**Southern Kent Island Sanitary Project: Market Value
Differential for Buildable vs. Non-Buildable Unimproved Lots**

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An analysis by W. Fitzhugh Turner, of Tidewater Property Appraisers, LLC, identified market transactions for 197 buildable but unimproved lots during the period 2003 through 2012.[1] These lots were either served by public sewer or had successfully passed a soil percolation test, indicating that septic tanks could be installed. The same survey identified sales of 117 non-buildable unimproved lots. These lots had either failed a percolation test, or had not been tested. In the latter case, it can be presumed that the parties to the market transaction did not expect that a septic tank would be permitted. Waterfront properties were excluded from both totals, as well as properties non-buildable for environmental reasons (wetlands, etc.), commercial properties, boat slips, non-arms length transactions, etc. Waterfront properties are discussed later in this report.

Mr. Turner's compilation of the market values of these properties can be summarized as follows:

Market transactions from January 1, 2003 through December 31, 2012.	**Buildable –** Public Sewer or Passed Perc. Test	**Non-Buildable** – Failed Perc. Test or No Test
No. of Market Transactions	197	117
Mean Market Price	$137,382	$16,098
Lowest Price	$47,000	$500
Highest Price	$255,000	$47,000

All prices are for individual lots. Where a transaction involved more than one lot, the total price was divided by the number of lots to obtain the average price per lot.

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1   Turner, W. Fitzhugh, "Re: Southern Kent Island Sanitary Project: value differential: improved properties with private septic tanks versus public sewer and between residential buildable and non-buildable lots," March 6, 2014.

Economic theory, market behavior, and common sense would all argue that buildable lots have a greater market value than non-buildable lots. The construction of a public sewer, which transforms non-buildable lots into buildable lots, confers a windfall gain on the owners of the presently non-buildable lots in the form of increased market value. The amount of that gain is of considerable importance in devising an equitable allocation of the costs of the project. This is the subject of this report.

Mr. Turner's data suggest that the differential between buildable and non-buildable lot prices is on the order of $121,000 (the difference between the means of the two data sets). But this simple calculation may not be reliable for two reasons:

1. The market prices collected by Mr. Turner cover a period of extraordinary price fluctuation in the real estate market. Prices rose sharply up to 2007-2008, then dropped even more sharply, only to begin some tentative recovery at the very end of the period. A fair comparison between the two means requires that all market prices be adjusted to a common price level.

2. The considerable variation of lot prices in each sample suggests that the observed means may not be reliable estimators of the true means of these two groups of properties. The difference between the true means may be something different from the difference noted here.

The first issue is dealt with by adjusting all observed market prices to 2012 levels. The second issue requires a statistical test of the difference between two means (in this case, between the means of the adjusted market prices). The result of this test is not a difference that can be stated with certainty, but rather the probability that the true difference is at least as large as some selected amount.

Adjusted Market Prices

In adjusting observed market prices to equivalent 2012 values, Mr. Turner used the FHFA's House Price Index (HPI) for the Baltimore Metropolitan Statistical Area.[2] The HPI is a "constant quality" house price index, derived from repeat transactions on single-family detached residences that have been re-sold or re-appraised at least once.[3] Although the index pertains specifically to improved property, it is used here to normalize prices of unimproved property, based on the observation that the prices of such properties track the general real estate market. The HPI for the Baltimore MSA was chosen because this MSA includes Queen Anne's County and because Kent Island has been subject to similar market pressures and trends as Anne Arundel County, also part of the Baltimore MSA.

Specifically, the factors used in this analysis are derived from the All-Transactions House Price Index for the Baltimore Metropolitan Statistical Area.[4] Quarterly indexes were averaged to obtain annual values. The following table shows the computed annual index numbers and the resulting factors used to adjust observed market prices. Within each calendar year, each price is multiplied by the factor for that year to obtain the adjusted price.

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2   Subsequent to his March 6 report, Mr. Turner performed the market price adjustments described in this section. The details of these adjustments were communicated verbally and by examination of a revised spreadsheet which Mr. Turner provided to the writer on April 1, 2014.

3   Calhoun, Charles A., "OFHEO House Price Indexes: HPI Technical Description," Office of Federal Housing Enterprise Oversight, Washington, March 1996.

4   Downloaded from http://www.fhfa.gov/Default.aspx?Page=87 on March 22, 2014.

Year	HPI	Factor
2003	153.69	1.30
2004	181.08	1.10
2005	218.63	0.91
2006	245.80	0.81
2007	252.18	0.79
2008	239.41	0.83
2009	220.47	0.90
2010	209.99	0.95
2011	201.19	0.99
2012	199.42	1.00

Using these factors, all of the relevant lot sale prices were adjusted by the appraiser, William Fitzhugh Turner. The following table summarizes the results of these adjustments:

2003—2012 transactions adjusted to 2012 prices.	Buildable – Public Sewer or Passed Perc. Test	Non-Buildable – Failed Perc. Test or No Test
No. of Market Transactions	197	117
Mean Market Price	$130,625	$15,899
Lowest Price	$47,000	$495
Highest Price	$247,000	$42,300

It can be seen that the difference between the observed means is now $114,726, as compared to $121,284 before the adjustments. Also, the ranges of the adjusted prices are smaller.

Testing Difference Between Means

The difference between the adjusted means is tested by means of a "one-sided t-test." The null hypothesis is that the mean price for buildable lots **is not** at least $100,000 greater than the mean price of non-buildable lots. If the test rejects the null hypothesis, it can be concluded that there is reason to believe an alternative hypothesis: that the mean price for buildable lots **is** at least $100,000 greater than the mean price of non-buildable lots. In this case, the null hypothesis was rejected.

The next task is to determine how likely it is that the alternative hypothesis is true. This depends on the level at which the null hypothesis was rejected – in this case, less than 0.001. This number reflects the probability that the null hypothesis will be rejected when it is, in fact, true. Since it was rejected, this means that there is a negligible chance that this rejection was in error.

The probability that the null hypothesis has been correctly rejected, therefore, is greater than 0.999.

Translating this into simpler terms, we can make the statement:

The average buildable lot is worth at least $100,000 more than the average non-buildable lot, at 2012 prices.

The probability that this statement is true, based on the property values surveyed, is greater than 0.999 – a virtual certainty.

The statistical test described here posited a difference of "at least $100,000." It follows, then, that the same conclusion can be reached for any difference smaller than $100,000. In view of the size of the benefit assessments being considered by the County, it does not seem necessary to test differences larger that $100,000.

Waterfront Lots

Unimproved lots abutting water are more problematic for several reasons: (1) there is more variation in market price as a consequence of differing site and environmental factors; (2) they are more likely to be held by speculators for long periods of time, with resulting distortion of market prices; and (3) there are fewer data points in the survey, making statistical tests less powerful. Nevertheless, transaction data were obtained for waterfront lots and subjected to the same analysis described above.

Summarizing the results of Mr. Turner's survey gives the following information about actual market prices for waterfront lots.

Waterfront market transactions from January 1, 2003 through December 31, 2012.	**Buildable** – Public Sewer or Passed Perc. Test	**Non-Buildable** – Failed Perc. Test or No Test
No. of Market Transactions	37	25
Mean Market Price	$571,324	$32,356
Lowest Price	$200,000	$10,000
Highest Price	$1,850,000	$100,000

In this case, the observed difference in means ($538,968) is very large, as is the range within each sample.

Using the HPI, as before, to adjust these data to 2012 price levels gives the following results.

2003—2012 waterfront transactions adjusted to 2012 prices.	Buildable – Public Sewer or Passed Perc. Test	Non-Buildable – Failed Perc. Test or No Test
No. of Market Transactions	37	25
Mean Market Price	$540,212	$30,606
Lowest Price	$166,000	$10,000
Highest Price	$1,461,500	$79,000

The effect of the adjustment to 2012 prices is to reduce the mean and the range for each sample.

Although a substantially larger value differential may be present here, because of the purpose of this study as well as the small sample size only the $100,000 differential was tested, as used for non-waterfront property.   Nevertheless, the same result was obtained. We can make this statement:

The average buildable waterfront lot is worth at least $100,000 more than the average non-buildable waterfront lot, at 2012 prices.

The probability that this statement is true, based on the property values surveyed, is greater than 0.999 – a virtual certainty.

Conclusions

This report describes an analysis of actual market prices for buildable and non-buildable lots in the proposed service area of the South Kent Island sewer project. It is expected that owners of unimproved non-buildable lots will receive a substantial benefit in the form of increased market value.

Based on this study, for the period 2003-2012, the average buildable lot had a market value at least $100,000 greater than the average non-buildable lot (in terms of 2012 prices). This result was obtained with a very high degree of statistical certainty (probability over 0.999). Waterfront and non-waterfront lots were analyzed separately, but the same result was obtained.

Therefore, it is reasonable to expect the provision of public sewer service to result in market value appreciation on the order to $100,000 per lot, or more.

These conclusions reflect my opinion to a reasonable degree of professional certainty.

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