ATTACHMENT B

Orange County Business Council
Orange County Transportation Infrastructure Construction Cost Pressure Index
Fall 2022
Prepared for the Orange County Transportation Authority

OCBC Research Team

Dr. Wallace Walrod – Chief Economic Advisor, Orange County Business Council
Dr. Marlon Boarnet – Professor and Chair, Department of Urban Planning and Spatial Analysis, USC

Background and Purpose

As a supplementary examination to the Next 10 Delivery Plan: Market Conditions Forecast and Risk Analysis study delivered by Orange County Business Council (OCBC) in September 2017, the Orange County Transportation Authority (OCTA) Board of Directors (Board) requested further study and exploration of potential cost fluctuations beyond existing cost analysis from the California Department of Transportation's (Caltrans) Construction Cost Index (CCI) and internal OCTA analysis. The OCTA Board requested an ongoing analysis of construction cost factors, with periodic updates. In response, the OCBC team developed the Orange County Transportation Infrastructure Construction Cost Pressure Index (ICCPI), which is updated every six months.

To develop the cost pressure index, the OCBC team analyzed annual trends in material costs, labor costs and general economic conditions to determine a range of potential cost increases with a time horizon that is typically three years into the future. The index updates begin by collecting relevant market data and indicators and then performing data analytics on to assess current cost pressure and forecast future cost pressure. In doing so, and providing these findings to OCTA's Board, more accurate budgets can be determined reducing the potential risk of cost pressure and project delivery slowdowns due to financial constraints. This September 2022 memo updates the March 2022 forecast of the Orange County Transportation ICCPI and provides annual cost pressure index forecasts for the remainder of 2022 and for 2023, 2024, and 2025.

Findings and Discussion

The most recent available input data were gathered to update the ICCPI. That includes first quarter 2022 data for the following index components: California's unemployment rate, California building permits, Caltrans index data on infrastructure construction materials costs as well as 4th quarter data on Orange County and Southern California construction industry wages. 2022 values for building permits and unemployment rates were estimated from changes from first quarter 2021 to first quarter 2022 and construction wages from fourth quarter 2020 to fourth quarter 2021.

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Following the trend established in the last update, wages continue to climb while the inflation rate remains stubbornly high, leading to elevated material and labor prices. Despite recent Fed actions in raising interest rates in an effort to mitigate the high inflationary environment, the labor market remains strong, suggesting that additional interest rate increases are likely to occur in the near future.

In the March 2022 update, the OCTA Construction Cost Pressure Index jumped to a reading of 5 for 2022, the highest inflation environment observed during the benchmark 1994-2017 time period, before dropping to an index of 4 in 2023 and 2024. Six months prior to that, the year-ago September 2021 Construction Cost Pressure Index predicted a high-inflation cost change environment in 2021 (index value of 5), declining slightly in 2022 and 2023 (to index values of 4).

The new estimate for September 2022 is an index value of 5 for the remainder of 2022, dropping to an index of 4 in both 2023 and 2024, before declining to an index of 2 in 2025. This update highlights the continued expected high-inflation environment first seen in September 2021 while also forecasting a light at the end of the tunnel, with a clear signal that inflationary pressures may begin to recede by 2025.

Table 1: September 2022 Update to Three-Year Orange County Transportation Infrastructure Construction Cost Pressure Index, with comparison to March 2022, September 2021, March 2021, and September 2020 index estimates

Year	Index (September 2022) with annual cost increase range	Index (March 2022) with annual cost increase range	Index (September 2021) with annual cost increase range	Index (March 2021) with annual cost increase range	Index (September. 2020) with annual cost increase range
2020	Not Estimated	Not Estimated	Not Estimated	Not Estimated	0 (-17% to -2%)
2021	Not Estimated	Not Estimated	5 (11% to 40%)	1 (-2% to 1%)	1 (-2% to 1%)
2022	5 (11% to 40%)	5 (11% to 40%)	4 (6% to 11%)	2 (1% to 2%)	1 (-2% to 1%)
2023	4 (6% to 11%)	4 (6% to 11%)	4 (6% to 11%)	4 (6% to 11%)	3 (2% to 6%)
2024	4 (6% to 11%)	4 (6% to 11%)	4 (6% to 11%)	Not Estimated	Not Estimated
2025	2 (1% to 2%)	Not Estimated	Not Estimated	Not Estimated	Not Estimated

The index values correspond to ranges of forecast annual infrastructure construction cost increases shown in Table 2.

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Forecasting Method

OCBC used a series of regression analyses and forward-looking projections to create the ICCPI. The ICCPI provides a ranking from 0 to 5, with each rank corresponding to a range of percent changes in overall construction costs. These ranges are built to be forecasting tools, with scores indicating public construction forecast cost increase. Values of 2 and 3 indicate somewhat normal inflationary environments. A value of 4 is a high inflation environment. A value of 1 is a low inflation/deflationary environment. Values of 0 and 5 correspond to the most extreme conditions observed in Orange County over the past three decades, and hence the ranges for those values are wide due to the unusual nature of the highly deflationary environment that occurred immediately prior to and during the Great Recession and the high-cost inflation environment that occurred in the building boom years of the early 2000s.

Table 2 below highlights each ICCPI ranking and the proposed range of cost fluctuations which have been provided on a low, midpoint, and high scale.

Table 2: OCBC Orange County Transportation ICCPI Scores

Index Value	Projected Annual Cost Increase, Low	Projected Annual Cost Increase, Midpoint	Projected Annual Cost Increase, High
0	-17%	-9.5%	-2%
1	-2%	-0.5%	1%
2	1%	1.5%	2%
3	2%	4%	6%
4	6%	8.5%	11%
5	11%	25.5%	40%

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Methodology

To determine the Transportation ICCPI, the OCBC team started by aggregating several datasets, measures, and indicators on an annual basis as far back as 1972.

The index was built with the following key data inputs:

- California's unemployment rate,
- Building permits in California,
- Selected construction materials costs for California, from Caltrans, and
- Orange County construction labor costs.

The OCBC team examined how the various measures and indicators of construction costs varied with changes and recent past trends in construction inflation. Using statistical analyses, the research team has built a forecasting model that projects forward cost increases and predicted cost increases are grouped into the categorical ranges shown in Table 2.

Recent Data Trends

Table 3 shows the recent pattern for three key components of the construction cost pressure index. While building permits in California declined from 2018 to 2020, they jumped by 12.2 percent in 2021 and are expected to decline slightly by 3.4 percent in 2022. (The 2022 estimate is based on the change in permits from first quarter 2021 to first quarter 2022.) This decline in building permits is most likely tied to the recent slowdown in the housing market. Rising interest rate and record home prices in Southern California have resulted in an increasingly smaller pool of residents able to afford the purchase of a home. These trends serve to reduce overall demand and slow the pace of new home developments. Despite recent interest rate increases by the Federal designed to rein in inflation, the national and regional labor markets remain strong, and wages continue to trend upward. The estimated change in Orange County construction salaries for 2021 is based in the change from fourth quarter 2020 to fourth quarter 2021.

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Table 3: Infrastructure Cost Correlates, Annual Percentage Changes, 2016-2022

Year	California Building Permits	% Change year-on-year	California Unemployment Rate	% Change year-on-year	OC Construction Labor Costs (avgerage annual wage)	% Change year-on-year
2016	102,350	4.2%	5.5%	-11.6%	$67,179	3.8%
2017	114,780	12.1%	4.8%	-12.9%	$71,474	6.4%
2018	113,502	-1.1%	4.2%	-12.0%	$74,669	4.5%
2019	109,904	-3.2%	4.1%	-3.4%	$77,288	3.5%
2020	104,544	-4.9%	10.3%	153%	$81,460	5.4%
2021	117,291	12.2%	7.3%	-28.9%	$84,040**	3.2%
2022	113,360*	-3.4%	4.0*	-44.9%	-	-

* Estimated from Quarter 1 (Q1) change, 2022 to 2021, converted to an annualized estimate
**Estimated from Quarter 4 (Q4) change, 2020 to 2021, converted to an annualized estimate

The appendix shows annual changes in materials costs in recent years. The 2022 values are the percent change from Q1 2021 to Q1 2022, and hence represent an estimate that will be revised in the next six-month update. Portland Cement Concrete (PCC) pavement costs saw the largest increase, 105 percent, with aggregate Base costs rising by 38.4 percent. Steel bar costs rose by 24.4 percent. Note that all of these are percent increases based on the change from Q1 2021 to Q1 2022, converted to an annual value for 2022 that is then compared to 2021 annual. The large increases in PCC pavement, aggregate base, and steel bar costs reflect changes from Q1 2021 to Q1 2022 that might be revised downward when full 2022 data are available. With an economic downturn expected in late 2022 or early 2023, prices are expected to continue to shift.

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Appendix: Changes in Infrastructure Materials Costs 2016-2022 (all values are percent year-on-year changes, 2022 values forecast from first quarter changes, 2021 to 2022)

Year	Aggregate	PCC Pavement	PCC Structure	Steel Structure	Steel Bar
2016	9.4%	8.6%	7.7%	35.0%	26.3%
2017	24.2%	106.8%	26.8%	-21.0%	-51.0%
2018	18.9%	25.9%	17.2%	9.4%	-58.8%
2019	4.6%	-11.1%	-4.2%	53.6%	0.8%
2020	14.9%	-20.5%	10.0%	-9.3%	-36.2%
2021	-27.5%	-19.8%	23.5%	5.0%	6.6%
2022*	38.4%	105.1%	-2.2%	-3.0%	24.4%

*The annual 2022 change in value represents the change between Q1 2021 and Q1 2022.