December 18, 2017

To: City Council

We are working towards a Resolution to refer to our electorate allowing the City Council the authority to change the amount of a System Development Charge based upon an Index. To increase a charge more than the agreed upon Index would require a vote of the electors.

We have used the Building Cost Index published by the *Engineering News-Record*. It has been tracking the index since 1915.

The attached Report to the City Council provides information about construction cost indexes.

The recommendation is that the City Council use the *Engineering News-Record’s* Building Cost Index – Seattle as the starting point in all discussions and decisions in adjusting System Development Charges.

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Subject: Recommendation to Select a Construction Cost Index to Determine Increases in System Development Charges.

Background. Public facilities (i.e., schools, fire halls, water plants, sewer plants) are built to serve both current and future capacity. The costs for a new, larger facility are borne by the current taxpayers or users. I view an SDC payment as the new arrival’s contribution to offset some of the costs that current and past citizens paid for the larger, improved facilities. Section 50 of the Sheridan Municipal Code requires certain fee increases to be approved by a vote of the people. SDC increases fall into that category.

Based upon the September 28th Council discussion about increasing SDC fees, the staff was tasked with proposing an ordinance that would increase SDC fees based upon changes to an index. In the past, we have used an Engineering News-Record Index and pegged our proposed changes to the Building Cost Index (BCI).

There are a number of indexes available. Most are input driven and aimed at assisting cost estimators. Indexes measure different things and some are unique, i.e., public works (Army Corp of Engineers), one-family homes, roads and highways, gas facilities, electric facilities, dams and reservoirs, general construction, etc. They are all a means of measuring the price movement for some objects over time and/or location using a series of values.

There are a number of indexes. The Census Bureau did a study of them comparing 12 indexes over the period 1964 through 2002. A copy of the indexes and their numbers are attached. I presume they did a study to validate some of their data. The current Census website does not have an annual construction cost index study.

An index can use input costs, output costs or a combination of all. Output cost indices fluctuate the most. Input cost indexes can be skewed by market conditions. The combination index does not fix the volatility problem.

The next chart shows 4 popular indexes. The Turner Cost Index is an output index. The PPI Nonresidential Construction Index by the Bureau of Labor Statistics attempts to measure subcontractor pricing for items, introducing aspects of an output index. RS Means and ENR produce traditional input indexes.
The input cost indexes do not show the extremes of economic cycles like output indexes.

Every month, *Engineering News-Record* (ENR) publishes the construction cost index (CCI), which is a weighted aggregate index of the 20-city average prices of construction activities. Although CCI increases over the long term, it is subject to considerable short-term variations, which make it problematic for cost estimators to prepare accurate bids for contractors or engineering estimates for owner organizations. The ability to predict construction cost trends can result in more-accurate bids and avoid under- or over-estimation.

*Engineering News-Record* compiles and publishes an extensive amount of data on building material prices and construction labor costs. Each month it publishes prices for 67 different building materials, in each of 20 major U.S. cities. The first weekly issue each month contains a table of cement, ready-mix concrete, and aggregate (crushed stone) prices; the second weekly issue contains a table of pipe prices; the third issue contains lumber, plywood, drywall, and insulation prices; and the fourth issue contains steel and other metal product prices.

A small amount of this data is used to calculate two monthly index figures, the Construction Cost Index and the Building Cost Index. Both indexes are calculated using a formula made up of fixed amounts of four components—Portland cement, 2x4 lumber, structural steel (steel beams), and labor. The only difference between the two indexes is in their labor component. The labor
component of the Construction Cost Index is common (unskilled) labor, while the labor component of the Building Cost Index is skilled labor.¹

The two indexes apply to general construction costs. The CCI can be used where labor costs are a high proportion of total costs. The BCI is more applicable for structures.

Discussion. ENR’s Construction Cost Index has been issued since 1908, while the Building Cost Index has been issued since 1915. Each index is widely used throughout the U.S. construction industry as a benchmark for measuring inflation.

We have used the BCI-Seattle from the Engineering News-Record for prior adjustments to our System Development Charges. Ordinance 1991-14 (codified in Sheridan Municipal Code §13.24.040B and attached to this report) allows the city manager to change the SDC. “Inflationary cost impacts shall be measured and calculated each January by the city manager and charged accordingly. Such calculations will be based upon changes in the Engineering News Record Construction Index (ENR Index) for Seattle, Washington, or any suitable replacement index identified by the council by resolution.”

We are using the index to adjust the SDC amount and not tie that amount to the actual construction costs in Seattle. The four key items that comprise the index most likely inflate and deflate at about the same rate in Oregon and Washington.

Recommendation. Based upon the above, recommend that the City Council use the Engineering News-Record’s Building Cost Index – Seattle as the starting point in all discussions and decisions in adjusting System Development Charges.

Francis D. Sheridan
Francis D. Sheridan
City Manager

Attachments:
C. Annual Construction Cost Indexes (1996=100); U.S. Census Bureau, Construction Expenditures Branch, Manufacturing & Construction Division; downloaded from: https://www.census.gov/construction/c30/pdf/annindex.pdf (1 page).

¹ See first page of Using ENR Indexes for details on the “basket” of goods and services.
D. Annual Construction Cost Indexes as Reported by or Computed from Sources; U.S. Census Bureau, Construction Expenditures Branch, Manufacturing & Construction Division; downloaded from: https://www.census.gov/construction/c30/pdf/annindex.pdf (1 page).


References:
1. Report to the City Council from the City Manager, October 2, 2017, subject: Review of Municipal Utilities Proposed Increases for Calendar Year 2018.
2. Report to the City Council from the City Manager, September 18, 2017, subject: City Enterprise Funds Financial Performance.
3. Report to the City Council from the City Manager, January 7, 2008, subj: Increases in System Development Charges (SDC) for Water, Sewer, Storm Water, Parks and Streets.
Using ENR Indexes

Readers of ENR direct a steady stream of questions about the magazine’s indexes and how to accurately apply them to various construction projects. To help clarify the nature and uses of the cost indexes, here are answers to the most frequently asked questions and suggestions on how to avoid costly mistakes.

What is the difference between ENR’s Construction Cost Index and its Building Cost Index?
The difference is in their labor component. The CCI uses 200 hours of common labor, multiplied by the 20-city average rate for wages and fringe benefits. The BCI uses 68.38 hours of skilled labor, multiplied by the 20-city wage-fringe average for three trades—bricklayers, carpenters and structural ironworkers. For their materials component, both indexes use 25 cwt of fabricated standard structural steel at the 20-city average price, 1.128 tons of bulk portland cement priced locally and 1,088 board ft of 2x4 lumber priced locally. The ENR indexes measure how much it costs to purchase this hypothetical package of goods compared to what it was in the base year.

What kinds of construction do the ENR indexes represent?
The two indexes apply to general construction costs. The CCI can be used where labor costs are a high proportion of total costs. The BCI is more applicable for structures.

Where does ENR get its data?
ENR has price reporters covering 20 U.S. cities who check prices locally. The prices are quoted from the same suppliers each month. ENR computes its latest indexes from these figures and local union wage rates.

Does ENR have cost indexes for cities outside the U.S.?
No. However, we publish a limited amount of international cost data in our Fourth Quarterly Cost Report in December.

Are material prices averaged?
No. ENR reporters collect "spot prices" from a single source for all of the materials tracked, including those in the index. The reporters survey the same suppliers each month for materials that affect the index. Actual prices within a city may vary depending on the competitiveness of the market and local discounting practices. This method allows for a quick indicator of price movement, which is its primary objective.

Do the city indexes have different weightings?
No. Each city uses the same weight for the labor and materials components as the U.S. average index.

Do the indexes measure cost differentials between cities?
No. This is one of the more common errors in the application of ENR’s indexes, which only
measure the trend in an individual city and in the U.S. as a whole. Differentials between cities may reflect differences in labor productivity and building codes. Moreover, quoting bases for lumber and cement vary from one city to another. One city may report list prices while in another prices for the same material may include discounts.

**Are indexes seasonally adjusted?**
No. This is an important point for users of the indexes to keep in mind. Wages, the most important component, usually affect the indexes once or twice a year. Cement prices tend to be more active in the spring while fabricated structural steel pricing tends to have monthly adjustments. Lumber prices, more dependent on local pricing and production conditions, are the most volatile and can change appreciably from month to month. Declines in indexes are most often the result of falling lumber prices.

The study of an index movement for a period of less than 12 months can sometimes miss these important developments. Users of an index for individual cities should also watch the timing of wage settlements. Stalled labor negotiations may keep the old wage rate in effect longer than a 12-month period, giving the appearance of a low inflation rate.

**Is it more accurate to use an index that is closest to my home city?**
No. The 20-city average index is generally more appropriate. Because it has more elements, it has a smoother trend. Indexes for individual cities are more susceptible to price spikes.

**Are annual averages weighted?**
No. They are straight mathematical averages.

**Are the indexes verifiable?**
Yes. ENR’s national indexes are updated in the first week of each month on the Construction Economics pages of the magazine while indexes for individual cities appear in the second issue of the month. Prices for the indexes’ materials component are published in the preceding month on the Construction Economics pages.

Cement prices are in the first issue of the month, lumber prices in the third and steel in the fourth issue. Wage rates for all 20 cities are published in the second and third Quarterly Cost Reports. The reader can compute ENR’s indexes by multiplying the published prices and wages by the appropriate weights, shown in the tables below, and summing the results.

**Does ENR forecast its indexes?**
Yes. ENR projects its BCI and CCI for the next 12 months once a year in the Fourth Quarterly Cost Report. To reach its forecast, ENR incorporates the new wage rates called for in multiyear, collective-bargaining agreements and estimates for areas where new contract terms will be negotiated. ENR estimates the materials component by studying consumption forecasts and price trends.

**Does ENR ever change the weighting of the index components?**
No. The components are always multiplied by the same factors. However, a component’s share of an index’s total will shift with its relative escalation rate.
Has ENR ever changed the makeup of the index components?
Yes. Only once, in 1996. ENR was forced to switch from the mill price for structural steel to the 20-city average fabricated price for channel beams, I-beams and wide-flanges when ENR’s sources for mill prices left the structural market.

Does ENR revise the indexes?
Yes. On some occasions, ENR must revise the indexes. For example, ENR revised its March 2004 indexes shortly after their initial publication to reflect the huge surcharges being placed on structural steel. Revisions to national indexes are published below. Revisions to indexes for individual cities are published in the tables on the following pages.

Do ENR's cost indexes capture all the factors influencing construction costs?
No. ENR’s two primary cost indexes, the Construction Cost Index and the Building Cost Index, each have only four components (inputs) -- cement, lumber, structural steel, and labor. They do not capture all the factors influencing project costs. They merely offer a snapshot of general cost trends.

Why doesn't ENR publish data on construction costs in Florida or Arizona?
When we first began collecting cost data in the 1930's Florida and Arizona were very lightly populated. We have decided not to revise our list of 20 cities, in order to preserve the continuity of our data sets.

Where can I obtain data on construction costs in Florida or Arizona, or other states that ENR does not collect cost data from?
There are three major firms that collect construction cost data -- R.S. Means, Marshall and Swift/Boeckh, and BNI Books -- all of which have data for most regions of the U.S., including Florida and Arizona.

What data does ENR publish on building material prices?
ENR has been collecting, compiling and publishing price data on 67 different building materials, in 20 major U.S. cities, plus Montreal and Toronto, on a monthly basis for over 50 years. We publish a table of cement and concrete and aggregate prices in our first weekly issue every month, pipe prices the second week, lumber, drywall and insulation prices the third week, and steel prices the fourth week.

How can I get any of this building material price data going back in time?
If you only need this data for a few specific months in the past, the best way to get it is to get those tables off our website. The monthly tables since January 2005 are posted on our website. To find them, go to our Construction Economics Index.

If you need cost data prior to 2005, then you need to find a library that has copies of ENR for that time period.
Construction Cost Indices: Their Creation and Use

By Tom Wiggins on 8 Mar 2016

Those who regularly work with construction cost estimates will at some time use a cost index.

To use cost indices, most people look up a couple of values in the tables, perform some rudimentary math and the resultant factor can be used for the desired adjustment. The adjustment desired is typically cost change over time at a location or cost differences between locations, often including some time adjustment.

However, construction cost indices are an extremely powerful tool whose use is broader than these typical applications. For example, the U.S. Government produces indices, such as price indices for houses for a few building types, including houses. The government uses them to prepare price deflators for Gross Domestic Product (GDP). They recognized many years ago inherent problems unique to construction indices.

An important aspect of using a cost index is to ensure you are asking the right questions about its source.

A few basic index distinctions will help provide some clarity. The first question to ask about an index is: 'What does it really measure?'. Most construction indices are built using the cost of the inputs – a representative selection of labor, material and equipment. Notice the distinction, cost of the inputs, not price of the output.

It is essential to remember that a cost index measures the price movement for some objects over time and/or location using a series of values. A basic understanding of the theoretical construct aids in interpreting the results from applying the index. Different index creation methodologies may yield very different search results.

Most U.S. cost indices use cost inputs. It's difficult to prepare an output index for the construction industry. This is unfortunate since market forces are not well measured by input indices. Output indices measure changes in prices of what is produced by entities engaged in construction activity. An output index includes the items built into the price paid by purchasers of the output element – materials, labor, plant and equipment, overheads, profits, margins. An example is the home seller index which measures the selling price of a house.
It is essential to remember that a cost index measures the price movement for some objects over time and/or location using a series of values.

Market conditions may be the factor that skews input-based index comparison results the most. This is why some organizations seek to introduce some aspects of output measures, creating a pseudo-output index.

A comparison of four construction indices begins to demonstrate the point. The Turner Cost Index is presumably an output index. The PPI Nonresidential Construction Index by the Bureau of Labor Statistics attempts to measure subcontractor pricing for items, introducing aspects of an output index. RS Means and ENR produce traditional input indices. While other factors contribute to the variations shown, it illustrates very clearly how measures of the market (reflecting output prices) influence an index. Input cost indices do not show the extremes of economic cycles like output indices.

Most users of cost indices are focused on smaller issues than adjusting the value of construction GDP. Anyone with a database of historical construction costs relies on construction cost indices to prepare cost estimate benchmarks. When establishing a benchmark, using previous project costs to establish a budget, adequately ascertaining cost change for time and location is essential.
However they are used, indices provide a simple way to relate the cost of an item at a specific
time to a corresponding cost at a different time, or a different location and time. The focus is
modifying historical costs. Unfortunately the use of an index as an accurate predictor of future
costs is not yet a reality.

When comparing different locations, local codes and climate can skew cost comparisons.
Adjustments for these considerations are never straightforward. Thoughtful consideration may
assist if the results after applying an index do not seem quite right. Differences in seismic and
wind loading design requirements can impact cost comparisons between locations. For example,
any index comparison of costs between Los Angeles and Minneapolis should include
consideration of a seismic cost adjustment. But, countering the higher Los Angeles cost due to
seismic requirements would be some higher costs in Minneapolis due to the climate. Similarly, a
coastal Florida building will have unique costs for wind loading. Then, there is Charleston, South
Carolina with both seismic and wind design requirements to consider.

If you want to avoid misusing a cost index, understand what it measures.

The type of construction modeled in the index should be considered. Many indices are intended
to reflect general building construction. Some may be tailored to a specific building type, i.e.
manufacturing, or type of construction, i.e. steel frame.

Indices are differentiated by how they are compiled. Most construction indices are Laspeyres
Type. They hold constant the types and quantities of each item required, suitably weighted
according to contribution toward total cost.

If you want to avoid misusing a cost index, understand what it measures. Remember that cost
indices are as much an art as they are science. Use the index values with some thought and
consider judicial adjustments for what they are not measuring.
Annual Construction Cost Indexes (1996 = 100)

Downloaded from: [https://www.census.gov/construction/c30/pdf/annindex.pdf](https://www.census.gov/construction/c30/pdf/annindex.pdf)

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<th>Handy Whitman Building</th>
<th>Handy Whitman Electric</th>
<th>Handy Whitman Gas</th>
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<th>C.A. Turner</th>
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<td>19</td>
<td>20.5</td>
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<td>30</td>
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Source: U.S. Census Bureau, Manufacturing & Construction Div.
Washington, DC 20233-8916

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## Annual Construction Cost Indexes as Reported by or Computed from Sources

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<tr>
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<td>28.3</td>
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<td>1963</td>
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<td>1981</td>
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Source: U.S. Census Bureau
Construction Expenditures Branch
Manufacturing & Construction Div.
Washington, DC 20233-6810

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The building and construction cost indexes for ENR's individual cities use the same components and weighting as those for the 20-city national indexes. The city indexes use local prices for portland cement and 2 X 4 lumber and the national average price for structural steel. The city's BCI uses local union wages, plus fringes, for carpenters, bricklayers and iron workers. The city's CCI uses the same union wages for laborers.


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<thead>
<tr>
<th>YEAR</th>
<th>MONTH</th>
<th>BCI</th>
<th>%Change</th>
<th>CCI</th>
<th>% Change</th>
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<td>2005</td>
<td>January</td>
<td>4207.51</td>
<td></td>
<td>8165.36</td>
<td></td>
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<tr>
<td>2006</td>
<td>January</td>
<td>4371.86</td>
<td>3.91%</td>
<td>8464.55</td>
<td>3.66%</td>
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<tr>
<td>2007</td>
<td>January</td>
<td>4446.86</td>
<td>1.72%</td>
<td>8626.01</td>
<td>1.91%</td>
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<td>2008</td>
<td>January</td>
<td>4589.55</td>
<td>3.21%</td>
<td>8606.64</td>
<td>-0.22%</td>
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<tr>
<td>2009</td>
<td>January</td>
<td>4820.93</td>
<td>5.04%</td>
<td>8725.88</td>
<td>1.39%</td>
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<tr>
<td>2010</td>
<td>January</td>
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<td>5.03%</td>
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<td>3.42%</td>
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<td>9059.77</td>
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<td>-0.10%</td>
<td>9418.27</td>
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<td>2.29%</td>
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<td>10386.83</td>
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*Chart 1 - Frank/ ENR Seattle cost indices - by month.xlsx.*

As the chart below shows, a ten-year recent history of percentage changes have no drastic changes between the two indexes.

*Chart 2 - Percentage Changes 2006 through 2015 ENR's Seattle Indexes.*

B. Systems development charges for each type of capital improvement may be created through application of the methodologies described in Section 13.24.050. The amounts of each system development charge shall be adopted initially by council resolution. Changes in the amounts shall also be adopted by resolution, except changes resulting solely from inflationary cost impacts. Inflationary cost impacts shall be measured and calculated each January by the city manager and charged accordingly. Such calculations will be based upon changes in the Engineering News Record Construction Index (ENR Index) for Seattle, Washington, or any suitable replacement index identified by the council by resolution.