An Analysis of the

“[2017 Regional Water Impact Fee Facilities Plan & Analysis prepared for the Washington County Water Conservancy District by Zion’s Public Finance and Applied Analysis](http://content.csbs.utah.edu/~lozada/Research/2017-Regional-Water-Impact-Fee-Facilities-Plan-Analysis.pdf)”

by

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November 2017[[1]](#footnote-1)

**Point 1.  The District’s Impact Fee Calculation is Wrong**

I will abbreviate the “2017 Regional Water Impact Fee Facilities Plan & Analysis” by “FP.”

The FP’s Table 14 (page 18) shows a “total cost of supply facilities” of around $1.5 billion and a “yield (acre-feet)” of around 93,000.  The FP divides the cost by the water supplied, obtaining approximately $1.5 billion/93,000 ac-ft = $16,000/ac-ft.  Or, measuring water by ERCs instead of by ac-ft, $16,000/ac-ft \* 0.89 ac-ft/ERC = $14,000/ERC, approximately.  The FP then adds in treatment costs of about $3000/ERC, for a total of about $17,000/ERC, which forms the basis of the District’s proposed new long-run (2025) impact fee.

The first problem with this calculation is that page 6 of the FP says that in 2026 “the District will need to supply 26,159 new ERCs.”  The right way to figure out the cost per ERC through 2026 is to divide the cost by the actual number of ERCs that will exist in 2026, not by the number that could be supported decades later.  But then one gets approximately $1.5 billion/26,159 ERC = $57,000/ERC.  That is much larger than $14,000/ERC.

This $57,000/ERC impact fee number is not the ultimate answer either because there are other problems with the methodology used in the FP.  Table 14’s “cost of new supply facilities” is $1,461,718,340.  Table 13’s total “projected capital expense” is $1,585,469,129.  The figure in Table 14 is $1,461,718,340/$1,585,469,129 = 92% of the figure in Table 13.  Page 13 of the FP says “new development beyond the 10-year planning window is expected to finance the remaining portion from which it will benefit.”  If new capacity is 92,570 ac-ft, or 92,570 ac-ft\*ERC/0.89 ac-ft = 104,011 ERCs, and only 26,159 of those ERC’s will exist in 2026, then by the logic of the FP, only 26,159/104,011 = 25.15% of the costs would need to be covered by 2026, not 92%. That would reduce Table 14’s “cost of new supply facilities” down to 25.15% of Table 13’s total “projected capital expense” of $1,585,469,129, which is approximately $398,749,000.  Again following the logic of the FP, dividing that by the 26,159 ERCs of 2026 yields only $15,243/ERC.

Yet that is not the right number either, because the cost is stated in 2017 dollars (FP page 16 first line), while the receipts from the impact fees are coming in in future years, and future year dollars are worth less than current year dollars.  Starting on page 18 the FP ignores this, and hence the logic of the FP is fatally flawed.

In other words, before page 18, the FP takes the time value of money into account.  On page 18 and later, it does not.  This makes its final calculation, and the corrections of the last three paragraphs, worthless.

In the minutes of the [August 16, 2017 meeting of the Board of Trustees of the WCWCD](http://content.csbs.utah.edu/~lozada/Research/2017-08-16-Minutes-work-mtg.pdf), page 4 reports a discussion of differing time paths to get to the long-run impact fee.  Because dollars obtained in one year are not equal to dollars obtained in any other year, differing time paths of fee increases bring in different amounts of total 2017 dollars, in turn affecting what the long-run impact fee would have to be.  Yet no one at the meeting---and page 3 reports that Jeremy Aguero of Applied Analysis was at the meeting---pointed that out.  The District’s “total cost” of $17,396 (p.3 of 8/16/17 minutes; the 9/20/17 minutes have $17,071 on p.2) is in 2017 dollars; setting that as the impact fee in 2026, or in any year after 2017, is not going to bring in enough revenue.  In addition, a proper analysis would have to take into account the exact year that the 2017—2026 impact fee revenues were received.  And---to make sure that 100% of the pipeline could be financed, not just 25.15%--- a proper analysis would have to take into account the exact year that all the impact fee revenues until the 2060’s were received.  The FP clearly does none of this.  So, while its pre-page-18 analysis of costs is competent in its handling of the time value of money, its page-18-and-after analysis of revenues is utterly incompetent.

(The FP page 16 time value of money is 2.4% per year, meaning $17,071 of 2017 dollars would have to be $17,071\*1.024^(2026-2017) = $21,133 in 2026 dollars, and be $17,071\*1.024^(2036-2017) = $26,789 in 2036 dollars, and so forth.)

It is easy enough to do a correct calculation in less than a minute using [the spreadsheet](http://content.csbs.utah.edu/~lozada/Research/2015%20LPP%20FINAL%20Repayment%20Analysis11_Windows.xlsm) from my [web page](http://content.csbs.utah.edu/~lozada/Research/index.htm). Go to its “First Scenario” tab and change its cell M18 (“impact fees’ portion of split financing) to 100%.  (Click on the “recalculate” button in cell P16 if either cells O15 or Q15 aren’t zero; Excel macros have to be enabled for the “recalculate” button to work.)  The answer is that impact fees have to increase by a factor of 3.43129 (cell B21), meaning an average impact fee of $20,938 in 2013 dollars (cell B22).  The FP’s preferred inflation index (FP page 16 and footnote 20) [went from](https://data.bls.gov/timeseries/WPUSI012011) 208.8 in June 2013 to 221.9 in June 2017, making $1 in June 2013 equal to $1 \* 221.9/208.8 = $1.06274 June 2017 dollars.  That translation implies **an impact fee of** $20,938\*1.06274 = **$22,252 in 2017 dollars, which is 30% higher than the District’s number** of $17,071 (the math is 22,252/17,071 – 1).[[2]](#footnote-2)

If the impact fee were not raised to $22,252 in 2017, but was phased in over a period of years, its ultimate value would have to be more than $22,252 in 2017 dollars, to make up for the shortfalls during the transition time.

**Point 2.  The District ignored required Interest Payments**

The FP’s Table 6 (page 10), and the rest of its analysis, assumes zero cost for bond financing of the Lake Powell Pipeline.  This is a blatant violation of the LPP Development Act, and contradicts [the Utah Board of Water Resource’s FERC filing of August 11, 2017](http://content.csbs.utah.edu/~lozada/Research/2017_FERC_filing_UBWR.pdf), which says “the project beneficiaries are required to subsequently repay the state for its costs with interest” (page 2).

A journalist said to me, “I would want to address the more general question of what impact it would have on the state to provide, as you’ve called it, a no-interest loan to the districts to finance the project….”  Page 2 of [the Economists’ letter of September 2016](http://content.csbs.utah.edu/~lozada/Research/WCWCD%202016%20Letter10.pdf) says that the no-interest feature of the loan from the State to the District “amounts to the State paying 72% of the true financial cost of the project (its `net present value’) and the WCWCD paying only 28% of it.”

(My spreadsheet’s calculations do include repayment of interest.)

**Point 3.  The District’s 75%/25% split of fee burdens was incorrectly analyzed**

The [8/16/17](http://content.csbs.utah.edu/~lozada/Research/2017-08-16-Minutes-work-mtg.pdf) and [9/20/17 minutes of the board meetings of the WCWCD’s trustees](http://content.csbs.utah.edu/~lozada/Research/2017-09-20-Minutes.pdf) record a decision to divide the burden of the new facilities’ costs 75% to impact fees and 25% to property taxes and water rates.  The FP assumed all the costs would be borne by impact fees.  (See, for example, on its page 15: “…the District’s Board of Trustees may determine that a set portion of the costs required to serve new development be paid by user charges and general taxes rather than by the full impact fee calculated in this analysis.”)  Ignoring all the problems I raised about the calculation of the needed impact fee in Points 1 and 2 above, the needed impact fee according to the FP is $17,071 (its Table 16).  If only 75% of the costs are to be borne by impact fees, one would think the needed impact fee would fall to $17,071 \* 75% = $12,803, yet the Board meeting minutes still use $17,071.  That is a mistake, even according to the flawed logic of the FP.

The correct calculation can easily be done using [my spreadsheet](http://content.csbs.utah.edu/~lozada/Research/2015%20LPP%20FINAL%20Repayment%20Analysis11_Windows.xlsm).  Go to its “First Scenario” tab and change its cell M18 (“impact fees’ portion of split financing) to 75%.  (Click on the “recalculate” button in cell P16 if either cells O15 or Q15 are not zero; Excel macros have to be enabled for the “recalculate” button to work.)  The answers are that impact fees have to increase by a factor of 2.82347 (cell B21), meaning **an impact fee of** $17,229 in 2013 dollars (cell B22), which is $17,229\*1.06274 =  **$18,310 in 2017 dollars** using the FP’s preferred measure of inflation; **and water prices have to** go up by a factor of 3.10905 (cell B20).  That means water prices have to **go up by 210.905%** (because going up by a factor of 1 would be a 0% increase in water prices).  It is interesting that in the Board meetings, no one discussed how much water rates would have to go up, nor what such an increase in water rates would do to population growth projections or water need projections.  Certainly the water rate increases, by decreasing the demand for water, would push down the water need projections and imply the LPP would be unneeded until a date farther into the future.  In particular, even with unchanged population growth projections, water demand would change by a factor of 0.57 (cell J21); total water demand in the year 2060 would be 108,760 ac-ft/yr (cell U10 of tab “Water Demand”); and since the District will be able to supply 130,840 ac-ft/yr without the Lake Powell Pipeline (“Water Demand” tab cell C10), **with that kind of water price hike the LPP would not be needed until sometime after the year 2060**.

If the impact fee were not raised to $18,310 and water prices were not raised by about 211% in 2017, but the increases were phased in over a period of years, the ultimate impact fees would have to be more than $18,310 (even measured in 2017 dollars, let alone the future years’ dollars) and the ultimate water price hike would have to be more than 211%, to make up for the shortfalls during the transition time.

**Point 4.  Citizens express no awareness that the ultimate burden of impact fees is on current landowners, not newcomers**

The WCWCD Trustee board minutes show that the homebuilding and realtor community of Washington County was concerned about the increase in impact fees.  Economic theory suggests that homebuilders and realtors may suffer short-term adverse effects of an impact fee increase, but in the long run, when real estate markets in that part of Utah and Nevada equilibrate (including nearby counties in Utah that are not part of the LPP), the value of land in Washington and Kane Counties will fall by the amount of the impact fee increase.  The ultimate burden will be on current landowners in those counties.  It is not clear how long the markets will take to equilibrate, and economic theory makes simplifying assumptions which do not always reflect reality, so homebuilders and realtors may be hurt for a long time, but it is still likely that the biggest effect will be to depress the value of unimproved land.

In the 9/20/17 minutes, page 5, Board member Mayor Jon Pike is quoted as saying many current residents “don’t think new growth benefits them, but it benefits everybody.”  Paying for the LPP via impact fees will hurt “everybody’s” land value.  This is not meant to be a criticism of Mayor Pike or the homebuilders or realtors; only an economist would be assumed to know this.

**Point 5.  The District’s analysis of water needs is dubious**

All of my analysis above assumes the State is projecting population growth correctly, but if an expensive pipeline has to be paid for by increasing water rates, fewer people may move into the area.  Also, a rise in population typically leads to conversion of agricultural land to suburban uses, which decreases water use, a factor the District’s water needs projections do not take into account.  And if the rise in population did not lead to conversion of agricultural land to suburban uses, St. George will have become a city in which most people live in skyscraper apartments, which means they will have no need for the outdoor water which (FP Table 1 page 5) constitutes about half of projected future water needs.

The District’s assumptions about water conservation are also subject to criticism.

1. This document contains hyperlinks which are underlined and set in blue, which may confuse anyone who reads a paper printout of it instead of reading its electronic version. [↑](#footnote-ref-1)
2. The spreadsheet only includes the Lake Powell Pipeline, not the other supply and transmission projects and not any treatment facilities; and uses a cost of about $1.328 billion 2013 dollars (cell O3), which translates to $1.328 billion \* 1.06274 = $1.41132 billion June 2017 dollars.  So the FP’s estimate of LPP construction cost, $1.377609 billion 2017 dollars, seems somewhat low.  The FP does not mention LPP operations and maintenance costs, nor LPP power sale revenue, which the spreadsheet takes into account. [↑](#footnote-ref-2)