

## 1 Issue

The long-term<sup>1</sup> cost of serving additional residents<sup>2</sup> (i.e. marginal cost) is an important cost to understand correctly for the City of Davis (Davis), as it is used for a number of important calculations, including accurately determining the net economic contribution a proposed development project or long-term growth target will make to the City's fiscal position in the long-term.

## 2 Background

It is current City policy to assume that additional residents will add 75% of average costs per resident for City departmental cost categories<sup>3</sup>. This assumption was adopted by Davis City Staff (Staff) when the issue was last debated as 'splitting the difference' between camps, whose views of long-term marginal cost per resident ranged from 0% to 100%, with most lying between 50% and 100%.<sup>4</sup>

This assumption has long been contested within the Budget and Finance Committee (B&FC)<sup>5</sup>, and was once again contested by members of the B&FC during their review of the City's assessment of the net benefits of the Mace Innovation Research Center (MIRC) project at their October meeting.<sup>6</sup>

At the B&FC's December 2020 meeting, the Davis City Council (the Council) representatives to the B&FC expressed their desire for the B&FC to analyze the issue and provide guidance back to Council. At this same meeting, a draft report on improving the economics of major property developments identified the marginal cost assumption as being one issue for further investigation due to its potential fiscal impact on Davis's long-term fiscal position.

## 3 Analysis

Research was undertaken to identify potential sources of data that could be used to estimate what the cost of additional residents would be to the City. This research effort identified a dataset from the California State Controller's Office, which included costs and revenues per capita for 482 California cities from 2004-2017. It was concluded that this dataset could be used to assess the relationship between population size and average cost per resident, to provide a fact based estimate of marginal cost.

The full dataset for 2017 was first analyzed to identify any statistical relationship between city size and costs per resident. Figure 1 below uses the data<sup>7</sup> to relate average<sup>8</sup> California city expenditure (i.e. cost) per capita to average city population. Simple regression analysis suggests population accounts for 8% of the change in cost per resident, however, the relationship<sup>9</sup> is not statistically valid. In other words, the 'best fit' relationship indicated by the dotted line is not statistically supportable.

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<sup>1</sup> The traditional economic definition of long-term is the period over which all costs are variable, e.g. 40-50 years.

<sup>2</sup> Resident is used here in lieu of the more technically correct metric, Dwelling Equivalent Unit (DEU).

<sup>3</sup> Costs related to capital improvements, debt financing, do not appear to be included in the cost calculation.

<sup>4</sup> This characterization is based on statements by Councilor Carson and Matt Williams.

<sup>5</sup> Councilor Carson advised the issue of marginal cost has been a long standing one at a recent meeting.

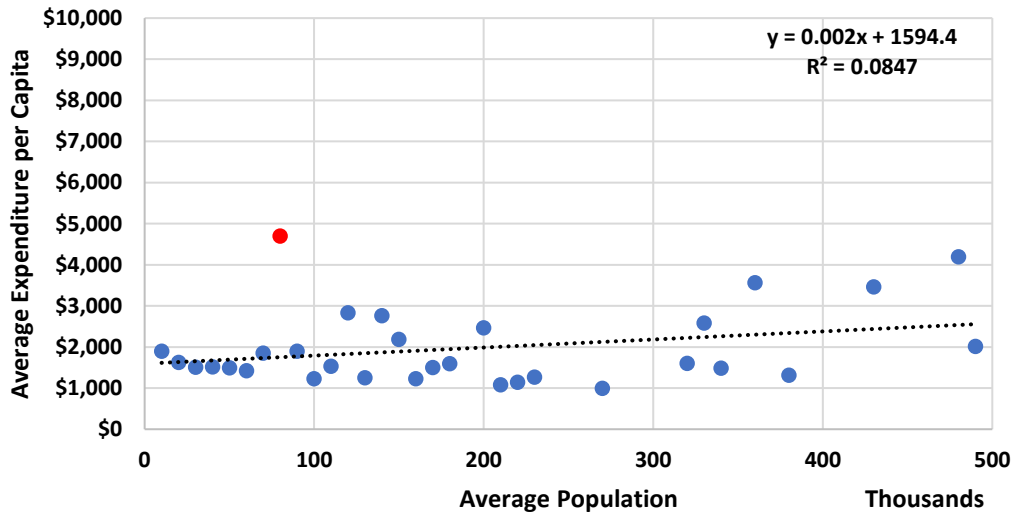
<sup>6</sup> The MIRC was recently voted down by Davis voters as Measure B.

<sup>7</sup> Limited to cities between 10,000 and 500,000 in population.

<sup>8</sup> Average was used to reduce statistical noise, the attached spreadsheet shows the unaveraged results as well.

<sup>9</sup> P-values for slope (11%) and intercept (5%) are above industry standards of 5%.

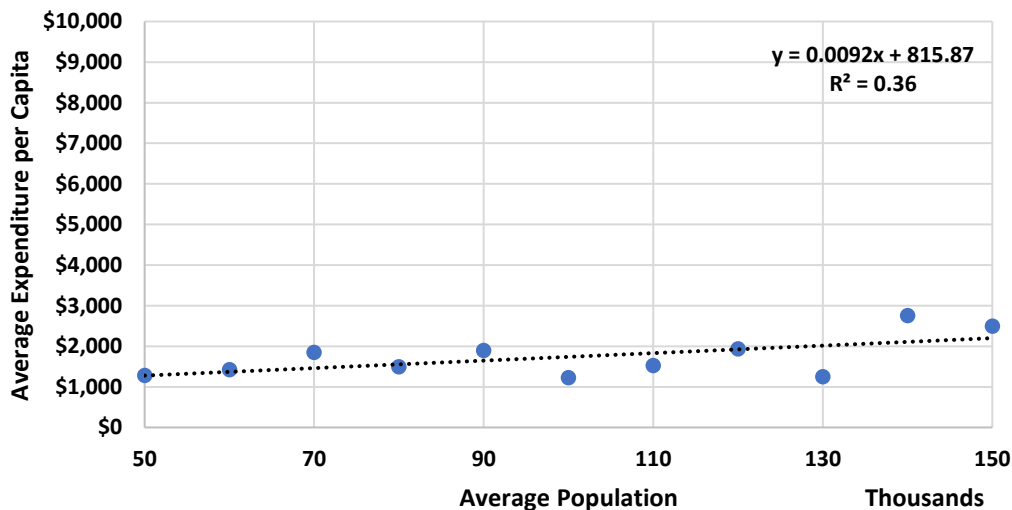
Figure 1 – Relationship of Avg. City Size to Avg. Cost per Capita (10,000-500,000 residents)



Source: California State Controller’s Office

In order to more appropriately apply the available dataset to the Davis’s current and long-term circumstances, and to address the data outlier shown in red in Figure 1, a sub-set of the data was examined. The figure below reports the same data as Figure 1, but limited to cities between 50,000 and 150,000 residents<sup>10</sup>, as being more representative of the range of populations that Davis<sup>11</sup> is likely to be able to reach in the next 40 years.

Figure 2 – Relationship of Avg. City Size to Avg. Cost per Capita (50,000-150,000 residents)



Source: California State Controller’s Office

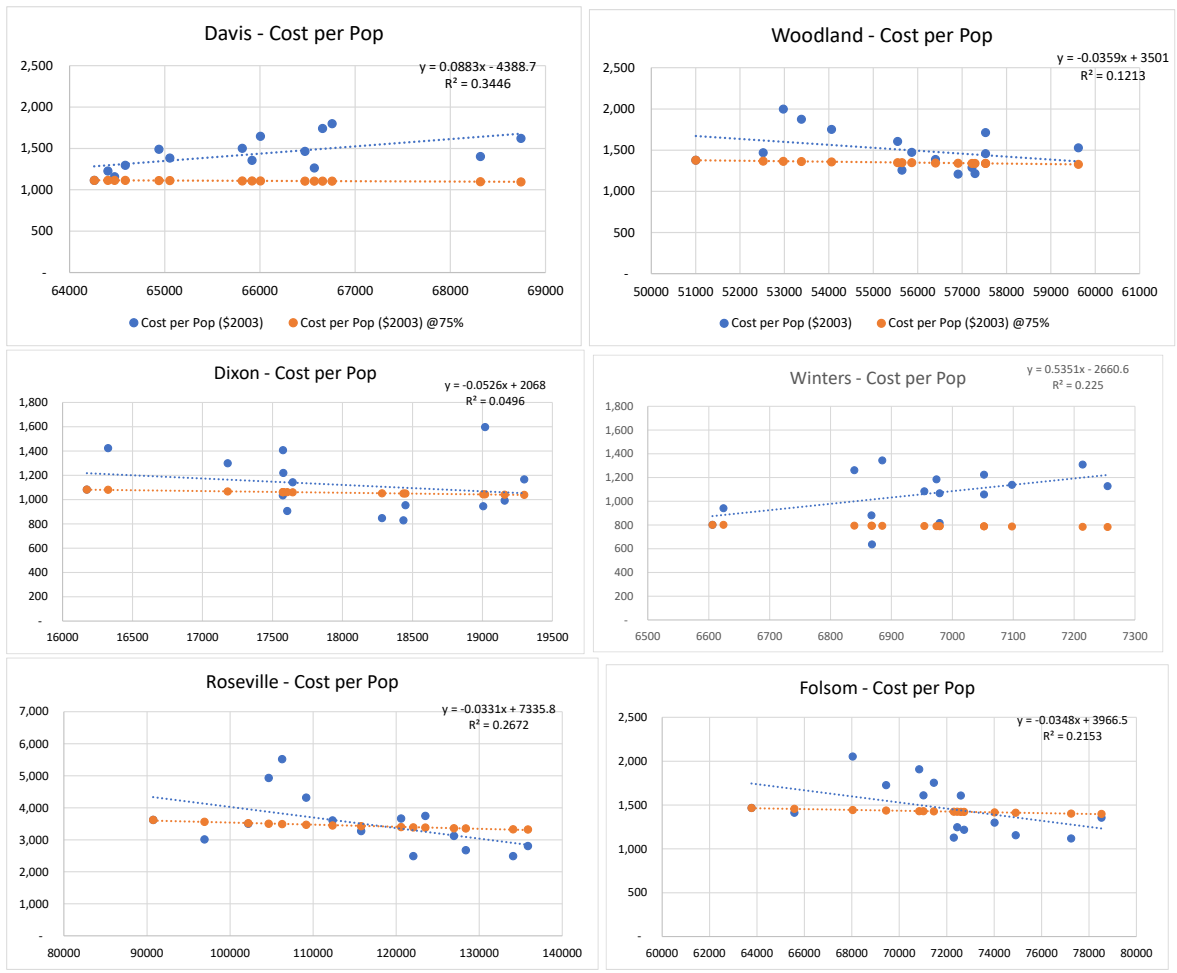
<sup>10</sup> Mountain View was also excluded due to it being a distant outlier with over 65k per capita expenditure.

<sup>11</sup> The data shows Davis as having 68,740 in 2017, and is indicated by the round green marker.

The above analysis of city costs per resident across 140 cities ranging between 50,000 and 150,000 using data provided by the California State Controller’s Office excluding two outlier cities shows that the average size of city accounts for 36% of the change in the average cost per resident, and that the relationship (of rising cost per resident) is statistically valid<sup>12</sup>. This analysis does not account for regional differences specific to Davis, which may work to increase or decrease marginal cost from the average.

The task force then looked exclusively at local cities to see if there was any difference in the results for local, comparable cities to Davis. The results of this analysis, which also adjusted for inflation assuming a 2% per annum rate, are summarized in the table of graphics below in blue, with an estimated 75% cost point over time for new residents indicated in orange. Although it is difficult to see, the blue and orange dots in 2003 are overlapping, as they start in the same place.

The analysis shows mixed results across regional cities, with inflation adjusted costs in Davis and Winters rising over the period and costs in Woodland, Dixon, Roseville and Folsom falling. Of these, Dixon’s Roseville and Folsom’s rate of decline is consistent with the assumption that 75% or more of a City’s costs are variable.



<sup>12</sup> P-values of intercept (33%) and slope (5%).

Based on the above analysis, the Marginal Cost Task Force (the Task Force) has concluded that the data does not support an assumption that additional residents will contribute only 75% the cost of current residents. Data appears to show that costs per capita rise on average with additional population for California cities between 50,000 and 150,000 residents<sup>13</sup>. The data is mixed for cities in the Yolo County and nearby regions over the 14 year period from 2003 to 2017, with Davis's own trend rising, implying an increasing cost to serve additional residents over time.

## 4 Key Limitations and Future Directions

The Task Force want to emphasize that this analysis is limited by the available data, and that a more accurate estimate would require a bottom-up cost estimate for the whole city over a long-term timeframe, something only really possible during a general plan update. It is also worth considering that this analysis only looked at the cost per resident, and that the overall benefits of growth require consideration of the impact of City size on revenue per capita as well.

The Task Force is therefore recommending that future City analysis including include:

- Review of costs and revenues per resident to inform the general plan update
- Analysis of the key drivers of cities with relatively high net positive positions to inform policymaking
- Recalculation of long-term costs as part of the general plan update

## 5 Consultation

The task force reached out to the consultant<sup>14</sup> that had completed the economic analysis for the MIRC to understand the basis for the 75% assumption used. They informed us that the approach was an industry rule of thumb, and that they could not point to any analysis supporting this assumption.

In addition, this report to the B&FC was circulated on 8 March 2021 to the following stakeholders and subject matter experts for their input:

- Ms. Elena Adair, Director of Finance, as the liaison to the B&FC, and
- Mr. Ash Feeny, Director of Community Development and Assistant General Manager, as the Director with the greatest stake in the analysis, and
- Councilors Carson and Chapman, as liaisons to the B&FC.

No feedback was received from the stakeholders prior to the finalization of this report on 8 April 2021.

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<sup>13</sup> Outliers and variability appear to increase as city population increases.

<sup>14</sup> Economic and Planning Systems, Inc.

## 6 Recommendation

Based on the analysis presented herein, which is that we have found no data that supports an assumption of 75% marginal cost of service for Davis at the present time, the Marginal Coast Task Force recommends that the B&FC:

1. Provide constructive feedback on the research, data, analysis and conclusion
2. If it is found to be reasonable, support a motion to recommend to the City Council to adopt a financial policy (which they can always change at any time) of assuming at least a 100% of average costs in lieu of the current policy of assuming 75% of average costs, when estimating the marginal cost of serving a higher population
3. Consider assigning a task force to undertake recommended future directions