

A Review of the Proposed King William Reservoir's Escalating Cost, Debt, and Risk Factors,
and Practicable Alternatives

Prepared for:

Alliance to Save the Mattaponi, and
the Virginia Chapter of the Sierra Club

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Overview

My 1997 analysis of the region's realistic water needs determined that Newport News Waterworks (NNW) had vastly overstated regional water demand. Two other independent studies (Phillips 1997, and PMCL 1998) confirmed this finding. All three studies found the proposed King William Reservoir (KWR) was not required to meet the region's realistic water needs.

The intervening years have shown these three studies to have been accurate, while those produced by NNW and the U.S. Army Corps of Engineers Institute for Water Resources (USACOE/IWR) have proven to be wildly amiss.

Contrary to NNW and the USACOE's forecasts for robust growth, regional water demand has failed to increase at all for 15 years or more. Yet, NNW and its consultants continue to produce forecasts that purport and project significantly increased water demand. Notably, water demand has been stagnant to declining during the very years NNW (in its 1997 FEIS) had forecast it to experience its most rapid rate of increase.

As shown in the following Figure 1, beginning with NNW's original demand forecast (FEIS 1997), followed by NNW's second attempt (HDR 2000), and yet another prepared and utilized by the U.S. Army Corps of Engineers (IWR 2000, USACOE Record of Decision 2001, which is essentially equivalent to NNW's), the 'official' forecasts have all been proven to be grossly exaggerated.

To date, each of these official forecasts and decision-documents overstated regional demand by an amount that – to date – is essentially equivalent to the safe yield of the proposed reservoir. And, the amount by which they overstate regional demand is virtually certain to grow ever-larger over the following decades.

NNW, its consultants, and the USACOE have consistently demonstrated an inability to develop a reliable forecast of regional water demand. Contrary to their projections for rapid and robust growth in water demand, regional demand for water has been stagnant to declining since around 1995, despite:

- an (until recently) robust local, regional, and national economy which saw the addition of tens of thousands of new jobs and households, and water customer accounts,
- the simultaneous waging of two wars that have stimulated activity at the region's military bases and among its defense contractors,
- periods of both extreme drought and abundant rainfall.

As shown in Figure 1, regional water demand has exhibited a stagnant to downward trend. NNW most recent 5-year average annual water sales of 43.7 mgd (2003 to 2007, inclusive) is already 17.5 mgd short of the level of demand it forecast in its FEIS for 2010.¹

However, after adjusting for an internal shift in demand as a result of the de-commissioning of the federally-owned Big Bethel water treatment plant, the variance is closer to about 18.5 mgd.

The magnitude of the error in the demand forecasts prepared by and for NNW (FEIS and HDR) and the USACOE (IWR) is essentially equal to the safe yield of the proposed reservoir.

Simply put, the level of demand NNW and the USACOE used to justify construction of the proposed reservoir has failed to materialize.

Nor is there anything in the last several years of historical data, or prospectively, to suggest the region will require a major new source of supply on the order of the proposed KWR in the foreseeable future.

In reality, the KWR has been sustained by inertia and/or political necessity, rather than by any intrinsic demand. Accordingly, there is no compelling reason to proceed with land acquisition for the proposed reservoir at this time.

Proceeding with land acquisition at this time will create unnecessary risk for NNW's ratepayers by obligating them to pay for land acquisition for an unneeded reservoir well in advance of receipt of required State permits. It would unnecessarily add to the City's already high level of per capita debt. It will constrain the City's ability to fund necessary services, and to fund capital improvements with a legitimate and demonstrable need. And, it will further strain the wallets of the region's residents, business, and industry costing them billions of dollars in capital, interest, operating, and maintenance costs over the next 30 to 40 years. All of which will be magnified should the reservoir's extraordinarily high rate of cost escalation continue.

¹ FEIS Vol. 1, Table 2-14 (excludes unaccounted for water, i.e., un-billed).

Figure 1.
Stagnant to Declining NNW Water Demand,
Newport News Regional Water Sales,
Millions of Gallons Per Day (mgd)
1993 - 2008

Water Sales (mgd)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2010
NNW, Actual	44.3	46.5	44.8	46.1	43.0	44.7	44.2	44.0	44.3	45.8	44.4	43.0	43.2	44.4	43.5	N/A	
5-yr average					44.9					44.6					43.7		
FEIS																	61.2
Variance, actual (to 2007) and FEIS 2010																	17.5

Sources: Newport News Waterworks, various Annual Water Rate Studies, 1997 FEIS, Vol. 1.

Notes:

- 1). 2008 data was requested from NNW, but was not made available for this report.
- 2). FEIS 2010 amount from FEIS Vol. 1, Table 2-14, "Projected Lower Peninsula Demands by Purveyor, Subtotal of Metered Demands" (amount excludes unaccounted for water and represents water sales).
- 3). After accounting for de-commissioning of the federally-owned Big Bethel water treatment plant, NNW's post-2000 water sales would be approx 1.0 mgd lower, and the variance that much higher. Big Bethels' decommissioning had no impact whatsoever on total regional water demand. Rather, it caused a one-time shift of demand from the Big Bethel reservoir and treatment plant to NNW. The Big Bethel reservoir continues to be an existing, practicable, available, and relatively low-cost source of raw water for the region.
- 4). FEIS, HDR, IWR and USACOE Record of Decision demand forecasts are essentially equivalent, being within a few percent of each other.

Series 2007 Water Revenue Bond

NNW's latest demand forecast appears in a required public disclosure document for its Series 2007 Water Revenue Bonds.² The 'Financial Feasibility' section of the Official Statement ("OS") for these bonds utilizes an erroneous methodology that causes it to exaggerate the recent and prospective volume of regional water sales.

Among other problems documented by Dr. Phillips (Phillips 2008)³ the OS confuses a one-time internal shift in water demand of approximately 1.0 mgd⁴ to be an increase in total regional demand. It then uses this non-existent increase as the basis (in part) for forecasting increasing demand and water sales.

Together, these errors cause the OS to project water sales of 45.2 mgd in 2007, and to increase by 0.39 percent annually thereafter. For its initial year (2007), the OS projects water sales (demand) to exceed annual average actual sales of 43.7 mgd for the 2003 to 2007 period (inclusive) by 3.5 percent. This level of error in the OS's initial year demand forecast – expressed as a substantial upward bias – invalidates its multi-year projection of water sales, and its financial forecast on which it relies.

Phillips documents a number of significant errors that contribute to the OS's exaggerated water sales forecast. These errors were known or knowable to NNW and/or the Consultant who prepared the OS's Financial Feasibility Analysis. As the foregoing Figure 1 (and Phillips) demonstrate, when adjusted for its errors, the 2007 OS's forecast would show regional water demand to be declining, or stagnant at best, and for water rates to be substantially greater.

The 2007 Series bonds are a regulated public security requiring full disclosure, due diligence, and other fiduciary and professional obligations on the part of those associated with their issuance. Accordingly, known or knowable defects in the OS (e.g., failure to fully disclose relevant and material information, or to conduct due diligence, material errors, etc.) could potentially open parties involved in the issuance to claims by bondholders or other interested parties.

² City of Newport News, Virginia Water Revenue Bond Series 2007, Financial Feasibility Evaluation, p. A-15 , June 5, 2007.

³ Phillips, D., Comments on the Prospectus for the City of Newport News Water Revenue Bonds, Series 2007, June 2008.
June, 2008

⁴ The approximate average production from the Big Bethel water treatment plant when it was fully operational in the years prior to its de-commissioning. The OS makes no mention of Big Bethel.

And, Phillips notes other risk factors that were not disclosed in the OS – to which one might add NNW and its consultants demonstrated inability to reliably forecast regional water demand, and the problems posed by the reservoir’s upwardly spiraling cost.

KWR's Spiraling Cost

My original analysis (Siegel 1997) demonstrated the proposed KWR to be an expensive and unnecessary luxury. It has since become less necessary and far more costly.

The proposed reservoir's ballooning construction cost, combined with the failure of any significant new demand to materialize since it was proposed, will more than double its ultimate impact on NNW's ratepayers.

Since 1997, when it was estimated to cost \$150 million – to 2007, when it was revealed to cost \$289 million – the cost of the reservoir has grown by an average of 9.2 percent per year.⁵ Its cost has almost certainly surpassed \$300 million by now, and at this rate, it could easily approach or exceed a half-billion dollars by the time NNW expects major construction activity to commence around 2012.

The rate at which the reservoir's costs have escalated has been more 3.5 times the increase in the general rate of inflation (CPI) of 2.57 percent over the same period.⁶

Its rapidly ballooning cost must be borne by a substantially smaller rate base than NNW planned. These two factors – rapidly escalating costs and stagnant to declining water demand – will cause future rate increases to be substantially greater than they otherwise would have been.

Practicable Alternatives

Since regional demand has been stagnant to declining, simply maintaining the existing system is a reasonable and practicable alternative until such time as demand may begin to turn significantly upward.

In this event – and in addition to continued public and private conservation, re-use, and efficiency improvements – NNW has previously identified a number of practicable, readily-implemented, and lower-cost alternatives for augmenting regional supply.

The existence of such practicable alternatives was specifically acknowledged in the 2007 OS. NNW has consistently declaimed the practicability of desalination since its 1997 FEIS. Yet two such facilities have come online since then. And, the recent OS confirms that yet additional capacity from

⁵ Hubbard, F., "Supes Urged Not to Use Revenue Bonds for Reservoir", Tidewater Review, September 26, 2007.

⁶ See: inflationdata.com/inflation/Inflation_Rate/HistoricalInflation.aspx?dsInflation_currentPage=0. Typically, construction costs tend to be fractionally greater than CPI, not a factor of it.

desalination remains part of NNW's formal plans:

“Other future System storage capacity components include conservation programs, **expansion of ground water and surface water desalinization facilities** and additional reservoir sites, if needed” (emphasis added).⁷

The existence of other unspecified practicable alternatives was re-affirmed just weeks ago in a James City Service Authority (JCSA) Bond Resolution and related Project Development Agreement (PDA) between NNW and JCSA. The Bond Resolution stipulates that its capital contribution to NNW can be used for:

“...the King William Reservoir Project, *or an alternate water supply source...*” (emphasis added).⁸

A Memorandum to the JCSA Board of Directors describing the PDA between it and NNW – under which JCSA is to obtain up to an average of 5 mgd of water from NNW (average annual basis) – also states:

“The provision of the water is **not dependent** on the construction of the King William Reservoir” (Emphasis added).⁹

Another alternate water supply source would be for NNW to obtain the right to use the 2.0 mgd Big Bethel reservoir from the military. NNW could likely obtain access to this reservoir for the asking at little to no cost. This existing reservoir can be rehabilitated and readily integrated with NNW's current raw water storage, transmission, and treatment system.

NNW's FEIS previously documented that, should regional water demand begin to turn upward sometime over the next several decades, its reasonably projected demand can be met by still other practicable, lower-cost, and readily implemented alternatives.

In addition to continued conservation, another such alternative identified was to raise the level of NNW's existing Chickahominy reservoir. This would yield another 5.0 mgd of supply at a small fraction of the cost of the proposed KWR.

And, charging an effective summer conservation surcharge, or moving to an increasing block rate structure (while maintaining its lifeline rate) that reflects the cost of peak period and seasonal water

⁷ Official Statement, Newport News Water Revenue Bond Series 2007, p. 17.

⁸ JCCSA Series 2008 Water and Sewer System Revenue Bond Resolution, July 22, 2008. See: www.jccegov.com/pdf/bodpdfs/bodpdfs2008/072208bod/e1_res.pdf

⁹ Memorandum, Smith, R., to JCSA Board of Directors, July 22, 2008. See: www.jccegov.com/pdf/bodpdfs/bodpdfs2008/072208bod/e1_mem.pdf.

use would lead to further reductions in demand. Moreover, an effective summer conservation surcharge would discontinue forcing a large percentage of the region's ratepayers (including most of its lower-income and minority households) to subsidize the cost of providing water to those living in expansive suburban subdivisions with large lawns and swimming pools.

The ongoing rehabilitation of the region's older housing stock and recently adopted conservation standards for washing machines will also yield steadily greater efficiencies over the next several decades. So too will evolving changes in regional development and land use patterns (certain to be accelerated by higher gasoline costs) that encourage infill and redevelopment, as well as smaller and fewer water-intensive lawns and swimming pools.

The foregoing are more than capable of meeting the region's reasonably anticipated water needs in the foreseeable future, and possibly beyond.

And, in the unlikely event additional sources of supply will eventually be needed, additional ground- or surface-water desalination capacity can be pursued.

Future desalination facilities (and retro-fits of existing facilities) would make use of higher efficiency, lower-cost, and lower-energy intensive desalination technologies currently under development – such as those recently demonstrated by researchers at New Mexico State University and Lawrence Livermore Laboratories.¹⁰ Such technologies will enable desalination of seawater to become a practicable and cost effective alternative sometime over the next few decades and would provide the region with a virtually inexhaustible source of water supply.

Escalating Water Rates

NNW's ratepayers are only just beginning to experience the costs associated with constructing an unnecessary multi-hundred million dollar reservoir in their bi-monthly water bills.

For example, NNW's FY2008 Rate Report anticipated a rate increase in that year of a relatively moderate 2.8 percent.¹¹ Yet, soon thereafter, the City's adopted FY 2008 Budget imposed a water rate increase of more than 5 percent – almost double the amount anticipated earlier.¹² Additionally, the City's most recently adopted budget (FY 2009) calls for another water rate increase of 4 percent.

¹⁰ See: www.nmsu.edu/~ucomm/Releases/2007/may/desalination_project.htm; and, "Tiny Tubes Make the Flow Go", Lawrence Livermore Laboratory, S&TR, January/February 2007. See: www.llnl.gov/str/JanFeb07/Bakajin.html, <https://publicaffairs.llnl.gov/news/2006/NR-06-05-06p.html>.

¹¹ Newport News Waterworks, FY2008 Rate Report, Spring, 2008.

¹² City of Newport News, Adopted FY 2008 Budget, p. 9.

Because only a fraction of the proposed reservoir's ultimate capital costs (and none of its operating costs), have yet to impact NNW's budget and rates, the proposed reservoir's impact on its customers utility bills will continue to grow.

A fall-off in housing (and commercial) construction would place further upward pressure on user rates as substantial capital revenues in the form of anticipated system development charges, hook-up fees, and other non-rate user revenue declines.

The recent round of water rate increases is occurring when the region's ratepayers, business-owners, homeowners, and taxpayers are already stressed with a high level of per capita public debt, rising interest rates and mortgage payments, higher property taxes, stagnant to declining housing values, and increasing rate of foreclosures. In this environment, other legitimate and more urgent needs will begin to compete for limited public funds and debt capacity that could be better spent on something other than an un-needed reservoir.

Excessive Per Capita Debt

Newport News' per capita debt levels are among the highest among all Virginia cities and counties. According to the Virginia Auditor of Public Accounts, the City's 2007 per capita local debt burden of \$4,902 (roughly \$13,000 per household) ranks it as having the 8th highest debt burden among all Virginia localities.¹³

High per capita debt is a concern because it signifies an excessive burden on taxpayers, and its potential to negatively affect debt ratings and borrowing costs.

Ratings agencies have already expressed concern over the City's excessive level of per capita debt. The City has responded by committing itself to self-finance more of its future capital needs out of current revenues through 'pay-go' (e.g., cash) funding a larger share of its capital improvements plan (CIP).

This strategy can be effective in an environment of double-digit increases in taxable real property values. However, it becomes problematic against a background of: a) stagnant to declining real property values – as can be expected over the coming years as the impact of the meltdown in the mortgage, credit, and housing sectors begins to be reflected in real property assessments, b) the need to increase the City's contribution to its under-funded pension system to come into compliance with applicable accounting standards; and, c) the need to undertake capital projects with a legitimate and urgent need.

¹³ Virginia Auditor of Public Accounts, "Comparative Report of Local Government Revenue and Expenditures", year-ended June 30, 2007. It ranked 7th among cities.

Unfortunately, the City can no longer count on double-digit increases in its real property tax base to self-finance more of its CIP, or to keep its debt ratios under control. It may not be able to count on any increase in its real property tax base over the next few years. Indeed, it could well experience a decline in valuations – particularly in its residential sector.

Already, real estate values have fallen precipitously in some U.S. markets. While it may experience a lower level of decline, there is no reason to expect the Hampton Roads region to escape the impact of the powerful forces that have already caused significant to substantial declines in real property values elsewhere in Virginia and the U.S.

And, by the end of 2007, foreclosure data for the Hampton Roads area had begun to reflect the impact of the national contraction in the housing and credit markets.

The foreclosure rate for the Virginia Beach-Newport News area was reported to be a still manageable .04 percent at the end of 2007. However, it's year-over-year number of foreclosure filings had soared by an alarming 258 percent – making it the 7th highest rate of increase among the 100 largest metropolitan areas in the U.S.¹⁴ Clearly, the region was just beginning to feel the affect of the impact of the ongoing recapitalization and reversion to the mean of housing values that became increasingly evident during the latter part of 2007.

Alternately, Newport News can begin to significantly reduce its high per capita debt levels by decreasing its level of outstanding debt. This is typically accomplished by reducing capital borrowing below the level at which existing debt is retired.

Should its pay-go strategy for reducing its excessive per capita debt become increasingly difficult over the next few years (as appears likely), the City could face the prospect of having to make substantial cuts in its CIP to preserve its bond rating.

¹⁴ See: www.inman.com/news/2008/02/3/us-foreclosure-filings-79-in-2007, February 13, 2008.

Conclusion

The large increase in regional water demand that NNW has used to justify construction of the proposed KWR has yet to materialize. Nor does demand show any sign of increasing significantly in the foreseeable future. In reality, demand has been stagnant to declining for about the last decade-and a-half, rather than increasing robustly as NNW and the USACOE anticipated.

In fact, the safe yield of the proposed reservoir is essentially equivalent to the amount by which these agencies demand forecasts have already fallen short.

Accordingly, the reservoir is not needed to meet the region's legitimate water needs.

In the event that demand should begin to trend upward sometime in the future, a number of other existing, practicable, readily-implemented, and lower-cost sources of supply are available.

Continuing to spend hundreds of millions of dollars on land acquisition, permitting, environmental studies, construction, and operation and maintenance of this unnecessary facility will commit the region's ratepayers to throwing good money after bad for the next several decades.

The reservoir's excessive cost will cause the City's already high per capita debt to be much greater than it would otherwise be over the next several decades.

Proceeding with the proposed KWR could well cause cutbacks and/or deferrals in other necessary capital improvements and requirements as the City struggles to fully fund its CIP, raise revenues in a stagnant to declining real estate market, and to come into compliance with its un-funded pension obligations.

It remains to be seen how much longer local officials will continue to support an un-needed and increasingly costly reservoir over necessary public facilities and other requirements for which there are legitimate and urgent needs.