New River Advocates, Inc.
Analysis & Opinion of the
2009 Environmental Assessment Report
Prepared by WK Dickson
for
The Town of Boone's Proposed Raw Water Intake

FAULTY JUSTIFICATION FOR INITIATION OF THE BOONE WATER INTAKE PROJECT-

The Town of Boone's engineers used inconsistent, conflicting and superseded data to conclude a need of an additional **4 million gallons of water per day**. Then, with this dubious determination of need, they concluded the only site that will provide this amount of water is on the South Fork of the New River, 27 river miles outside of Boone's corporate limits at the Watauga/Ashe County line.

We have been told repeatedly by the Town of Boone:

> *"When a water system reaches 80% capacity, the N.C. Department of Environmental and Natural Resources recommends a plan for expansion. When the system reaches 90% capacity, N.C. recommends the expansion be under construction. If not underway the **state** could impose a moratorium on new water hookups."* [1]
>
> [1] *From* ● New River Project, Town of Boone Publication

And, we all have heard Boone's mantra:

> *"Boone surpassed the 80% mark in 2006 and is projected to hit the 90% mark in 2009."*[1]
>
> [1] *From* ● New River Project, Town of Boone Publication

It is now 2014 and the State of North Carolina has not imposed any moratoriums on water hookups in Boone. Since the Town of Boone has continually claimed that 2006 was the year that triggered the initiation of planning for a new water supply, we expected to find the 2006 water use information in WK Dickson's 2009 Environmental Assessment for Boone's proposed new water intake. However, the information was missing. We attempted to access the Water Supply Plan the Town of Boone submitted to the NCDENR for 2006, it was missing. According to NCDENR, Boone was not required to submit a report for 2006. **This is significant since 2006 is declared the *triggering year*, the year the Town of Boone needed to start planning for a future water supply.** New River Advocates, Inc. decided to examine the Growth Section of WK Dickson's Environmental Assessment (pages 8-9 attached to our report for your reference) in detail.

WK Dickson, consulting engineers for the Town of Boone's proposed raw water intake project, states on page 9 of their 2009 Environmental Assessment:

> *"It should be noted that when the Town's **five day maximum day demand (MDD)** for the system reaches 2.40 MGD (80% of capacity), the North Carolina Department for Environmental and Natural Resources Public Water Supply Section (NCDENR) **regulations** **recommend** that expansion planning be initiated."* [MGD – Million Gallons per Day]

This statement is in stark contrast to the actual law, found at N.C. General Statute §143-355(l):

> *"A unit of local government or large community water system **shall** submit a revised plan that specifies how the water system intends to address foreseeable future water needs when eighty percent (80%) of the water system's available water supply **based on calendar year average daily demand has been allocated to current or prospective water users** or the seasonal demand exceeds ninety percent (90%).*

Contrary to WK Dickson's legal citation, the *triggering factor* is ***Average Daily Demand*** for water on a calendar year basis and has nothing to do with ***Maximum Day Demand*** for water. Please note that WK Dickson used the term recommended in their reference to a law: *"*NCDENR ***regulations recommend*** *that expansion planning be initiated".* Laws do not make recommendations, they require action as is evidenced by the language in the law we cited above, *"shall submit a revised plan…".*

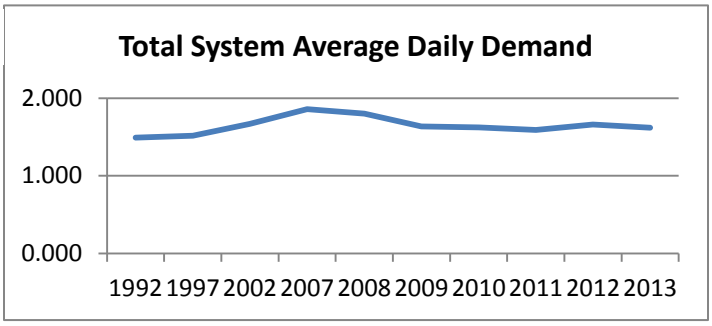
What is the Town of Boone's actual situation with respect to required planning, construction and impending moratoriums? The Town of Boone is allowed to draw up to 3 million gallons of water per day from their **primary** water intake on the South Fork of the New River (located in Town behind the Armory) and they have an additional **emergency** water supply on Winklers Creek with the capacity to draw another 1.6 million gallons of water per day. WK Dickson's 2009 Environmental Assessment focuses on Boone's primary water supply and we will do the same.

New River Advocates has reviewed the Water Supply Plans submitted by Boone to NCDENR from 1992 to 2013. The ***Average Daily Demand*** for water has never been close to 80% of capacity:

Year	Average Daily Demand (MGD)	Percent of 3 MGD Capacity
1992	1.490	49.67%
1997	1.517	50.57%
2002	1.667	55.57%
2007	1.860	62.00%
2008	1.800	60.00%
2009	1.634	54.47%
2010	1.622	54.07%
2011	1.589	52.97%
2012	1.661	55.37%
2013	1.618	53.93%

Following is a graph illustrating the historic trend from 1992 to 2013:

Figure 1



Remarkably, the 2013 *Average Daily Demand* for water is the same as that reported for 2003 by WK Dickson in Table 1 on page 8 of the Environmental Assessment (ten years earlier)! And, with the exception of 2007 and 2008, the preceding graph illustrates that Boone's *Average Daily Demand* for water has not changed over the past 20 years.

What caused this noticeable; but, slight increase in 2007 and 2008? We examined details in the 2007 and 2008 Water Supply Plans and found that there was an average of 700,000 gallons of water per day unaccounted for in 2007 and 664,000 gallons per day unaccounted for in 2008. The *"unaccounted for gallons per day*" decreased to 376,000 in 2009 and to 235,000 in 2010. We believe this unusual unaccounted for "loss of water" is the reason for the anomalous increase in *Average Daily Demand* for 2007 and 2008. Was there a water leak in 2007 and 2008? What measures does the Town of Boone have in place to identify, document and correct these situations? Why does WK Dickson not address this abnormality in their environmental assessment?

This is significant since WK Dickson used 2007 data in making projections which formed the core arguments for a need for an immediate water supply with the capacity to supply an additional 4 million gallons of water per day.

Has the Town of Boone and WK Dickson misrepresented the need to initiate planning and construction? New River Advocates was unable to find the regulatory citation used by WK Dickson and the Town of Boone. We examined the NCDENR regulations at title 15A of the N.C. Administrative Code in its entirety. The only 80%-90% rule provided was for ***"wastewater capacity"*** at 15A NCAC 02H .0118, titled, "**DEMONSTRATION OF FUTURE WASTEWATER TREATMENT CAPACITIES**:

(1) *"Prior to exceeding 80 percent of the **wastewater treatment system's** permitted hydraulic capacity (based on the average flow of the last calendar year), the permittee must submit an approvable engineering evaluation of their future wastewater treatment, utilization, and disposal needs…,"*
(2) *"Prior to exceeding 90 percent of the **wastewater treatment**, utilization, or disposal systems permitted hydraulic capacity, (based on the last calendar year), the permittee must obtain all permits needed for the expansion of the wastewater treatment, utilization, or disposal system and, if construction is needed, submit approvable final plans…"*

We also found where a ***sewer line moratorium*** could be imposed under frequently asked questions at NCDENR's website; **but, we found nothing about water hookup moratoriums**:

> ***"8. What is statutory Moratorium?*** *A sewer line moratorium may be imposed by two different scenarios. One involves implementation of 15A NCAC 2H .0223 (the "80/90%" rule) and the other involves implementing a statutory moratorium by G.S. 143-215.67."*

NOTE- there are two questions asked by NCDENR on each annual Water Supply Plan submitted to NCDENR:

- *"Did average daily water production exceed 80% of approved plan capacity for five consecutive days during **the year**?"*

- *"Did average daily water production exceed 90% of approved plant capacity for five consecutive days during **the year**?"*

We believe it is of great significance that the Town of Boone has answered **NO** to these questions each year. These questions are related to what WK Dickson claims is the *triggering factor*, *"the five day maximum day demand"*. The *"the five day maximum demand"* would be equal to the average of the 5 highest consecutive daily demands for water.

NOTE - if either of these questions is answered YES, NCDENR asks, *"Was there any water conservation implemented?"* These questions are related to conservation planning and are not related to required or recommended water supply expansion planning.

We decided to ask NCDENR's, Linwood Peele, Division Water Resource Manager, about the 80%-90% rule. He referred our question to Vardry E. Austin, who replied by email as follows:

> "Ms. Greene,
> **There are no Public Water Supply (PWS) regulations that require water systems to take action in response to an 80% or 90% capacity situation.** However 15A NCAC 02T .0118 does require publicly owned treatment works to take action before receiving approval for sewer line extensions. There may be policy that PWS section has used or is using to recommend water systems take action at certain stages of their ability to meet current and future demands, but there is no rule requiring such action. Check with the PWS regional office serving your area of interest to see if such policy exists.
> Sincerely,
> Vardry E. Austin, P.E., BCEE, LEED Green Associate
> NCDENR - Division of Water Resources
> Water Supply Planning Branch

And, as recommended, we contacted NCDENR's Tom Boyd, Regional Drinking Water Environmental Senior Specialist, about the 80%-90% rule and we found that our conclusions are corroborated:

1. NCDENR does not have an 80%-90% rule requiring revised water supply plans for water production. The only law is a state law found at N.C. General Statutes at §143-355(l).
2. NCDENR does not have an 80%-90% rule or policy recommending revised water supply plans for water production.
3. NCDENR does not have any rules, regulations, or laws that refer anywhere to a maximum day demand (MDD) in relation to water supply planning other than implementing conservation measures.
4. There is no provision for State of North Carolina to impose a moratorium on water hookups. (We were told by NCDENR that Boone uses a *"self-imposed" moratorium.*)

New River Advocates believes there has been a misrepresentation of the regulations in the Town of Boone's proposal for the proposed raw water Intake project beginning in 2004. What we do not know is whether there was a misinterpretation of the law or whether there was a deliberate plan to deceive the public. Only the Town of Boone can answer this question.

INCONSISTENT AND CONFLICTING DATA AND INAPPROPRIATE DATA USED FOR PROJECTIONS-

As we continue to examine pages 8 and 9 of WK Dickson's Environmental Assessment, we find inconsistent use of data and data years and conflicting data. We found the data years and related data used by WK Dickson were not consistent, were outdated and were superseded at the time of publication of the Environmental Assessment in November 2009.

WK Dickson's Environmental Assessment Report also states on page 9, based on the MDD (*Maximum Day Demand*) for water versus the ADD (*Average Daily Demand*) for water:

> *"**Assuming** an ADD of 1.86 MGD **in 2007** and the maximum MDD/ADD ratio from the past two years of approximately 1.38, the theoretical MDD for 2007 was 2.567 MG. **Therefore, in 2006**, the Town crossed NCDENR's recommended threshold for the initiation of expansion planning."* [MG – Million Gallons]

We have already refuted WK Dickson's claim that NCDENR recommends initiation of planning once the ***"five day Maximum Day Demand"*** for water reaches 80% of capacity. If we assume that WK Dickson misinterpreted NCDENR rules and was not aware of the actual legal requirement, the above statement is still flawed as we conclude in 1-4 below.

1. **Why would the engineers use the *highest one day demand* (MDD) above instead of the *"5-day Maximum Day Demand"* which they assert is the legal benchmark?** WK Dickson projects the Maximum Day Demand for water for 2007 in the statement above and uses that projection to conclude Boone has crossed NCDENR's recommended threshold.

   The "*Maximum Day Demand"* is the highest recorded water use for one day out of the year. This figure is reported in the Water Supply Plan for the year, as well as, for each month

   The "*5-day Maximum Day Demand*" is the average of the five highest consecutive daily demands for water for the year. This "*5-day Maximum Day Demand"* is not reported in the annual Water Supply Plans.

   Obviously, we do know that the *highest one day demand* will result in a greater, exaggerated result than an average of the *five (5) highest consecutive daily demands. Otherwise, WK Dickson will have to answer the question.*

2. **Why would the engineers use assumptions for 2007 to arrive at conclusions for 2006?** The 2007 Water Supply Plans for the Town of Boone would have been available to WK Dickson at the time of publication (16 NOV, 2009) of their Environmental Assessment. We do not understand why the word ***"assuming"*** was used above when referring to 2007. We also do not understand how assumptions made for the year 2007 result in conclusions for the prior year 2006 **(*"Therefore, in 2006…"*)**. And, most puzzling, why does the historical table, *"Table 1. Recent Demand Data"* not include data for 2006? **The data year 2006 is notably missing.**

   As previously mentioned, according to NCDENR, Boone was not required to submit a Water Supply Plan for 2006. However, the Town of Boone may have maintained such

plans in-house. We have not been able to verify the records provided in Table 1 except for the years reviewed by NCDENR and available on line. Where did WK Dickson get the information for Table 1? Did WK Dickson estimate the data for the years for which Water Supply Plans were not submitted to NCDENR? Why did WK Dickson not clearly cite their source? **This is significant because WK Dickson uses this information to make projections which form the entire basis for immediate initiation of planning and a need for a water supply with the capacity to provide an additional 4 million gallons per day.**

3. **Why does WK Dickson project data for years in which it has the actual data?**

WK Dickson projects the 2007 ***Maximum Day Demand*** for water in the statement above when the actual data was available. We also question why Table 1 shows **actual results** for 2007 and 2008 while Table 2 shows **projections** for the same years.

WK Dickson provides two tables on pages 8 and 9 of the 2009 Environmental Assessment. Table 1 is labeled *"Recent Daily Demand Data"* and is stated to provide *"historical demand data".* Table 2 is labeled "*Maximum Day Demand Projections"*. Since the *Average Daily Demands* and the *Maximum Day Demands* are reported in the Water Supply Plans to NCDENR, there would be no need to estimate or project the *Average Daily Demand or the Maximum Day Demand .*

However, WK Dickson starts the table of projections with 2007 data. WK Dickson records the *Average Daily Demand* projection for 2007 as 1.86. This is not a projection. The number 1.86 was reported to NCDENR as the actual *Average Daily Demand* in Boone's 2007 Water Supply Plan. WK Dickson also records 1.86 as the *Average Daily Demand* in their table of historical data. **Why did WK Dickson record the actual data for 2007 as both actual and projected?**

The 2008 Water Supply Plan (due April 2009) would have also been available before the Environmental Assessment was published (November 2009). However, according to their table of projections, WK Dickson has projected an *Average Daily Demand* of 1.9205 MGD for 2008. The actual *Average Daily Demand* reported by the Town of Boone was 1.80 MGD in the 2008 Water Supply Plan. WK Dickson also records 1.80 MGD in their table of historical water use. **Why did WK Dickson provide the actual data and then make a projection of the same data?**

4. **Why did WK Dickson use 1.38 as a factor to project the 2007 Maximum Day Demand?**

WK Dickson admits to using the *highest out of the last 2 years'* ratio of "*Maximum Day Demand"* to "*Average Daily Demand"* to derive a *projection factor of 1.38*. The question is why? Why not the lowest? Better yet, why not compute an average using the historical data available. According to the table 1, WK Dickson was using the 2007 ratio. We question the use of 2007 since it was one of the years with the unusually high 700,000 gallons of water per day that was unaccounted for. We believe WK Dickson should have documented their rationale.

Why were WK Dickson's projections, made in 2009, so much greater that the actual future results? We noted that WK Dickson's projections for 2009 and 2010 were markedly elevated when compared with the actual data subsequently submitted to NCDENR for 2009 and 2010. WK Dickson projected an *Average Daily Demand* of 1.981 MGD for 2009; the actual outcome was 1.634 MGD. An even greater divergence was evident in WK Dickson's projected *Average Daily Demand* of 2.0415 MGD for 2010; the actual outcome was 1.622 MGD. We believe inconsistent and conflicting data resulted in overstated projections.

This is significant since these projections are used to justify the conclusion that there is a need for an additional 4 million gallons of water per day.

Why does WK Dickson use the 2003 Average Daily Demand and the 2002 Population to make projections when more current figures were available?

WK Dickson states on page 8 of the Environmental Assessment:

> *"Using the 2003 Average Daily Demand and the 2002 water system user population, the total system average demand per capita is 82.6 gallons per capita per day (gpcd)."*

The 2008 Water Supply Plan would have been available at the time of publication of the WK Dickson Environmental Assessment. Also, WK Dickson used 2007 data in making other projections. Why did WK Dickson use 2007 data as the basis for some projections and 2003 and 2002 data for other projections? Why are they not consistent with the data years used for computing projections? And, why use 2002 population figures when the 2003 related population figures would be reported on the 2003 Water Supply Plan? Was there a 2003 Water Supply Plan? Or, did WK Dickson estimate 2003 using 2002 and then use the 2003 estimates to make future projections? We believe that if WK Dickson has a basis for this, then they should disclose it.

This is significant because WK Dickson is using these projections to support a need for an additional 4 million gallons of water per day.

Why not compare apples to apples*?* The annual Water Supply Plans submitted to NCDENR include a breakdown of the water used by consumer type, residential, commercial, industrial and institutional. The report also includes an average daily per capita *residential* use (the average gallons of water used by each person daily), the average daily water used by the residential consumer divided by the population. According to the 2009 Water Supply Plan, the average daily per capita residential use is 33 gallons per day. However, WK Dickson computed an **average daily per capita demand for the total water system** by dividing the **average daily water used by all consumer types** by **the residential population**.

WK Dickson states, using a total system per person demand of 82.6 *gallons per capita per day*,

> *"Applying this to the 2030 projected water system user population, and using the average demand per capita shown above, we would **estimate** the 2030 Average Day Demand to be 2.75 MGD (33,336 x 82.6 gpcd)."*

We believe that both factors used above, the ***population*** and ***average demand per capita,*** are incorrect making the conclusion incorrect.

We find this is significant since this "estimate" is the entire basis for the proposed raw water intake on the South Fork of the New River, 27 river miles from the Town of Boone at the Ashe/Watauga County line.

1. **<u>Why is the use of 82.6 gallons of water per capita per day incorrect?</u>** We believe that each type of consumer (residential, commercial, industrial and institutional) should be analyzed and projected separately to arrive at the *projected total system demand*. However, WK Dickson derived an *average per capita demand for the total system* based on a *residential population* and then applied it to *a projected residential population* to arrive at a *projected total system demand*.

   This is significant because the residential consumer population is not necessarily directly related to the other consumers as WK Dickson suggests. This is especially true in an area where commercial use serves a seasonal population, tourists and students residing on-campus that are not part of Boone's residential population.

   Appalachian State University has its own water supply for the campus. The Town of Boone supplies water primarily to the Town of Boone and students living off-campus in Boone. And, Boone serves approximately 350 water connections outside of their corporate limits, mainly in the extra-territorial jurisdiction area.

2. **<u>Why is the population of 33,336 incorrect for a 2030 projection?</u>** The Water Supply Plan submitted by the Town of Boone in 2002 shows a projected population of **20,483** for 2030. The same projected population is shown on the annual Water Supply Plans submitted for 2007, 2008, 2009, 2010, 2011, 2012 and 2013? WK Dickson does not justify the projected population of 33,336.

Since WK Dickson's total system demand projection of 2.75 MGD for 2030 is incorrect, we examined the 2009 Water Supply Plan to see what the Town of Boone projected for 2030. We found that Boone showed 2.75 MGD as the projection for 2030. However, when asked *"What major water supply reports or studies were used for planning?,* the response was, ***"2004 W.K. Dickson Water System Analysis and Master Plan."***

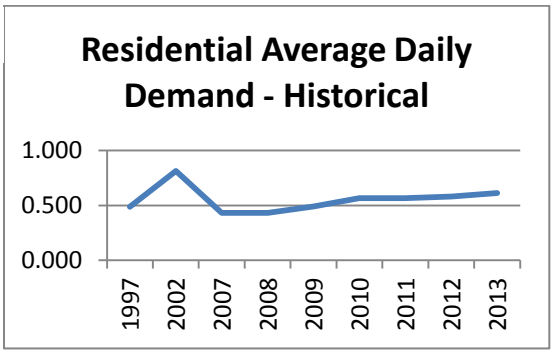
The 2.75 MGD projection attributed to WK Dickson is broken down in the 2009 Water Supply Plan by consumer type, residential, commercial, industrial and institutional. The 2009 Water Supply Plan shows the following ***residential*** projections for 2030: projected *residential demand* of 1.050 MGD, projected *population* of 20,483 and a *long-term 33 gallons per capita per day*. We should be able to multiply **20,483** by **33** to arrive at the residential demand. However, we get 675,939 (0.676 MGD) versus 1.050 MGD. Why? We could answer this question if we knew exactly what method was used to allocate WK Dickson's *total system demand projection* for 2030 of 2.75 MGD among the consumer types.

Why should we be able to multiply the ***projected population*** by the ***long-term per capita demand*** to arrive at the projected ***residential average daily dem*****and**? According to the Water Supply Plans, the **long-term per capita demand** is computed by dividing the **residential Average Daily Demand** by the **population**. From simple Algebra, we conclude that *residential average daily demand equals population multiplied by long-term per capita demand.*

We believe the best case scenario is that one or more of the projected components for computing the projected *residential demand* was reported incorrectly. The worst case scenario might be that the *'end justifies the means'*, a predetermined result has been justified by the computation.

Following is a graph of the historical trend of ***Residential Average Daily Demands*** for water for years in which NCDENR has Water Supply Plans:

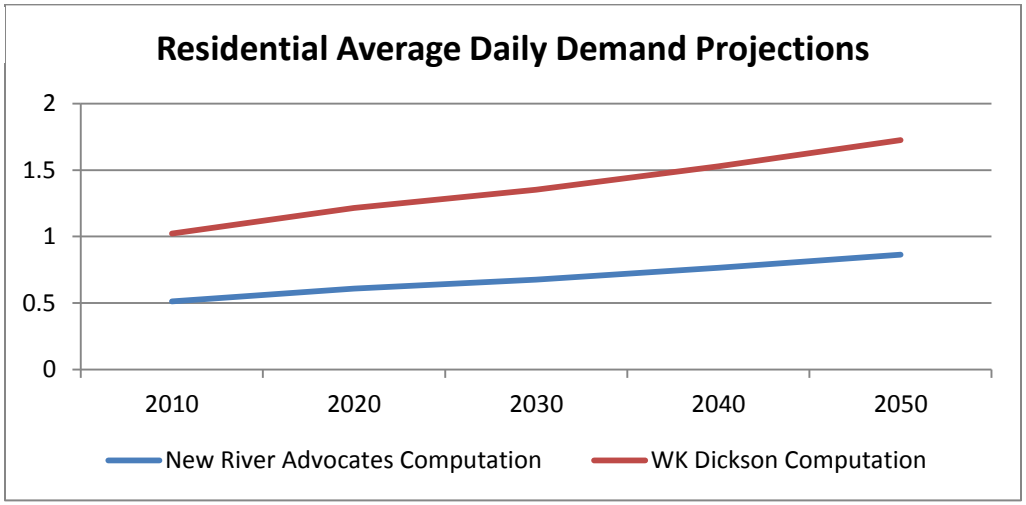
Figure 2



NOTE- There is a spike in 2002. What happened in 2002 with the residential use? Was there a major leak? If 2002 is removed, the *Residential Average Daily Demand* for water is slightly increasing.

Following is a graph of the *Residential Average Daily Demand* Projected for 2020, 2030, 2040 and 2050. The "blue line" or lower line is computed by New River Advocates by applying the population projections to the long-term 33 gallons per capita per day shown in Boone's 2009 Water Supply Plan. The "red line" or upper line represents the projections shown in the 2009 Water Supply Plan, noted as coming from the 2004 WK Dickson Water System Analysis and Master Plan.

Figure 3



New River Advocates' projections are more in line with the historical trend, slightly increasing. Also, please note that the actual 2010 *Residential Average Daily Demand* for water was reported as 0.565 MGD. New River Advocates' projected 0.511 MGD. However, the 2010 projection attributed to WK Dickson was 0.950 MGD.

IMPACT OF NOT CONSIDERING WATER CONSUMER PROJECTIONS BY CONSUMER TYPE-

As stated before, the Water Supply Plans submitted to NCDENR include a breakdown of the *Average Daily Demand* by consumer type (residential, commercial, industrial and institutional). WK Dickson does not provide an analysis of the growth by consumer type. Without such analysis, how does the Town of Boone or its engineers realistically estimate the ***total system demand*** for water for 2020, 2030, 2050 or 2060?

We believe WK Dickson inappropriately attempted to determine a future *total system demand* by relating a *total system per capita demand* to a *projected population of residential consumers*.

A closer look at the actual data shows that the ***commercial consumer*** uses far more water than the ***residential user*** per metered connection. In 2013 Boone shows 757 *metered commercial connections* using 0.710 MGD which represents an *Average Daily Demand* of 938 *gallons of water per day per commercial connection*. We believe an examination of the commercial user will include hotels which are related to tourism projections and not residential projections; and include swimming pools. Commercial users will also include restaurants which serve Boone's residential population, the county's residential population, tourists/visitors and the student population living on-campus (whose water is supplied by ASU).

As we have previously stated, we do not believe that the projection in the *residential Average Daily Demand* for water can be directly related to projections in the *commercial Average Daily Demand* for water. And, absent an analysis of the *commercial demand* for water by WK Dickson, the Town of Boone does not know what the *projected total system average daily demand* for water will be in 2020, 2030, 2040, 2050 or 2060.

Why didn't WK Dickson consider the Town of Boone's projected *commercial growth* separately? What is the breakdown of the *commercial consumers*? Which ones have the highest demand for water? What is the projected growth of these *commercial water supply consumers*?

What happens when a *residential population* and a *total system per capita demand* are used to project a *total system demand* with a dubious allocation of such demand among the different consumer types? On the next page are graphs that will visually illustrate what happens by comparing projections attributed to WK Dickson with the historical trend.

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Figure 4

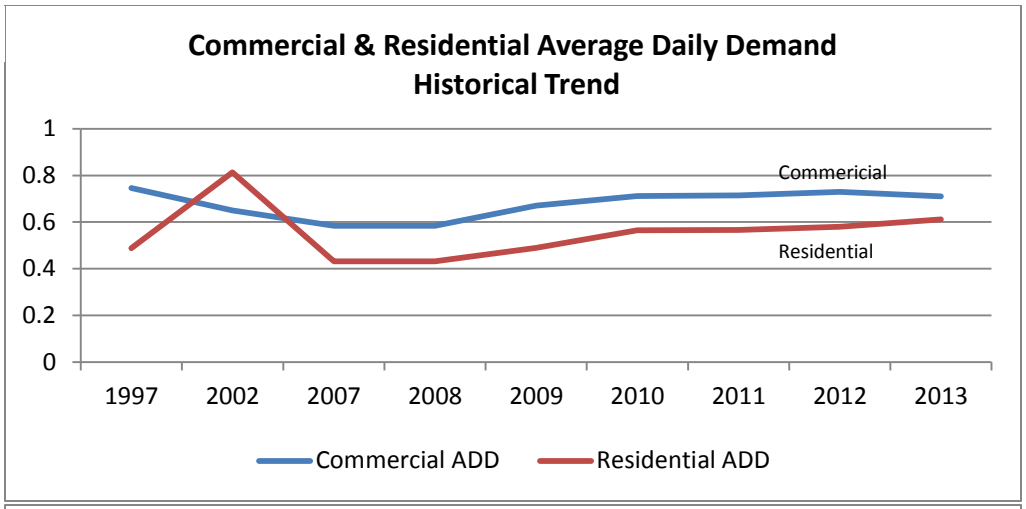
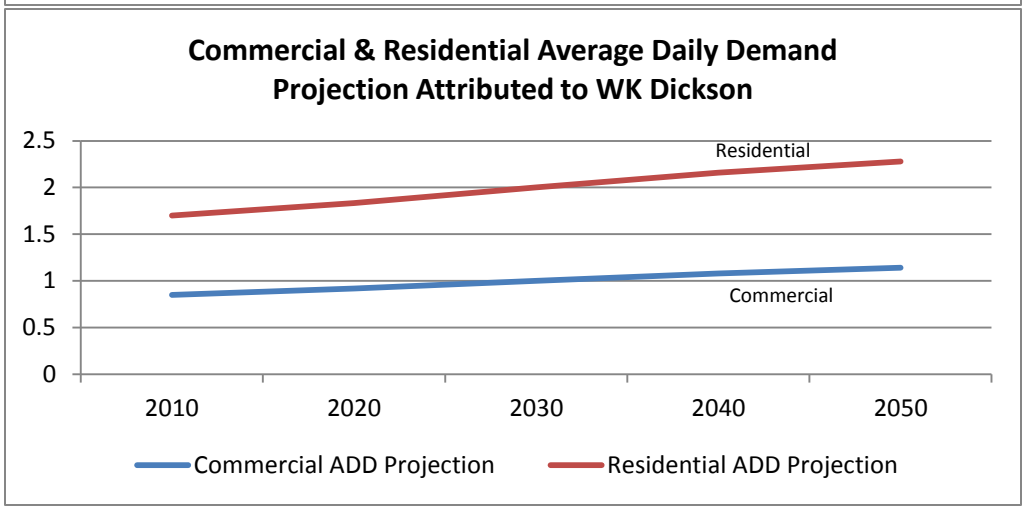


Figure 5



Please note that the ***historical trend of water use*** (see Figure 4) is quite different from the ***projected trend of water use*** (see Figure 5). The ***historical trend*** shows a trend of the ***commercial demand*** being greater than the ***residential demand trend.*** The ***projected demand*** shows the opposite, the *"blue line"* which represents the ***Average Daily Demand*** of the ***Commercial User***, switches places with the *"red line"* which represents the ***Average Daily Demand*** of the ***Residential User,*** mysteriously the ***residential demand*** is now greater than the ***commercial demand.***

And, while the historical graph shows a much narrower deviation between the two, the projected graph shows a widening of average daily demand trend between the two consumer types. We believe that applying the 82.6 *gallons per capita per day* (*the total system demand per capita derived by WK Dickson)* to the population (*the pool of residential consumers)* to arrive at a projected *total system demand* has resulted in not only an overstated total system demand for water, it has resulted in a dubious allocation among the consumer types which is obviously not anything like the historical trend. Whatever the allocation method, the 2010 actual average daily demand for water of 0.565 MGD is quite different from WK Dickson's projections of 0.950 MGD! **This is significant because the water use projections for 2020, 2030, 2040 and 2050 were based on the same method used to project 2010.**

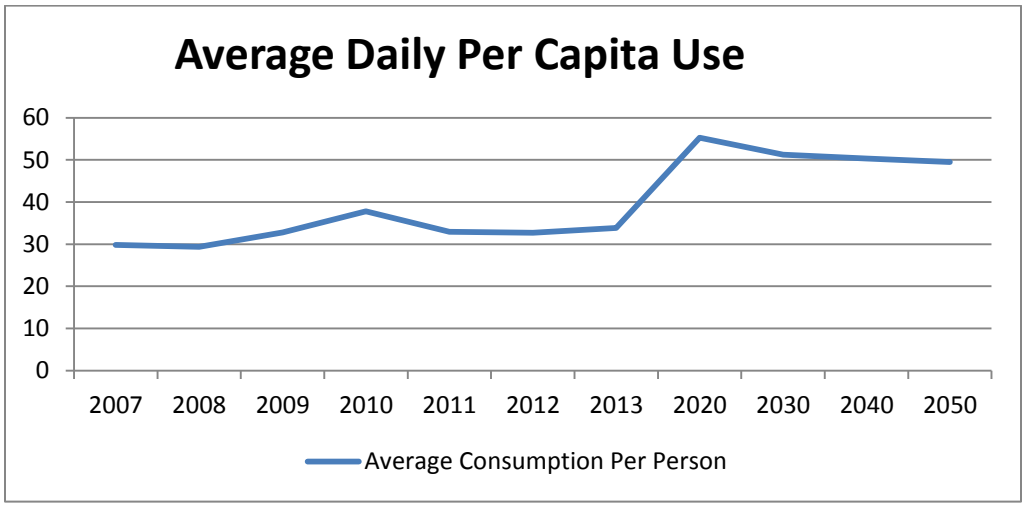
This is also significant because WK Dickson declares construction must begin immediately on page 9 of the Environmental Assessment,

> *"Based on the fact that the Town appears to be adding an additional 0.0605 MG of consumption per year and MDD/ADD ratio of 1.38, it is estimated that the Town needs to be under construction* ***no later than the 2010 time frame****."*

The best case scenario is there was an honest mistake made in the projections. The worst case scenario is projections were made to justify immediate construction.

The following chart shows how convoluted the projections are:

Figure 6



The *average consumption per person* rises sharply based on the *residential projections* attributed to WK Dickson. Please note the abnormal rise in 2010. Oddly, the population reported on the 2009 and 2010 Water Supply Plans were the same while consumption increased in 2010. This is an abnormality just as is the sharp rise caused by faulty projections. Did the Town of Boone err on the population figure supplied on the 2010 Water Supply Plan?

COMPOUNDING THE ERRONEOUS 2030 PROJECTION WITH A DUBIOUS CONTINGENCY FOR UNEXPECTED GROWTH-

We have demonstrated that we cannot rely on the 2030 projected *Average Daily Demand* of 2.75 million gallons per day computed by WK Dickson. And, the projection just grows worse. WK Dickson attempts to justify the total future demand of 7 million gallons per day (i.e. the combined capacities of current primary intake and the proposed new intake) with another flawed projection of 6.8 million gallons per day.

We will start with WK Dickson's convoluted conclusion:

> *"The total 2030 demand is therefore projected to be [(2.75 for Boone) + (0.5 for Blowing Rock) + (1.0 unallocated reserve)] x (1.6 MDD/ADD ratio] = 6.8 MGD on a MDD basis"*

We believe the 2.75 MGD projection for the 2030 Average Daily Demand is overstated and unreliable. Now we examine the other components of this dubious calculation.

WK Dickson states regarding the next component above *"0.5 for Blowing Rock",*

> *"The Blowing Rock connection should be evaluated as a regular bulk purchase connection for an average daily demand of 0.5 MGD."*

Why do we take issue with the Blowing Rock component? The Town of Boone shows 0.00 MGD for *"Future Water Sells"* on the Water Supply Plans for 2009, 2010, 2011, 2012 and 2013. The Town of Boone does not have a contract with Blowing Rock for a regular *average daily demand* of 0.5 MGD. The Town of Boone has a connection with Blowing Rock to provide emergency water ONLY. And, there is no historical record of such emergency water ever being transmitted to Blowing Rock. An emergency water demand would affect *Maximum Day Demand* and not *Average Daily Demand*. We believe that this emergency contingency does not qualify as a bulk purchase and should be treated as an emergency service that could be served by Boone's Winkler Creek resource.

Also, this should be a 0.050 MG MDD (Maximum Day Demand) component and not a 0.50 MGD ADD (Average Daily Demand) component.

WK Dickson adds another component, the *"1.0 unallocated reserve"*,

> *"It is further recommended for this evaluation that a 1.0 MGD average daily demand unallocated reserve should be added to the 2030 projected demand to be used for unexpected growth, industry, and bulk purchases."*

This equates to a contingency error of 36%.

Why would WK Dickson add a contingency for the *"unexpected"* demand of 1.0 million gallons per day to a projection of 2.75 million gallons per day? WK Dickson simply states *"unexpected growth, industry and bulk purchases"* without any justification for the demand without any analysis of how the 1.0 million gallons per day was derived. A contingency equal to 36% of your projected average daily demand is highly suspect and requires justification.

Please note that each of the 3 components above is labeled as an ***Average Daily Demand*** component by WK Dickson. We do not agree with that; but, this is what they have stated.

Did WK Dickson compute a 6.8 Average Daily Demand or a 6.8 Maximum Day Demand? This is the formula that WK Dickson used:

(2.75 MGD ADD + 0.50 MGD ADD + 1.0 MGD ADD) x 1.6 MDD/ADD

Now, let's solve the formula:

(2.75 MGD ADD + .050 MGD ADD + 1.0 MGD ADD) x 1.66 MG MDD/MGD ADD =

$$\frac{4.25 \text{ MGD ADD}}{1.0} \times \frac{1.6 \text{ MG MDD}}{\text{MGD ADD}} = \frac{6.8 \text{ MGD ADD MG MDD}}{\text{MGD ADD}} = 6.8 \text{ MG MDD (Maximum Day Demand)}$$

WK Dickson has derived a projected Maximum Day Demand for 2030. The Maximum Day Demand is the highest use for one day out of the year and is not measured in MGD (million gallons per day); it is measured as MG (million gallons).

WK Dickson claims the formula equates to 6.8 MGD (million gallons per day); it actually equates to 6.8 MG (million gallons) of water for one day, not daily. WK Dickson showed a projected *Average Daily Demand* of 4.25 MGD of water in their 2008 environmental scoping letter. NCDENR, during the environmental scoping period, recommended that WK Dickson justify the need for the additional 7.0 MGD capacity (the combined capacities of Boone's current intake and proposed intake) in the final assessment. **It appears they were merely attempting to justify it.**

Why did WK Dickson apply the 1.6 factor? We do not know. According to Table 2 on page 9 of WK Dickson's 2009 projections, they used a factor of 1.38 to compute the *Maximum Day Demands* for 2008, 2009 and 2010. WK Dickson claims the 1.38 represents a *"maximum MDD/ADD ratio from the past 2 years".* It is not clear; but, the highest MDD/ADD from Table 1, the historical data table for the last 2 years (2007 and 2008) is 1.38.

WK Dickson states regarding the historical Table 1 on page 8,

> *"The average **Maximum Day Demand/Average Day Demand** ratio is 1.6 based on 2003 data. This is comparable to other water systems the size of Boone, and will be used for future projections."*

It appears, for whatever convoluted reason, WK Dickson decided to use the 1.38 MDD/ADD factor to project 2008, 2009 and 2010 and then decided to round the figure of 1.59 on Table 1 for 2003 and use 1.6 to project 2030. We do not believe there is any justification for the 1.6 factor. And, WK Dickson has somehow derived a 6.8 (MG) million gallons (not 6.8MGD), a projection representing the highest possible demand in one (1) day out of the year for 2030, in an effort to justify 7.0 million gallons per day.

And, we believe every component of the formula is either not justified or unreasonable. **There is absolutely no justification for applying the 1.6 factor or any MDD/ADD factor to a contingency or an emergency allowance even to derive the highest Maximum Day Demand.**

[NOTE- In Table 1, the actual historical data for 2007, WK Dickson shows a MDD/ADD ratio of 1.38. However, WK Dickson shows a MDD/ADD ratio of 2.38 in Table 2, the table of projections. Amazingly, the ADD is 1.86 on both tables and the MDD is 2.567 on both Tables. With that said, the MDD/ADD ratio should be 1.38 on both tables for 2007. Maybe this is just an error; and, hopefully it wasn't used to arrive at any average factors that were used to make projections.

CLOSING-

What is the bottom line? The method of projecting is flawed and the projections are unreliable. Best case scenario, it wasn't done on purpose. Worst case scenario, we, as well as the reviewing governmental agents, have been subjects to a plan to deceive the public. Only the Town of Boone and WK Dickson can tell us which it is; answer our questions and/or justify their projections. We certainly cannot make a determination of what the Town of Boone's future needs are from the information provided in the 2009 Environmental Assessment. And, we question how the projections on the Water Supply Plans passed NCDENR vetting.

Why are these projections so important? The answer is on page 9 of the Environmental Assessment, at the last sentence below:

> *"In a previous engineering report and study, the Town investigated over 27 different options to augment their existing water supply needs. This investigation included seven (7) sites along the Watauga River, Watauga Lake in Tennessee, the Yadkin River, lakes on Federal land, increasing the Town's existing Winkler's Creek reservoir capacity, building a new reservoir, wells, interconnections with other utilities, as well as, 10 sites along the South Fork of the New River.* ***As a result, all of the alternatives except for one were not determined to be feasible****."*

Amazing! The projected needs could only be met at what Town of Boone officials have dubbed the ***"sweet spot",*** *the South Fork of the New River, 27 river miles from the corporate limits of Boone at the Watauga/Ashe County Line.*

And, the governmental agencies that reviewed and *'rubber-stamped'* the proposed project all did so with the understanding that Boone's engineers had demonstrated Boone's need for an additional 4 million gallons of water per day and this was the only spot that was feasible.

WK Dickson tells us of **"no significant impacts"** and impacts **"not anticipated"** in the same Environmental Assessment we analyze above. WK Dickson is proud to announce on their website that they were granted a *"Finding of No Significant Impact" (FONSI) for the Town of Boone's Raw Water Intake Project*. However, governmental agencies who reviewed WK Dickson's preliminary environmental scoping letter expressed many concerns and made suggestions during what is called the *"environmental scoping"* period. Of particular note is the statement: *"Avoidance of a South Fork of the New River intake should be fully evaluated. Alternative sharing and coordination with Appalachian State University (ASU) should be thoroughly evaluated as surplus water may be available closer to Boone."* The letters of concern may be found at the back of the 289-page document referred to as the 2009 Environmental Assessment at the following:

http://www.townofboone.net/BOONE_water_intakeEA_WM16November09.pdf

And, the annual Water Supply Plans for Boone may be accessed at:

http://www.ncwater.org/Water_Supply_Planning/Local_Water_Supply_Plan/report.php?pwsid=01-95-010

New River Advocates, Inc. will not be issuing a *"Finding of No Significate Impact" (FONSI).* We can't imagine that anyone would consider doing so after reading the 14-page comment letter submitted by the N.C. Wildlife Resource Commission (starts on page 98 of the Environmental Assessment) or after reading our analysis and opinion of the projections that were used to demonstrate the need for the proposed water intake.

What can you do? We encourage you to visit our website for more information, schematics and plans for the proposed intake at www.newriveradvocates.com. Become involved; write your federal, state and local government officials and permitting agencies. Keep informed; provide us with your contact information so we can keep you up to date.

New River Advocates' mission is to protect the New River and its resources which are enjoyed by all. We believe every use of the River has an economic benefit and governmental officials should consider the adverse impacts of the proposed intake to the New River and to the recreational, fishing, fish propagation, fish consumption and agricultural resources it provides.

What should the Town of Boone do? The Town of Boone needs to determine their real future water needs. And, then Boone needs to revisit the 26 other options. Surely, they can find an alternative closer to Boone and with substantially less adverse impacts.

The Town of Boone has requested questions be submitted directly to them. There are plenty of questions presented in this report. We would appreciate answers and explanations.

Why? The New River is the oldest river in North America and the second oldest river in the world. The New River begins with two forks, the North Fork and the South Fork. The headwater of the South Fork is a spring in Blowing Rock. The headwaters of the North Fork are on Snake Mountain in Watauga County. The two forks meander north to Ashe County where they eventually converge to form the New River continuing north through Alleghany County through West Virginia and Virginia reaching the Kanawha River, then the Ohio River and finally the Gulf of Mexico. Consider the New River's age, meager beginnings, growth as it flows northward, convergence of two forks and final destination. The New River deserves better consideration! The "*New*" cannot advocate for itself. We all are the New River's advocates. Do we have to *"build the intake it to find out what will happen"*?

Water intakes are not healthy for the New River, or any river. An increase in treated wastewater pollutants comes with each water intake. The Town of Boone claims the treated wastewater is cleaner than the water first taken out of the river. We question, whether treated wastewater is good for the ecosystem or human consumption. The chemicals used to treat the water are discharged into the river along with pharmaceuticals (including hormones) which are not removed during the treatment process.

The proposed water intake adjoins the Cooper Farm which is on the National Historical Registry and in both the Ashe and Watauga County Farmland Preservation Programs.

The pump house will be constructed on top of an area identified as an archeological site of interest. Recreational uses, fish propagation, fish consumption and agricultural uses will be adversely affected.

The plans for the proposed intake call for excavation of an area that is 30' by 120' at a depth of 5' below the riverbed. The area is to be backfilled with gravel and stone to the riverbed level. To supposedly prevent the gravel and stone from washing away during flooding, 2' of rip-rap encased in gabion baskets will be placed atop the riverbed. Please note that the Town of Boone attempted to get a law passed by the N.C. General Assembly to specifically allow the Town of Boone to construct this type of submerged

infiltration system. The attorney for Boone says it was done as a precaution. We believe this is the first time this type of system has been constructed in North Carolina. WK Dickson claims this type of structure will have the least impact and is most aesthetic. At the proposed location, the water has been measured, at its highest normal level, at 1.36'. The river is 110' wide at the proposed location. The maximum *"limit of disturbance"* is shown as encroaching a point almost midway the river. They are attempting to keep construction on the Watauga side of the river. However, water doesn't have a boundary; this intake will adversely impact Ashe County. NCDENR claims this type of intake increases the amount of water that can be taken in per second which is crucial in low water situations. Therefore, downstream flow will be impacted.

WK Dickson says the impact on flow downstream is insignificant. At what point does it become significant"? It has already become significant upstream at Boone's current water intake. According to NCDENR, the New River is impaired from a point beginning at the location of Boone's current water intake and downstream to US Highway 421, at the Watauga County Industrial Park. This impairment has been caused by taking so much water out of the river that the river flow fell below the minimum flow levels time after time and has been exacerbated by the pollutants discharged with the treated wastewater downstream from the intake.

Unless a real need for an additional water supply is established unequivocally, and a river bottom intake is absolutely warranted, a new water intake project should not be constructed on the New River.

Boone's proposed water intake is not warranted on the New River!

New River Advocates, Inc.
Board of Directors
September 8, 2014.