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I. EXECUTIVE SUMMARY

A benefit-cost analysis (BCA) was conducted for the New Windsor Community Revitalization Project for submission to the U.S. Department of Transportation (USDOT) as a requirement for a 2017 National Infrastructure Investments grant application, also known as the Transportation Investment Generating Economic Recovery (TIGER) discretionary grant program. The analysis was conducted in accordance with the benefit-cost methodology as recommended by the USDOT in the 2017 TIGER Benefit-Cost Analysis Guidance.¹ The period of analysis corresponds to 23 years and includes three years of construction and 20 years of benefits after operations begin in 2020.

The benefits of the New Windsor Community Revitalization Project correspond to the project improvements through a combination of the following:

- operational improvements for vehicle traffic,
- new pedestrian infrastructure that will unlock the potential for walking,
- streetscape improvements that will support the Town of New Windsor’s (Town) long-term economic goals, and
- safety enhancements to benefit all modes of travel.

The improvements gained by implementation of the project will generate a reduction in crashes for the existing vehicular traffic, and health benefits that result from increased pedestrian usage when compared to the “no-build” alternative. Moreover, the development of dedicated pedestrian infrastructure is projected to generate significant economic benefits in the form of increased property values which will serve as an advantage to the Town’s residents and businesses.

II. INTRODUCTION

A benefit-cost analysis (BCA) was conducted for the New Windsor Community Revitalization Project for submission to the U.S. Department of Transportation (USDOT) as a requirement of a discretionary grant application for the 2017 TIGER program. The following paragraphs describe the BCA framework, evaluation metrics, and report contents.

A BCA is an evaluation framework to assess the economic advantages (benefits) and disadvantages (costs) of an investment alternative. Benefits and costs are broadly defined and are quantified in monetary terms to the extent possible. The overall goal of a BCA is to assess whether the expected benefits of a project justify the costs. A BCA framework attempts to capture the net welfare change created by a project, including cost savings and increases in welfare (benefits), as well as dis-benefits where costs can be identified (e.g., project capital costs), and welfare reductions where some groups are expected to be made worse off because of the proposed project.

The BCA framework involves defining a Base Case or “No Build” Alternative, which is compared to the “Build” Alternative, where the grant request is awarded and the project is built. The BCA assesses the incremental difference between the Base Case and the “Build” Alternative, which represents the net change in welfare. BCAs are forward-looking exercises which seek to assess the incremental change in welfare over a project life-cycle. The importance of future welfare changes is determined through discounting, which is meant to reflect both the opportunity cost of capital as well as the societal preference for the present.

The analysis was conducted in accordance with the benefit-cost methodology as recommended by the USDOT in the 2017 TIGER Benefit-Cost Analysis Guidance. This methodology includes the following analytical assumptions:

- Assessing benefits with respect to each of the five long-term outcomes defined by the USDOT;
- Defining existing and future conditions under a No Build base case as well as under the Build Case;
- Assessing the independent utility of each project if the overall application contains multiple separate projects linked together in a common objective;
- Estimating benefits and costs during project construction and operation, including at least 20 years of operations beyond the Project completion when benefits accrue;
- Using USDOT recommended monetized values for reduced fatalities, injuries, property damage, travel time savings, and emissions, while relying on best practices for monetization of other benefits;

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• Presenting dollar values in real 2016 dollars. In instances where cost estimates and benefits valuations are expressed in historical dollar years, using an appropriate Consumer Price Index (CPI) to adjust the values; and

• Discounting future benefits and costs with real discount rates of 7 percent and 3 percent (sensitivity analysis) consistent with USDOT guidance;

The table below summarizes the results of this BCA. As shown, the benefit cost ratio is 1.08 at 7 percent discount rate and 1.85 at a 3 percent discount rate.

Table 1: BCA results summarized

<table>
<thead>
<tr>
<th>Metric</th>
<th>7% Scenario</th>
<th>3% Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discounted Benefits</td>
<td>$8,667,343</td>
<td>$11,384,321</td>
</tr>
<tr>
<td>Discounted Costs</td>
<td>$8,039,495</td>
<td>$6,153,687</td>
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<tr>
<td>Net Present Value</td>
<td>$627,848</td>
<td>$5,230,634</td>
</tr>
<tr>
<td>Benefit Cost Ratio</td>
<td>1.08</td>
<td>1.85</td>
</tr>
</tbody>
</table>
III. PROJECT OVERVIEW

ASSUMPTIONS

The analysis assumed a 2016 base year and a 23-year analysis length. The length corresponds to three years of preliminary engineering and construction, as well as, 20 years of benefits after operations begin in 2023.

In accordance with TIGER guidance, the analysis used a 7 percent real discount rate and a 3 percent real discount rate as an alternative. All benefits and costs were discounted to real 2016 dollars. In situations where values were expressed in other units, they were updated to 2016 dollars using the CPI-U.

Finally, a real rate of escalation of 2.5 percent was assumed for all construction and operations and maintenance (O&M) costs used in the analysis. This value corresponds roughly to the compounded annual growth rate of the Engineering News Record (ENR) construction index over the past six years. To remain conservative, the average inflation rate over the same period was not subtracted from the ENR estimate. Therefore, the 2.5 percent represents a real growth rate of construction costs.

Property Values

To capture the benefits of increased property values that would result from the implementation of this project, a baseline growth rate was established consistent with the national average plus the recent growth rate experienced by the year. Afterwards, an estimate of the expected growth rate in property values given the development of the project was calculated.

A survey of the literature indicates that property values tend to increase after the development of dedicated pedestrian facilities. An estimate by the Indiana University Public Policy Institute revealed that property values in the areas surrounding the Cultural Trail in Indianapolis increased by as much as 148 percent over eight years, significantly outpacing the National City average of about 22 percent over the same period. Although these impacts are related temporally, it is difficult to determine causality and/or the magnitude of the impact.

Accordingly, to remain cognizant of the fact that the study area differs substantially from the Cultural Trail, that the scope of the project is smaller, and that there are uncertainties in these estimates, the property values of the area were grown by an average of 8 percent per year minus the trend growth rate for the first eight years of the projects implementation. Afterwards, the analysis assumes that property values in the area will resume their long-run growth path. Overall, the net difference between the baseline and build scenario growth rates amounts to about 1 percent for the first years of the project’s implementation and then

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gradually narrows to zero in the latter years. This procedure limits the possibility of overestimating the impact on property values. In other words, the impact of the project on the growth rate of property values is estimated to be 1 percent for the first eight years and zero afterwards.

Table 2: Property Value Estimation Assumptions and Sources

<table>
<thead>
<tr>
<th>Variable</th>
<th>Unit</th>
<th>Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated useful Square Feet within approximately 1/2 mile of project study area</td>
<td>Sq. Ft.</td>
<td>719,566</td>
<td>Carroll County GPS</td>
</tr>
<tr>
<td>Estimated current price</td>
<td>$2016/sq. ft.</td>
<td>201</td>
<td>Trulia.com</td>
</tr>
<tr>
<td>National growth rate housing prices</td>
<td>%/year</td>
<td>3</td>
<td>Federal Reserve Bank Economic Data</td>
</tr>
<tr>
<td>Projected short run impact on property value growth</td>
<td>%/year</td>
<td>12</td>
<td>IUPPI 2015⁴</td>
</tr>
<tr>
<td>Local growth rate</td>
<td>%/year</td>
<td>2</td>
<td>Trulia.com and Carroll County</td>
</tr>
</tbody>
</table>

Safety

The safety benefits assessed in this analysis include a reduction in injuries, as well as a reduction in other property damage crash costs resulting directly from the project. The status of the design (at a 65% level) and the ongoing efforts to determine the future intersection geometry at two key intersections limit the extent to which it is possible to quantify anticipated variations in crash occurrences. Currently a roundabout is being considered for these intersections and, as discussed in the application narrative, these offer unique benefits in the form of reduced injury rates largely due to the reduced conflict opportunities (a factor of four times). In reviewing the historic accident data, the majority of accidents cited failure to yield right-of-way as the cause, which would be reduced markedly. Accordingly, the accident occurrence on an annual basis was reduced by a factor of one to two (1:2).

Pedestrian Health Benefits

The improvements proposed to be completed as part of the New Windsor Community Revitalization Project will improve pedestrian access and likely increase the number of pedestrian trips through this scenic downtown main street. The model can ascribe a monetary benefit to increased walking trips in the population. As part of this, the model assumes roughly four pedestrian roundtrips per year for a number of pedestrians that corresponds to 25 percent of the Town’s residents and may include visitors. The benefit-cost model assumes that the number of walking trips will double after project completion.

BASE CASE AND BUILD SCENARIO

The Build Scenario was compared against a “no-build” or existing conditions (Base Case). Under the Base Case, no project-related improvements are pursued and existing O&M expenditures are incurred. The study area has unsafe intersection geometry at two key intersections, is lacking safe, connected and ADA compliant sidewalks and is lacking critical stormwater management abilities which results in flooding.

The Build Scenario under which the proposed project is implemented, includes pavement resurfacing throughout the project limits, construction of ADA-compliant sidewalks, installation of pedestrian lighting, and improvements at two intersections.

A more detailed explanation of the New Windsor Community Revitalization Project and the existing study area can be found in the application narrative.

PROJECT COSTS

The New Windsor Community Revitalization Project has a total cost of approximately $9.9 million in undiscounted 2016 dollars. These costs include expenditures for acquisition of ROW, as well as construction of the proposed facilities. The construction costs are expected to be expended over three years from 2020 to 2023 with an approximate split of 66 percent in the first two years and the remainder in the final year of construction. The project is expected to be fully operational by the end of 2023. The discounted capital expenditures are approximately $8.1 million using a 7 percent discount rate.

PROJECT BENEFITS

The project is expected to generate considerable benefits in the form of reduced traffic incidents, increased bike-related and pedestrian-associated health benefits, improved pedestrian connections, and increased property values. These benefits are generated because of increased system safety and the development of dedicated infrastructure for pedestrians. The sum of these benefits totals nearly $15 million in undiscounted 2016 dollars, and are approximately $8.7 million and $11.3 million when discounted at 7 percent and 3 percent, respectively.

While the project is expected to generate considerable benefits, there is a significant amount of benefits that are not quantified in the analysis but should be considered qualitatively. These include:

- The ADA access benefits that accommodate individuals with mobility challenges
- O&M efficiencies gained in the form of fewer “one-off” sidewalk repair events
- Reduction in stormwater pollutant loading into the area’s waterways associated energy savings at the New Windsor Wastewater Treatment Plant from not needing to treat high peak storm flows
These additional benefits were not quantified, due to the difficulty in accurately assessing their impacts and to avoid the potential for double counting.

The table below presents the benefits by category both in undiscounted 2016 dollars and discounted at 7 percent.

**Table 3: Benefits by Long-Term Outcome, Millions of 2016 Dollars**

<table>
<thead>
<tr>
<th>Long-Term Outcome</th>
<th>Project Lifecycle</th>
<th></th>
<th>Discounted (7%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Undiscounted</td>
<td>Discounted</td>
<td></td>
</tr>
<tr>
<td>Accident reduction</td>
<td>$1,299,162</td>
<td>$454,707</td>
<td></td>
</tr>
<tr>
<td>Pedestrian health benefits</td>
<td>$7,708</td>
<td>$2,698</td>
<td></td>
</tr>
<tr>
<td>Property value increase</td>
<td>$13,356,991</td>
<td>$8,209,939</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$14,663,861</td>
<td>$8,667,343</td>
<td></td>
</tr>
</tbody>
</table>

**BENEFIT COST RATIO**

Comparing the discounted project costs with the project benefits results in the determination of the benefit cost ratio. As shown in the table below, the benefit cost ratio is 1.08 at 7 percent discount rate and 1.85 at a 3 percent discount rate.

**Table 4: Benefits by Long-Term Outcome, 2016 Dollars**

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