to 50% of future customers will use RCW for irrigation (will use upper bound), based on professional judgment of Town staff.

NOTE: Applied to future parcels with WSC of Developing, Developing Permitted, Vacant-Cary, Vacant-Morrisville, Vacant-RTP and Existing Redevelopment.

- All parcels north of US40 are assumed to not connect to the RCW system – no RCW infrastructure to be constructed north of US40.
- Existing water customers, currently without an irrigation system, that may choose to connect to the RCW system for irrigation when RCW is available will also be based on the 2010 Water Use Analysis (168 gpd/residence for accounts with a separate irrigation meter).

- It is assumed that these customers include accounts that either irrigated from a hose bib or had no intention of irrigating their lawn with potable water. The availability of RCW is assumed to change this customer type’s water use pattern by adding an irrigation system.
- 0% to 10% of existing customer will use RCW in the future for irrigation (will use upper bound), based on professional judgment of Town staff.

NOTE: In addition to existing accounts also applied to future parcels with WSC of Existing Unoccupied, New Existing, and BWOS.

The airport was not included in consideration for RCW demands, neither were any other meters north of US40.

- This demand will be assigned at existing SFR meter level:
 - Demand from existing SFR water customer hook up to RCW system = $10\% * 168 \text{ gpd}$
 - All accounts with an IR and RW meter were removed from this determination.
- Demand timing will be based on the overall rate of buildout for future parcels by sanitary sewer subbasins (once a subbasin reaches 50 percent built out existing SFR accounts interested in using RCW for irrigation will come online) – Assumption is that the Town will build infrastructure to serve future development and existing SFR interested in using RCW for irrigation will be hooked up as the infrastructure builds out.

Industrial/Commercial/Institutional (ICI) End Uses (Existing and Future):

- Existing irrigation and heating/cooling demand (those that have system separately metered) will be based on the current baseline year meter data (2010) – this only includes the existing customers currently with an irrigation meter (which is inclusive of irrigation meters installed for cooling towers).
 - Demand timing will be based on the overall rate of buildout for future parcels by sanitary sewer subbasins (once a subbasin reaches 50 percent built out existing customer irrigation demand will come online) – Assumption is that the Town will build infrastructure to serve future development and IRR meters will be hooked up as the infrastructure builds out.
 - If an irrigation meter had a 2010 consumption level less than 50 gpd, this unit demand was increased to 830 gpd for COM, 4,400 gpd for IND, and 1,400 gpd for INS (2010 Water Use Analysis)
- Future ICI Customers –
 - Table 1 outlines the percentage of total use for non-residential end uses that will be used to determine the RCW demands for future ICI accounts. The data presented in Table 1 is based on the following data sources:
 - Irrigation: 2010 Water Use Analysis (future irrigation only) and for RTP parcel irrigation demands were collected from Wake County provided data.
 - Cooling & Heating: Water Efficiency Manual for Commercial, Industrial and Institutional Facilities (NCDENR, 2009)
 - Toilets: Water Efficiency Manual for Commercial, Industrial and Institutional Facilities (NCDENR, 2009) * 80%
 - 80% is an assumption on total restroom water usage attributed to toilet flushing.
 - For Town Parks (PKS) it is assumed that 60 percent of the annual average demand will be from irrigation and 20 percent from toilet flushing (based on review of existing billing data and reasonable judgment)
 - Site specific irrigation demands have been developed for Thomas Brook Park – Phase III, the USA Baseball complex, Mills Park expansion, Panther Creek high school, Roberts Rd. park (future), unnamed park facility adjacent to the ATT (future). See the LRWRP Water Demand and Wastewater Flow Projections TM for details.
 - Percentage of future ICI accounts served with RCW:
 - Future ICI accounts –
 - 100 percent for IRR for all ICI

- 100 percent for Toilets for all ICI
- Cooling Towers:
 - COM - 10%
 - IND - 50% (50% conversion to air cooled chillers (McQuay International, 2001))
 - INS - 20%
- Future PKS - assumed to all connect if RCW is available
- Existing ICI accounts - assume majority of large user are already on separate (irrigation) meter for irrigation (per Town policy) and cooling towers (based on review of seasonal affect in monthly billing data)

Table 1: ICI Non-potable Water Demand End Use Percentage

Used to Calc RCW Demand				
Assumptions				
End Use	COM	INS	IND	PKS
Landscaping/Irrigation	20%	20%	20%	60%
Cooling & Heating	28%	20%	20%	0%
Restrooms	32%	32%	5%	20%
Total	80%	72%	45%	80%
Primary Representative Customer types	Office Bldgs	School/Churches	Computer/Electric Manufacturing	Multi-purpose parks

NOTE: For all future non-residential parcels the percentages in Table 1 will be applied based on a parcel’s FLUGEN classification, except RTP. For future RTP parcels identified (in Wake County's demand spreadsheet) as having a mix of COM & IND, the IND percentages will be applied.

3. There will be no RCW demand adjustment to account for the different use profiles between potable water irrigation and RCW irrigation. Though RCW is currently not as expensive and its use is less restricted than potable water for irrigation, future RCW policies may shift the rates and restrictions on RCW use making it more parallel with that of potable water.
4. The assumptions related to the timing of RCW demand will be based on a parcel’s Water Service Connection (WCS) category used to assign potable water demand through 2060 for the LRWRP.
5. The extent of RCW service will be an important factor in the determination of RCW demands. The following are the assumption that will be used to define RCW service areas for the 4 scenarios defined in the Strategic Reclaimed Water System Plan (SRWSP) Kick-off Meeting Summary:
 - a. Scenario 1 – A reduced PS 132 service area boundary, specifically focused on a reduction of the Western service area to parcels adjacent to the Phase I and II RCW lines already funded and existing RCW lines.

- b. Scenario 2 - The entire Town planned service area (i.e. urban service area)
- c. Scenario 3 - The existing PS 132 RCW service area.
- d. Scenario 4 - A reduced version of the PS 132 RCW service area, matching RCW supply with RCW demand.
 - i. Goal will be to maximize demand while minimizing additional RCW system infrastructure.

References

McQuay International. 2001. Engineering System Solutions, Air-Cooled Chillers: Benefits And Design Tips. Edition No. 7.

NCDENR. 2009. Water Efficiency Manual for Commercial, Industrial and Institutional Facilities.