HUMBOLDT PARKWAY DECK

Economic Impact Study

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Funded by:

New York State Department of Transportation

Prepared by:

Regional Institute
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Executive Summary

This report was commissioned by the New York State Department of Transportation (NYSDOT) to determine the possible economic impacts of constructing a $560 million (2015 dollars) deck over the existing NY Route 33 Expressway, commonly known as the Kensington Expressway. Within the City of Buffalo limits, NY Route 33 has been designated a Commemorative/Memorial Highway named in honor of the Reverend Dr. Martin Luther King Jr. "NY Route 33", "Kensington Expressway", and "Reverend Dr. Martin Luther King Jr. Expressway" are used interchangeably within the context of this report. The three-quarter mile stretch of expressway would be covered by a park resembling the previously demolished Humboldt Parkway designed by Frederick Law Olmsted.

The impact study presented here uses industry standard input-output modeling software (IMPLAN) and a predictive regression model to explain potential impacts over a 30 year timeline that span three distinct scenarios.

The results shown below are estimates of increases to regional economic activity (Regional Output), local home values (household wealth), tax revenue to Erie County and the City of Buffalo, and regional employment that would result from the construction of the Humboldt Deck. The results are also accompanied by a "multiplier." This is a commonly used measure in the economic development industry to compare economic impacts across several projects and generally range from 1.5 to 3.0 for highway infrastructure projects. To better understand this measure, it is helpful to think of it in terms of an input and resulting output. For example, a project yielding a multiplier of 2.5 can be thought of as a $1.00 input into the economy that produces $1.50 in spin-off economic activity.

Minimal Impact Scenario

This scenario only considers the spending related to the design and construction of the deck and the temporary influx of money to the regional economy. This is a low-end estimate and assumes that there will not be any residual impacts on the surrounding neighborhoods from the construction of the deck. It is also important to note that all the impacts associated with this scenario are short-term, lasting approximately the same length as the five year construction period. Overall, when considering only increased economic activity in the form of regional output, this scenario yields a multiplier of 2.08.

Minimal Impact Scenario
Impact Over 5-year Construction Period (2015 dollars)

Regional Output	$1.17 Billion
Household Wealth	$0
Tax Revenue	$0
Deck Construction Employment	950 jobs sustained during five years of construction

Statistical Inference Scenario

This scenario builds on the minimal impact scenario by adding the impacts related to predicted increases in home values within one-quarter mile of the proposed deck. Prediction methods are based on commonly used statistical methods and firmly grounded in the most recent body of knowledge about how parks affect home values. This scenario assumes some residual effects will occur in the surrounding neighborhoods, but also assumes there will not be any other new direct investment in the community other than the deck construction. Overall, this scenario considers all the impacts reported above from the minimal impact scenario and adds new household wealth and tax revenue to yield a multiplier of 2.14. The bulk of these impacts will occur during the five year construction period and the remainder will accrue to household wealth and tax revenue over the 25 years following the construction.

Statistical Inference Scenario
Impact Over 30-year Timeline (2015 dollars)

Regional Output	$1.17 Billion
Household Wealth	$31.88 Million
Tax Revenue	$1.16 Million
Deck Construction Employment	950 jobs sustained during five years of construction

Complete Revitalization Scenario

This scenario further builds on the first two by estimating impacts related to the re-densification of the surrounding neighborhoods to historical levels and the infill of new mixed-use development along the community's two commercial corridors – Jefferson Avenue and Fillmore Avenue. This scenario is a high end estimate and substantial amounts of additional direct investment would have to be made in the community to supplement the deck construction spending. Additionally, since a sizable portion of the new economic activity relies on infill development, the housing market in neighborhoods surrounding the deck would have change dramatically to exhibit high demand for such developments. The complete revitalization scenario builds on the statistical inference scenario by adding impacts associated with construction spending on new infill developments and increases in home values (household wealth) related to the reduction of vacant lots in the community. Overall, this scenario yields a multiplier of 2.96 and, as with the other scenarios, the bulk of these impacts will occur during the five year construction period and the remainder will accrue over the 25 year following the deck construction.

Complete Revitalization Scenario
Impact Over 30-year Timeline (2015 dollars)

Regional Output	$1.58 Billion
Household Wealth	$76.71 Million
Tax Revenue	$2.80 Million
Deck Construction Employment	950 jobs sustained during five years of construction
Infill Construction Employment	95 jobs sustained over 25 years after construction

Contents

Introduction

In the early 1960s Humboldt Parkway, an Olmsted-designed parkway that connected two of Buffalo's most prominent parks, was removed to make way for the Kensington Expressway (State Rte. 33). To accommodate the new expressway, approximately 1.5 miles of the new roadway was recessed below grade while access roads where constructed along either side of the expressway at grade. The new expressway divided several neighborhoods in half and has remained a physical barrier in the community to this day.

Like much of Buffalo, since the 1950s many of the neighborhoods surrounding the expressway have seen drastic decline. From 1950 to 2010, the four census tracts adjacent to the former Humboldt Parkway lost 64 percent of their population (22,532 less people) or 49 percent of their households (5,333 less households). At the same time the median household income dropped 24 percent (in adjusted 2010 dollars) from $29,648 to $22,410 and the unemployment rate increased from 5.5 percent to 27.2 percent.[1]

The New York State Department of Transportation (NYSDOT), has been asked to explore the possibility of a restored Humboldt Parkway as a way to reconnect the divided neighborhoods. The construction of a deck over the recessed expressway has been envisioned as one way to accomplish the restoration of the Parkway without compromising the long-term capacity of the expressway.

This report estimates the long-term economic impacts of such a deck and offers an aid in the decision making process related to the project. The economic impact model considers potential changes in housing prices, construction spending, and other impacts. All findings are based on the NYSDOT Kensington Expressway Concept Design Study dated August 2012.[2]

NYSDOT's Concept Design Study explored the design and construction cost implications of several alternate configurations of Kensington Expressway. For the purposed of this report, only Alternative D: Full Reconstruction of Expressway within a Tunnel Enclosure is considered and all findings are based on the construction estimates provided. (see appendix C for details).

The NYSDOT Alternative D includes the full reconstruction of the Kensington Expressway within a tunnel structure. The Humboldt Parkway would also be reconstructed, and an at-grade median with landscaping and pedestrian amenities would be established as a re-interpretation of the original Olmsted design. The 3,700 foot long tunnel would extend from Best Street to E. Ferry Street, while reconstruction of the expressway would extend between High Street and the pedestrian overpass north of E. Ferry Street. The existing retaining walls would be removed, and a series of continuous precast structural arches would be installed over the eastbound and westbound travel lanes and median. Ventilation, fire suppression, lighting, drainage and emergency egress systems would be provided. The expressway would be constructed on a new vertical alignment up to 11 feet below the existing alignment. The horizontal alignment would be maintained, although the tunnel structure would be wider than the existing expressway, resulting in the outside travel lanes of the expressway being constructed directly underneath Humboldt Parkway. Access ramps to and from the expressway would be maintained and reconstructed as part of this alternative, however Sub-Alternative D1 is under consideration to remove the exit ramp north of Best Street from NY Route 33 eastbound to Humboldt Parkway. Existing cross street bridges would be removed, and new street crossings constructed atop the new tunnel structure.

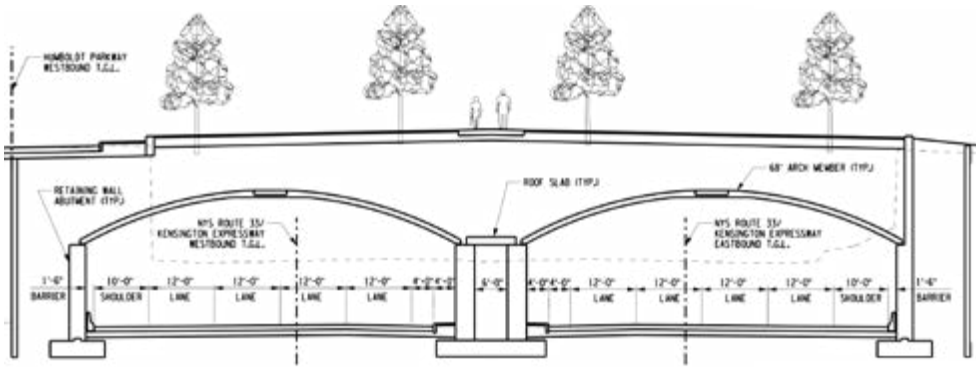


Figure 1. Alternative D Typical Section, Source: NYSDOT

Study Geography

While the impacts presented in this report are regional – Erie and Niagara Counties – the actual physical changes are assumed to be concentrated in the neighborhoods surrounding the proposed deck. The proposed deck location is located in the geographic center of the city where it would cover the Kensington Expressway. The expressway links Buffalo's downtown central business district to several suburban communities to the east and northeast of the city as well as the region's largest airport, the Buffalo-Niagara International Airport. This allows thousands of daily commuters to completely bypass city streets on their way into downtown. On average, the highway is estimated to carry 70,780 vehicles per day.[3]

The study area boundaries can be seen in figure 3. It covers approximately 0.64 square miles or 408 acres from Jefferson Avenue east to Fillmore Avenue and East Ferry Street south to Best Street. While this community is largely known to be part of the East Side, the neighborhood directly east of the Kensington Expressway and north of MLK Park has historically been referred to as the Humboldt Parkway neighborhood. In all, the study area is home to 136 commercial structures, 409 single family homes, 777 two family homes, and 23 three family homes.[4] Most of the study area's homes sit on typical parcels with 30 foot wide frontages and depths ranging from 100 to 200 feet. In addition to the existing structures there are 600 vacant parcels currently zoned residential and 110 vacant parcels zoned commercial.

Figure 2. City Context

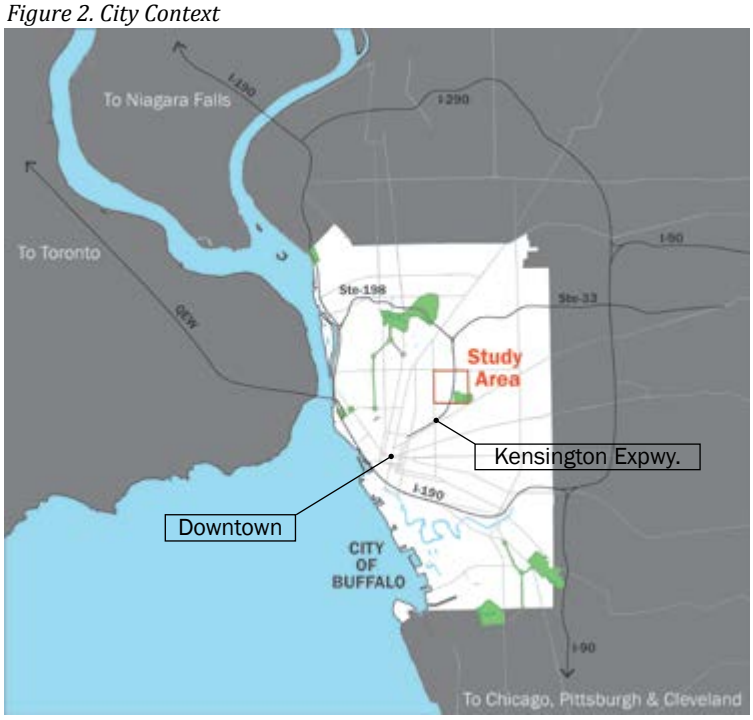


Figure 3. Economic Impact Study Area

Timeline

The overall timeline for this impact analysis is 30 years. Construction on the project is assumed to last five years starting in 2015 and its corresponding impacts are assumed to start accruing after the construction period and last the next 25 years at a constant rate, ending in 2045. Although impacts would most likely occur continually throughout the 30 year time period, they are broken into four discrete analysis periods with the cumulative impact within each period assumed to occur at the end of the period. A summary of impact milestones can be found in table 4.

Scenarios

While it is agreed that the construction of the Humboldt Deck will have a positive effect on the surrounding community, there are several other factors that may work in concert with the project to drive further change. In order to address a full range of possible future outcomes related to the construction of the deck, this analysis considers three distinct impact scenarios, each with a different set of assumptions. The scenarios are defined as follows:

Minimal Impact – Impacts will be based solely on spending related to the design and construction of the deck and the temporary influx of money to the regional economy using industry standard input-output modeling (IMPLAN).

Statistical Inference – This scenario builds on the minimal impact scenario by adding the impacts related to increases in home values within ¼ mile of the proposed deck. Methods are based on commonly used statistical methods and firmly grounded in the most recent body of knowledge about how parks affect home values.

Complete Revitalization – This scenario further builds on the first two by estimating impacts related to the re-densification of the surrounding neighborhoods to historical levels and the infill of new mixed-use development along the community's two commercial corridors – Jefferson Avenue and Fillmore Avenue.

Study-Wide Assumptions

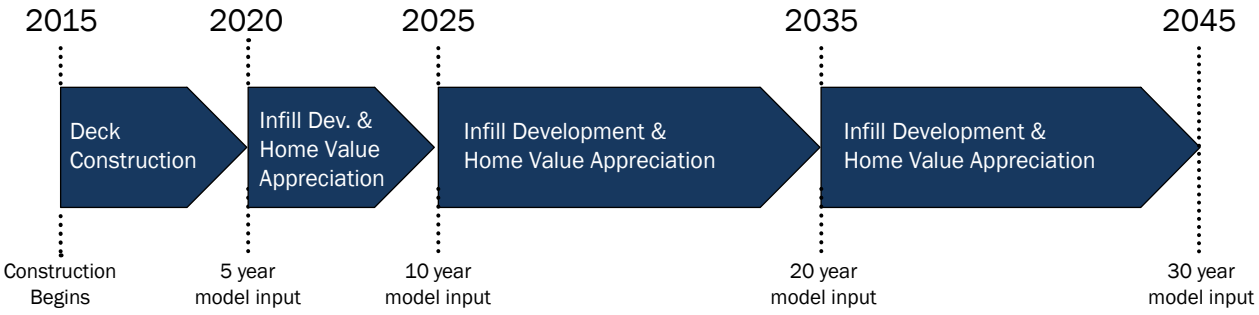
For purposes of this study, the geographic scope for impact analysis is Erie and Niagara Counties. Put another way, all required labor is sourced regionally and the impacts are calculated for the Buffalo-Niagara Region, although a sizable portion may accrue more locally. There is also assumed to be zero net regional population gain during the study time frame and the basic structure of the regional economy (input-output multiplier matrix) is assumed to remain constant.

Important Terms

It is important to clearly define key terms before interpreting the results of this report. A list of these important terms and their definitions are provided below.

Regional Output – Output represents the value of industry production. For manufacturers this would be sales plus/minus change in inventory. For service sectors production equals sales. For Retail and wholesale trade, output equals gross margin and not gross sales. Total output can be thought of as the total economic activity and does not necessarily reflect net added value because it counts intermediate products and services.

Figure 4. Analysis Timeline



Added Value – The difference between an industry's total output and the cost of its intermediate inputs. The components of value added consist of compensation of employees, taxes on production and imports less subsidies, and gross operating surplus. Value added equals the difference between an industry's gross output (consisting of sales or receipts and other operating income, commodity taxes, and inventory change) and the cost of its intermediate inputs (including energy, raw materials, semi-finished goods, and services that are purchased from all sources).[5]

Labor Income – All forms of employment income, including Employee Compensation (wages and benefits) and Proprietor Income.[6]

Household Wealth – Wealth that accumulated by individuals or households, but does not get counted as employee compensation. In this study appreciation of home value is the only impact associated with household wealth.[7]

Direct effects – A set of expenditure inputs to the predictive model for impact analysis. It is a series (or single set) of production changes or expenditures made by producers or consumers as a result of an activity or policy. In this study construction spending related to the deck and infill development are considered direct effects.[8]

Indirect effects – The impact of local industries buying goods and services from other local industries. The cycle of spending works its way backward through the supply chain until all money leaks from the local economy, either through imports or by payments to value added.[9] For this study, increase in household wealth is also considered an indirect effect.

Induced effect – The response by an economy to an initial change (direct effect) that occurs through re-spending of income. This money is recirculated through the household spending patterns causing further local economic activity.[10]

Impact Source 1: Deck Construction Spending impact

To quantify economic impacts due to the direct spending on construction in the Buffalo-Niagara Region, IMPLAN (Impact Analysis for Planning), an industry-standard input-output software package is used. IMPLAN traces spending patterns throughout a regional economy based on industry-specific linkages and multipliers. IMPLAN uses direct spending inputs to calculate multiplier effects and approximate secondary impacts. Direct spending estimates shown in table 1 are the sole deck spending figures considered to be associated with deck construction. While all the labor is assumed to be available regionally, some materials will not be available locally. Structural members for the proposed tunnel (concrete arch sections and reinforcing steel) are assumed to be imported from other regions, resulting in a local material sourcing of 84 percent of construction costs. For purposes of impact estimates, all spending is assumed to occur at the end of the five year construction period, ending in 2019.

Table 1. Alternative D Construction Costs (2012 dollars)

Construction and ROW costs	$486,873,726
Engineering Design and Inspection services	$26,129,908
Total Cost	**$513,003,634**

Data Source: NYSDOT

The IMPLAN analysis was carried out in three steps: indirect industry spending impact, labor income impact and direct employment impacts.

Indirect Industry Spending Impact – Direct spending of $616.8M (2020 dollars, future value of 2012 estimate escalated at 3 percent per year) is input into an "industry spending pattern" for highway and bridge construction (sector 509-039) provided by the IMPLAN software. This spending pattern models the flow of money among firms that are tied to highway construction. The default spending pattern is modified slightly to remove any spending on engineering design and inspection services. Based on the predetermined IMPLAN spending patterns, this spending only allocates 43 percent of the direct construction spending and the corresponding indirect and induced effects estimate the spending on goods and services that will be generated.

Labor Income Impact – The remaining 57 percent of the $616.8 Million in estimated construction costs is allocated to labor income (sector 5001, employee compensation). Labor income includes proprietor income and spending on employee compensation, including benefits and employer-paid taxes (social security, unemployment insurance, etc.).

Engineering and Inspection Services – Since NYSDOT's cost estimate provided itemized figures for this spending, these impacts are modeled separately by allocating $33.1 Million (2020 dollars) to the architectural, engineering, and related services sector (sector 369). The resulting impacts are measured as direct, indirect and induced figures.

Direct Employment Impact – Since the above steps only model spending, this step estimates the number of temporary jobs associated with $513M of spending in the "construction of other new nonresidential structures" sector (sector 36). Direct employment numbers are taken from this analysis and reported in the final results. The direct, indirect and induced output and value added effects are disregarded for this step since they are modeled in the above steps.

Impact Source 2: Infill Construction Spending Impact

Another piece of the impact estimate is associated with infill of new single family homes in the study area and mixed use development along Fillmore Avenue and Jefferson Avenue. These infill developments are assumed to occur on existing vacant lots and their estimated construction costs are estimated using RS means. The total cost of constructing infill developments will be treated as direct spending and its associated impacts will be estimated using the same method as the deck construction spending impact analysis described above. Overall, there are 600 vacant residential parcels and 110 vacant mixed-use parcels in the study area. Infill development is assumed to occur uniformly over the 25 year period after the deck is constructed. An infill schedule and estimated direct housing construction spending can be seen in table 2.

Impact Source 3: Home Value Increase & Property Tax Revenue

Since the early 1970s there has been several studies published that demonstrate a relationship between parks and their surrounding neighborhoods. It has also been shown that properties closer to urban parks exhibit higher values than those farther away. This premium for close proximity to a park may vary depending on several factors such as park size and level of investment but can be as much as 31 percent more than similar homes not located near parks.[11,12,13] Furthermore, properties directly adjacent to parks – especially those facing a park – tend to have higher property values than those a block or more away from the same park.

This "proximity theory" is the basis for calculating the economic impact associated with an increase in housing prices surrounding the newly constructed Humboldt deck. Housing price values – and their corresponding tax revenues – are estimated using a linear hedonic pricing model. This model uses actual sale prices along with several other variables to predict the value of homes, on average, within one-quarter mile of an Olmsted-designed parkway.

First, the model is constructed using home sales prices from 2003 to 2013 of homes at least one-quarter mile from Olmsted-Designed Parkways, including Richmond Avenue, Lincoln Parkway, Chapin Parkway, Bidwell Parkway, Humboldt Parkway, McKinley Parkway, and Red Jacket Parkway (see appendix F for a more detailed map). The resulting model is used to measure the impacts that the newly constructed deck will have on the study area by changing individual variables associated with each home. This method was chosen because it allows researchers to isolate the effects of individual

Table 2. Infill Development Schedule / Direct Construction Spending

	Year 10 (2025 dollars)	Year 20 (2035 dollars)	Year 30 (2045 dollars)
Single Family Homes	120 @ $328,734 ea.	240 @ $441,791 ea.	240 @ $593,730 ea.
Mixed Use Buildings	22 @ $1,045,458 ea.	44 @ $1,405,008 ea.	44 @ $1,888,213 ea.
Total Direct Spending	$62,448,155	$167,850,196	$225,576,628

Data Source: RS Means. For a more detailed estimate of construction cots refer to appendix G.

variables, or target variables, and change them based on the development scenarios detailed above, while holding other variables constant. For example, the effect of reducing vacant lots in the area may affect a home's value differently with each development scenario depending on how much the vacancy is reduced, but that home's square footage will not change. This allows for the application of the predictive model to a wide range of housing types and neighborhoods across the city. In the end, the effects due to changing the target variables for homes in the study areas will be summed for each development scenario and applied to the final economic impact.

Several combinations of variables are considered and a final model is selected based on its statistical significance. All coefficients are found to be statistically significant at a level of at least 95 percent and the model explains approximately 68 percent of the variation in home sales prices for the given data set. It should be noted that the goal of this model is not to predict the value of individual homes for direct comparison to their actual value, but to measure, on average, the effect of changing the target values across the study area.

A list of all variables considered in the modeling process are shown in tables 4 and 5. The values in the variable coefficient column should be interpreted as the marginal effect a variable has on a home's value, while holding all other variables constant. For example, for each one square foot of living space increase, a home's value is predicted to rise by 97.38 dollars, if all other variables are held constant.

Impacts are measured by changing the coefficients according to table 5. A portion of the resulting appreciation is allocated to city and Buffalo and Erie County property tax revenue ($35.18 per $1000 of value)[14] while the remaining is allocated to household wealth. For more detailed information about the results of the hedonic modeling process see appendix F.

All together, theses methods are used in different combinations to meet the assumptions of each scenario. Table 3 shows how each source is treated in the analysis.

Table 3. Summary of Economic Impact Inputs

Impact Source	Minimal Impact	Statistical Inference	Complete Revitalization	Year of Analysis	Impact Estimation Method	Data Sources
Deck Construction Spending	X	X	X	Year 5	IMPLAN	NYSDOT
Housing Value Increase/Tax Revenue		X	X	Years 10, 20 and 30	Hedonic Pricing Model	Zillow.com, ACS 5 year estimates, Erie County
Infill Construction			X	Years 10, 20 and 30	IMPLAN	Erie County, RS Means

Table 4. Hedonic Model Variables Definitions

Variable	Definition	Data Source
Sale Price	Dollars (2010 to 2013)	Zillow.com
SqFt	Square Feet of living space	Zillow.com
Vacancy Lot Ratio	Ratio of residential vacant parcels to residential parcels with structures by block group	Erie County Real Property Tax Services
2 Family	Dummy Variable (single family as reference variable)	Erie County Real Property Tax Services
3 Family	Dummy Variable (single family as reference variable)	Erie County Real Property Tax Services
Median HH Income	Median Household income by block group (2011 dollars)	American Community Survey
Bath/Bed	Number of Baths / Number of Bedrooms	Erie County Real Property Tax Services
Dist. to Parkway	Distance from an Olmsted parkway	Calculated using ArcGIS
Highway or Parkway	Dummy Variable (0 = 1/4 mile from existing parkway, 1= 1/4 mile from Kensington Expressway)	Erie County Real Property Tax Services
Premium Location	Dummy Variable (0 = 1/4 mile from parkway ***only***, 1 = 1/4 mile from a parkway ***and*** park)	Erie County Real Property Tax Services
Violent Crime Rate	Average number of violent crimes per year, per person, by census tract	City of Buffalo police Department
Age of Home	Years (as of 2013)	Erie County Real Property Tax Services
Mixed Use Corridor	Distance to a mixed-use corridor	Calculated using ArcGIS
Lot Size	Square feet of the lot a home sits on	Calculated using ArcGIS

Table 5. Hedonic Pricing Model Results

Variable	Coefficient ($)	Statistical Inference	Complete Revitalization
Intercept	-$129,398.17	Held Constant	Held Constant
SqFt	$97.38	Held Constant	Held Constant
Vacant Lot Ratio	-$86,650.13	Held Constant	Change from existing to 0% vacancy to reflect complete infill
2 Family	-$76,847.27	Held Constant	Held Constant
3 Family	-$137,997.70	Held Constant	Held Constant
Median HH Income	$1.17	Held Constant	Held Constant
Bath/Bed	$138,999.61	Held Constant	Held Constant
Dist. to Parkway	-$142,230.79	Held Constant	Held Constant
Highway or Parkway	-$29,254.19	Change from 1 to 0 for all homes within 1/4 mile of new deck	Change from 1 to 0 for all homes within 1/4 mile of new deck
Premium Location	$23,378.62	Change from 0 to 1 if near MLK Park and Humboldt Parkway	Change from 0 to 1 if 1/4 mile from MLK Park and Humboldt Parkway
Violent Crime Rate	Not used in final model		
Age of Home	Not used in final model		
Mixed Use Corridor	Not used in final model		
Lot Size	Not used in final model		

Regional Economic Impact Results

Total Economic Impacts

Since all impacts occur at different times across the 30 year timeline, the impacts are discounted back to a present value – in this case, the year 2015 – for comparison between scenarios.

The Humboldt Deck construction is estimated to add from $1.17 to $1.58 Billion to regional economic output and from $0 to $76.7 in new household wealth. Additionally, the City of Buffalo and Erie County could receive from $0 to $2.8 Million in new property tax revenue over the 30 year timeline due to the expected rise in home prices in the neighborhoods surrounding the newly constructed deck.

Ultimately, the project is estimated to have a regional output multiplier of 2.06 to 2.94. In simpler terms, the design and construction of the deck will create an additional 1.06 to 1.94 times its spending in new regional economic activity in the form of output, household wealth and tax revenue depending on the scenario chosen.

A more detailed view of estimated impacts over the 30 year timeline can be found in appendix A.

Table 6. Impact Summary by Scenario (2015 Dollars)

Minimal Impact, 30 year total	
Labor Income	$510,438,733
Household Wealth	-
Added Value	$583,764,965
Tax Revenue	-
Regional Output	$1,165,104,120

Statistical Inference, 30 year total	
Labor Income	$510,438,733
Household Wealth	$31,883,088
Added Value	$583,764,965
Tax Revenue	$1,162,401
Regional Output	$1,165,104,120

Complete Revitalization, 30 year total	
Labor Income	$638,787,119
Household Wealth	$76,709,558
Added Value	$773,844,553
Tax Revenue	$2,796,696
Regional Output	$1,577,209,718

Net Present Value

Net present value calculations are used to determine the present value of future cash flows to compare different options and assist in decision making regarding the profitability of investments. Similar to the overall impacts presented above, net present value (NPV) calculations are carried out for all three scenarios using 2015 as the base year. NPV calculations consider spending associated with the design and construction of the Humboldt Deck to be an investment, or a negative cash flow. The remaining economic activity – output (less construction spending), household wealth impacts and tax revenue – are considered to be returns and therefore positive cash flows. The NPV figures differs from the overall impacts figures because it counts the direct construction spending as a cost – and therefore a negative number– unlike the impact figures above which include the direct construction spending as a positive number. Table 7 provides a summary of the NPV results while more details can be found in appendix B. The minimal impact, statistical inference and complete revitalization scenarios yield NPV's of $40.19 Million, $73.24 Million, and $531.80 Million respectively.

Table 7. Net Present Value of Impacts (2015 dollars)

Scenario	Net Present Value
Minimal Impact	$40,192,087
Statistical Inference	$73,237,576
Complete Revitalization	$531,803,940

Employment Impacts

Approximately 66 percent of the estimated jobs created are directly associated with construction spending, so they will likely only produce temporary, short-term, surges in employment that will lag slightly behind the overall construction spending in the first five years. Construction spending is estimated to sustain approximately 950 jobs per year (4,750 job-years in total) region-wide during the five year construction period for all scenarios. Additionally, the complete revitalization scenario is estimated to sustain approximately 95 region-wide jobs (2,386 job-years in total) for the 25 years directly following the completion of the deck construction. There are not estimated to be any additional employment impacts (beyond deck construction spending impacts) from the statistical inference scenario since all the additional economic value is allocated to household wealth.

Table 8. Total Employment Generated

Scenario	First 5 Years Construction Period 2015-2019 (job-years)	Remaining 25 Years 2020-2045 (job-years)	Total Employment (job-years)
Minimal Impact	4,750	-	4,750
Statistical Inference	4,750	-	4,750
Complete Revitalization	4,750	2,386	7,136

Some Useful Definitions

Household Wealth – Wealth that accumulated by individuals or households, but does not get counted as employee compensation. In this study, appreciation of home value is the only impact associated with household wealth.

Added Value – The difference between an industry's total output and the cost of its intermediate inputs. The components of value added consist of compensation of employees, taxes on production and imports less subsidies, and gross operating surplus. Value added equals the difference between an industry's gross output (consisting of sales or receipts and other operating income, commodity taxes, and inventory change) and the cost of its intermediate inputs (including energy, raw materials, semi-finished goods, and services that are purchased from all sources).

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Other Potential Impacts

In addition to the impacts detailed above, several other potential economic impacts may come from the construction of a parkway deck over the Kensington Expressway. These benefits are more difficult to quantify and are not included in the impact results presented in this report. As with the estimated impacts presented above, theses other impacts would depend on several factors including the final deck design and level of anticipated neighborhood revitalization.

Gentrification

If realizing the complete revitalization scenario presented in this report is the ultimate goal, community leaders should be aware of the potential negative consequences for existing residents in the neighborhoods surrounding a newly constructed deck. A rapid influx of development in these neighborhoods could raise home prices and possibly price some residents out of their homes.

To mitigate these negative effects, community leaders can work with residents and city officials to enact local level tactics and polices that promote equitable development. Some potential strategies for building a strong and equitable community in the face of rising real estate values are shown below.

- Develop a unified vision and plan for the economic and housing needs of neighborhood residents.
- Implement regulatory and policy fixes at the regional, city and community levels. Including tax deferral programs that delay property taxes until the time of sale for appreciated homes and regulations that require affordable housing to be a part of new developments.
- Gain control of public and private property assets that can be taken out of the market and used to provide affordable housing and office space for neighborhood residents and service providers.
- Improve residents' understanding of legal rights, and home-buying and selling strategies.
- Create forums to resolve conflicts and to re-knit the community. [15]

New Trees

Trees are an integral part of the urban environment. Certain types of trees have a high impact on carbon dioxide reduction, increased storm water collection and improved air quality in the surrounding communities. Depending on the number of trees planted, they can provide millions of dollars of tangible benefits to communities.

With the help of a software package named i-Tree,[16] it is possible to calculate the economic impact of newly planted trees in and around the Humboldt Deck. I-Tree is a peer reviewed software suite from the USDA Forest Service that provides urban forestry analysis and benefits assessments tools. It calculates the approximate benefits that individual trees provide for a given area. The carbon, air quality and storm water calculations are based on methods and models which have been derived with the help of average species growth and geographic parameters. With the help of i-Tree, one can assess the economic impact a tree has, not only for the current year, but also 10, 20 and 30 years after it has been planted.

Table 9. Annual Benefits of American Elm Trees

	Year 0 (2 inch diameter at planting)	Year 10	Year 20	Year 30
Stormwater Intercepted	$1.11 (139 Gallons)	$36.66 (4,583 Gallons)	$46.20 (5,775 Gallons)	$56.08 (7,010 Gallons)
Air Quality Improvement	$0.11	$28.43	$34.16	$39.40
CO2 reduction	$0.11 (11 Pounds)	$3.51 (1,258 Pounds)	$4.77 (1,545 Pounds)	$5.58 (1,830 Pounds)
Total Benefit	**$1.33**	**$68.60**	**$85.13**	**$101.06**

Data Source: I-tree[14]

For example, if American Elm trees were planted along with the Humboldt Deck improvements they would bring with them benefits that continually appreciate as they grow. At the ten year mark of their lives each tree would account for an annual economic benefit of $68.60. At 20 and 30 years old they would bring annual economic benefits of $85.13, and $101.06 per tree, respectively. Table 9 show more detail on the benefits of American Elm trees.

While more detailed landscape plans would be needed to determine to provide an accurate estimate of benefits, NYSDOT estimates that a total of 472 trees would be planted if Deck Alternative D was constructed. This would yield a total estimated benefits of $624,837 (2015 dollars) over a 30 year period if all the trees were American Elms.

Increased Business Activity

The revitalization imagined under the complete revitalization scenario is projected to create impacts even beyond those quantified in this study, as new businesses begin to operate in the 110 mixed-use parcels that currently stand vacant and a projected 600 new households in the neighborhood create increased demand for products and services of existing neighborhood stores. Especially since the area is currently under served by healthy food and outpatient health services. The Census Tracts that comprise the study area (Census Tracts 33.02 and 35) are designated by the U.S. Department of Health and Human Services as medically underserved with shortages of primary care, dental and mental health professionals. Meanwhile, Census 35 is designated by the U.S. Department of Agriculture as an area where a sizable proportion have a low income and are relatively far (more than 1 mile) from a supermarket.

Indeed, this higher level of business activity will be supported not only by new households but through improved access to services where gaps currently exist, greater neighborhood walkability resulting from the deck, higher levels of household wealth, and the attraction of higher-income residents, as home values increase over time. The kinds of businesses that are most readily supported by the additional households in the neighborhood include variety stores, food stores and restaurants, as 100 households can support between 1,160 and 1,340 square feet of this kind of retail space, per projections from the Center for Economic Development at the University of Wisconsin. A total of 600 households could potentially support between 6,960 and 7,440 square feet. Based on median sizes in the City of Buffalo, this is approximately three small convenience outlets, three restaurants, and three small grocery markets. Together, these new outlets could bring millions of new dollars in sales to the neighborhood. Other space could offer an attractive location for entrepreneurs and other new development, especially with this neighborhood being just a few-minutes drive from an expanding medical corridor in downtown Buffalo.[17,18,19]

Health Care Savings

To date there has been several studies that point to the adverse impacts of highways on nearby residents' health. Road traffic is a major source of air pollutants such as nitrogen dioxide, carbon monoxide, particulate matter and volatile organic compounds which have major negative impacts on the health of children and adults who live in close proximity to them. There is also considerable epidemiologic evidence on the relationship between ambient air pollution, morbidity due to respiratory diseases,[20,21,22] and chronic respiratory disease in school aged children. [23,24] NO_2 concentrations from highway traffic have also been found to be positively related with the traffic density on the nearest highways and negatively correlated with the distance from the nearest highway. [25]

Locally, a study was carried out in Erie County that has linked asthma and other breathing disorders of children and adults to the effect of highways near residential areas.[26] The results of this study also estimated that children living within 200 meters of roads with heavy truck traffic or a high density of automobile traffic have a higher risk of asthma hospitalization.

Another study carried out in San Diego County, California examines associations between childhood asthma and traffic flow with the help of GIS (Geographic Information System).[27] In this study, health data was obtained in childhood asthma cases from Medi-Cal and Medical Care Statistics Program of California Department of Health Services. The results point to evidence that asthmatic children living near busy roads may have an increased risk of repeated medical care visits, as compared to asthmatic children living near lower traffic flow areas.

NYSDOT's proposed alternate D does not reduce the capacity—in traffic density or vehicle type—but with additional sources of funding, it may be possible to design additional filtration and emissions control systems that can reduce the highway's impact on ambient air quality. This could lessen the impact on those living closest to the highway, which could in turn, provide benefits to the community in the form of lower health care costs and less frequent visits to local hospitals.

While ventilation in tunnels of substantial lengths are required, emissions control systems that address the ambient air surrounding tunnels are not common. To address the growing concern about the adverse health affects associated with tunnel emissions, a number of countries—including Japan and Australia—have started to take closer look at ways to lessen the impact of emissions on surrounding communities. These countries have now begun to monitor ambient air quality surrounding tunnels and have also included control systems in their tunnel designs. Most commonly, emission stacks are used in urban settings to disperse emissions into the ambient atmosphere at greater heights to lessen the impact on ground level air quality. [28] Given the growing concern about urban air quality and the lack of emissions control designs for highways and tunnels, this may provide fertile ground for additional funding opportunities related to demonstration projects and research into cutting-edge emissions control systems. Further research and funding would be needed to determine the feasibility of augmenting the current design with new emissions control elements.

Additionally, the construction of the proposed deck would be the latest effort in restoring the complete Olmsted Parks and Parkways system. The deck structure would essential augment the footprint of MLK Park and add to the city's overall acreage of parkland. Theses open spaces are vital elements of the urban environment and easy access to such high quality parks and public facilities can encourage people to live more active and healthy lifestyles.

Parks and open spaces may also be important venues for children to engage in physical activity and are important destinations where children can walk or cycle.[29] In experimental studies carried out by Epstein et. al. it is evident that access to open spaces and park areas is associated with an increase in physical activity.[30] Studies have also shown that the ratio of park area to residential area in community is positively associated with physical activity in children ages 4–7,[31] while a lack of nearby parks is negatively associated with 10–12 year-old girls' walking and cycling.[32]

Density of parks is also important. Park density has been shown to be associated with adolescent girls' non-school physical activity;[33] similar findings have been documented among adults.[34]

There is evidence to suggest that the addition of the new parkway in the community could positively affect the activity levels those living close to the parkway, especially among children. As is the case with mitigation of harmful emission, this potential increase in physical activity would lead to long-term savings in health care costs and less frequent visits to local hospitals.

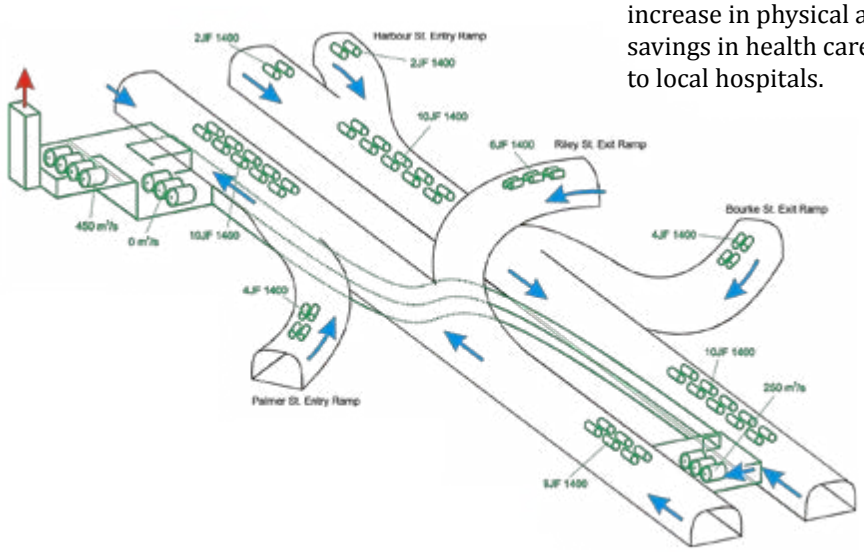

Figure 4.
Example of a ventilation system with emission stack from the Cross City Tunnel in Sydney, Australia.

Source: HBI Haerter

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Appendix A -- Total Economic Impact by Year

Minimal Impact Scenario (future value of impacts)					
	Impact Type	**Year 5 (2020 dollars)**	**Year 10 (2025 dollars)**	**Year 20 (2035 dollars)**	**Year 30 (2045 dollars)**
Labor Income	Deck Construction Direct	$369,770,640	-	-	-
	Deck Construction Indirect	$89,287,682	-	-	-
	Deck Construction Induced	$132,680,068	-	-	-
	Total Labor Income/Wealth	**$591,738,390**	**-**	**-**	**-**
Added Value	Deck Construction Direct	$284,453,059	-	-	-
	Deck Construction Indirect	$159,337,091	-	-	-
	Deck Construction Induced	$232,953,439	-	-	-
	Total Added Value	**$676,743,589**	**-**	**-**	**-**
Regional Output	Deck Construction Direct	$649,857,656	-	-	-
	Deck Construction Indirect	$312,168,424	-	-	-
	Deck Construction Induced	$388,648,920	-	-	-
	Total Added Value	**$1,350,675,000**	**-**	**-**	**-**

Statistical Inference Scenario (future value of impacts)					
	Impact Type	**Year 5 (2020 dollars)**	**Year 10 (2025 dollars)**	**Year 20 (2035 dollars)**	**Year 30 (2045 dollars)**
Labor Income	Deck Construction Direct	$369,770,640	-	-	-
	Deck Construction Indirect	$89,287,682	-	-	-
	Deck Construction Induced	$132,680,068	-	-	-
	Home Value Increase Indirect	-	-	-	-
	Total Labor Income/Wealth	**$591,738,390**	**-**	**-**	**-**
Household Wealth	**Home Value Increase Indirect**	**-**	**$8,569,641**	**$23,033,761**	**$30,955,449**
Tax Revenue	**Home Value Increase Indirect**	**-**	**$312,434**	**$839,771**	**$1,128,581**
Added Value	Deck Construction Direct	$284,453,059	-	-	-
	Deck Construction Indirect	$159,337,091	-	-	-
	Deck Construction Induced	$232,953,439	-	-	-
	Total Added Value	**$676,743,589**	**-**	**-**	**-**
Regional Output	Deck Construction Direct	$649,857,656	-	-	-
	Deck Construction Indirect	$312,168,424	-	-	-
	Deck Construction Induced	$388,648,920	-	-	-
	Total Added Value	**$1,350,675,000**	**-**	**-**	**-**

Complete Revitalization Scenario (future value of impacts)					
	Impact Type	**Year 5 (2020 dollars)**	**Year 10 (2025 dollars)**	**Year 20 (2035 dollars)**	**Year 30 (2045 dollars)**
Labor Income	Deck Construction Direct	$369,770,640	-	-	-
	Deck Construction Indirect	$89,287,682	-	-	-
	Deck Construction Induced	$132,680,068	-	-	-
	Home Value Increase Indirect	-	-	-	-
	Infill Construction Direct	-	$17,064,614	$45,866,828	$61,641,181
	Infill Construction Indirect	-	$9,644,304	$25,922,276	$34,837,372
	Infill Construction Induced	-	$7,788,982	$20,935,480	$28,135,534
	Total Labor Income	**$591,738,390**	**$34,497,900**	**$92,724,584**	**$124,614,087**
Household Wealth	**Home Value Increase Indirect**	**-**	**$20,618,246**	**$55,418,398**	**$74,477,692**
Tax Revenue	**Home Value Increase Indirect**	**-**	**$751,705**	**$2,020,458**	**$2,715,326**
Added Value	Deck Construction Direct	$284,453,059	-	-	-
	Deck Construction Indirect	$159,337,091	-	-	-
	Deck Construction Induced	$232,953,439	-	-	-
	Infill Construction Direct	-	$22,274,725	$59,870,734	$80,461,261
	Infill Construction Indirect	-	$15,132,866	$40,674,611	$54,663,277
	Infill Construction Induced	-	$13,682,624	$36,776,606	$49,424,683
	Total Added Value	**$676,743,589**	**$51,090,215**	**$137,321,951**	**$184,549,221**
Regional Output	Deck Construction Direct	$649,857,656			
	Deck Construction Indirect	$312,168,424			
	Deck Construction Induced	$388,648,920			
	Infill Construction Direct		$62,448,155	$167,850,196	$225,576,628
	Infill Construction Indirect		$25,501,468	$68,543,679	$92,116,974
	Infill Construction Induced		$22,817,470	$61,329,545	$82,421,780
	Total Added Value	**$1,350,675,000**	**$110,767,093**	**$297,723,420**	**$400,115,382**

Appendix B -- Net Present Value by Year

Minimal Impact Scenario NPV (2015 dollars)					
	2020	2025	2035	2045	Total
Net Economic Output	$604,531,197	-	-	-	$604,531,197
Household Wealth	-	-	-	-	-
Home Value Increase Tax Revenue	-	-	-	-	-
Deck Construction Costs	($564,339,110)	-	-	-	($564,339,110)
Net Present Value	$40,192,087	-	-	-	$40,192,087

Statistical Inference Scenario NPV (2015 dollars)					
	2020	2025	2035	2045	Total
Net Economic Output	$604,531,197	-	-	-	$604,531,197
Household Wealth	-	$6,376,618	$12,753,235	$12,753,235	$31,883,088
Home Value Increase Tax Revenue	-	$232,480	$464,961	$464,961	$1,162,401
Deck Construction Costs	($564,339,110)	-	-	-	($564,339,110)
Net Present Value	$40,192,087	$6,609,098	$13,218,196	$13,218,196	$73,237,576

Complete Revitalization Scenario NPV (2015 dollars)					
	2020	2025	2035	2045	Total
Net Economic Output	$604,531,197	$82,421,120	$164,842,239	$164,842,240	$1,016,636,796
Household Wealth	-	$15,341,912	$30,683,823	$30,683,823	$76,709,558
Home Value Increase Tax Revenue	-	$559,339	$1,118,678	$1,118,678	$2,796,696
Deck Construction Costs	($564,339,110)	-	-	-	($564,339,110)
Net Present Value	$40,192,087	$98,322,371	$196,644,741	$196,644,741	$531,803,940

Appendix C -- Total Economic Impact

Future Impacts and Present Values (Detailed View)

	Future Impacts (future year dollars)			Present Value of Future Impacts (2015 dollars)		
Impact Type	**All Scenarios**	**Complete Revitalization Only**	**Statistical Inference Only**	**All Scenarios**	**Complete Revitalization Only**	**Statistical Inference Only**
2020						
Deck Construction	**$2,619,156,979**			**$2,259,307,818**		
Direct - Deck Construction	$1,304,081,355			$1,124,912,032		
1. Labor Income/Wealth	$369,770,640			$318,967,402		
2. Added Value	$284,453,059			$245,371,708		
5. Output	$649,857,656			$560,572,923		
Indirect	$560,793,197			$483,745,138		
1. Labor Income/Wealth	$89,287,682			$77,020,339		
2. Added Value	$159,337,091			$137,445,574		
5. Output	$312,168,424			$269,279,225		
Induced	$754,282,427			$650,650,647		
1. Labor Income/Wealth	$132,680,068			$114,450,992		
2. Added Value	$232,953,439			$200,947,683		
5. Output	$388,648,920			$335,251,972		
2025						
Home Value Increase		**$21,369,951**	**$8,882,075**		**$15,901,251**	**$6,609,098**
Indirect		$21,369,951	$8,882,075		$15,901,251	$6,609,098
1. Labor Income/Wealth		$20,618,246	$8,569,641		$15,341,912	$6,376,618
3. Tax Revenue		$751,705	$312,434		$559,339	$232,480
Infill Construction		**$196,355,208**			**$146,106,715**	
Direct		$101,787,494			$75,739,455	
1. Labor Income/Wealth		$17,064,614			$12,697,675	
2. Added Value		$22,274,725			$16,574,487	
5. Output		$62,448,155			$46,467,292	
Indirect		$50,278,638			$37,412,029	
1. Labor Income/Wealth		$9,644,304			$7,176,268	
2. Added Value		$15,132,866			$11,260,274	
5. Output		$25,501,468			$18,975,487	
Induced		$44,289,076			$32,955,232	
1. Labor Income/Wealth		$7,788,982			$5,795,734	
2. Added Value		$13,682,624			$10,181,157	
5. Output		$22,817,470			$16,978,341	
2035						
Home Value Increase		**$57,438,855**	**$23,873,532**		**$31,802,501**	**$13,218,196**
Indirect		$57,438,855	$23,873,532		$31,802,501	$13,218,196
1. Labor Income/Wealth		$55,418,398	$23,033,761		$30,683,823	$12,753,235
3. Tax Revenue		$2,020,458	$839,771		$1,118,678	$464,961
Infill Construction		**$527,769,955**			**$292,213,428**	
Direct		$273,587,758			$151,478,908	
1. Labor Income/Wealth		$45,866,828			$25,395,351	
2. Added Value		$59,870,734			$33,148,974	
5. Output		$167,850,196			$92,934,584	
Indirect		$135,140,566			$74,824,055	
1. Labor Income/Wealth		$25,922,276			$14,352,536	
2. Added Value		$40,674,611			$22,520,546	
5. Output		$68,543,679			$37,950,973	
Induced		$119,041,631			$65,910,465	
1. Labor Income/Wealth		$20,935,480			$11,591,468	
2. Added Value		$36,776,606			$20,362,315	
5. Output		$61,329,545			$33,956,682	
2045						
Home Value Increase		**$77,193,018**	**$32,084,031**		**$31,802,501**	**$13,218,196**
Indirect		$77,193,018	$32,084,031		$31,802,501	$13,218,196
1. Labor Income/Wealth		$74,477,692	$30,955,449		$30,683,823	$12,753,235
3. Tax Revenue		$2,715,326	$1,128,581		$1,118,678	$464,961
Infill Construction		**$709,278,690**			**$292,213,429**	
Direct		$367,679,070			$151,478,909	
1. Labor Income/Wealth		$61,641,181			$25,395,350	
2. Added Value		$80,461,261			$33,148,974	
5. Output		$225,576,628			$92,934,584	
Indirect		$181,617,623			$74,824,056	
1. Labor Income/Wealth		$34,837,372			$14,352,536	
2. Added Value		$54,663,277			$22,520,546	
5. Output		$92,116,974			$37,950,974	
Induced		$159,981,997			$65,910,465	
1. Labor Income/Wealth		$28,135,534			$11,591,467	
2. Added Value		$49,424,683			$20,362,315	
5. Output		$82,421,780			$33,956,682	

Appendix D -- Economic Impact Type by Geography

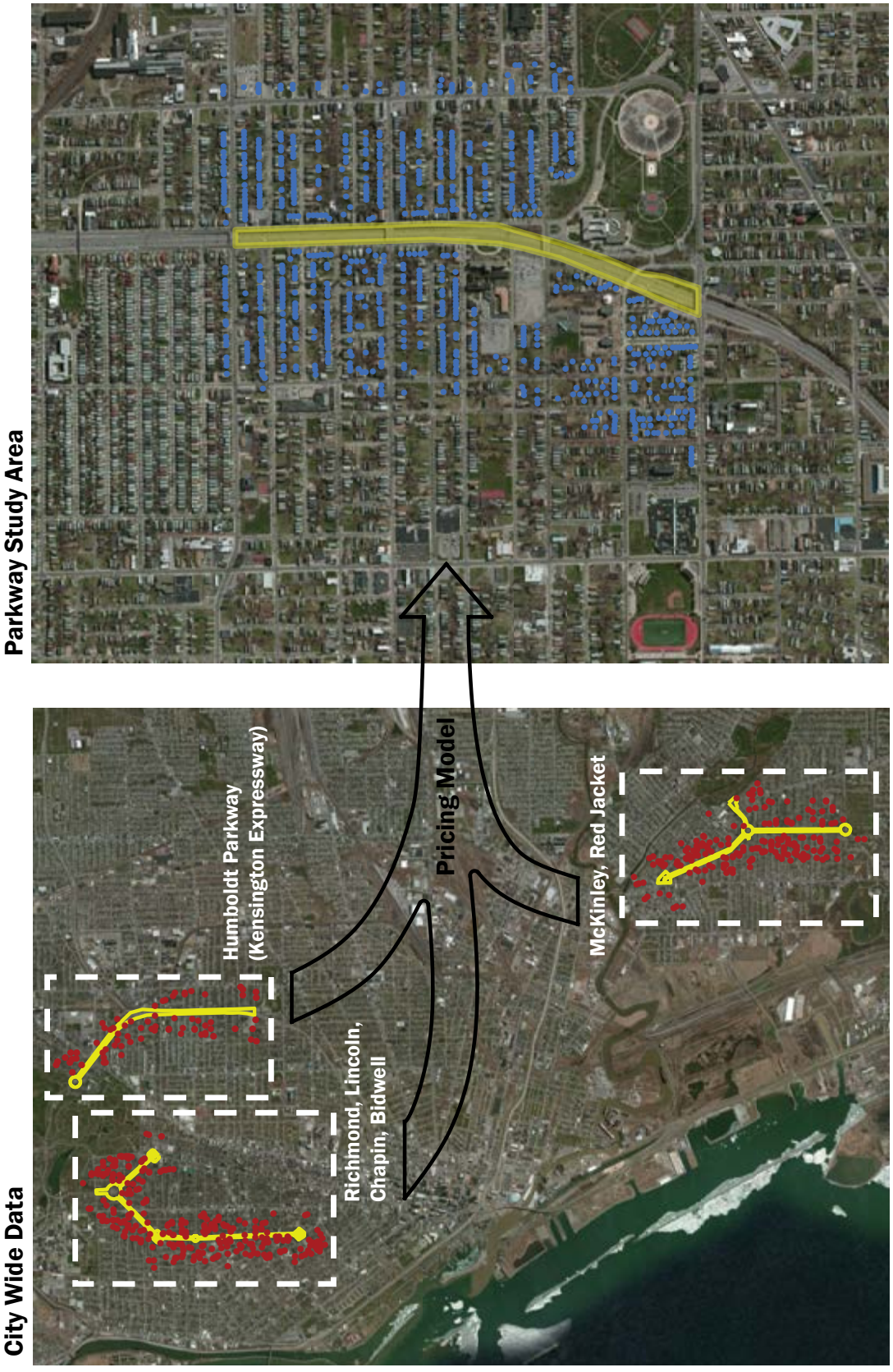
3.2.4 Alternative D – Full Reconstruction of Expressway within a Tunnel Structure

Alternative D - Full Reconstruction of Expressway within a Tunnel Structure					
Activities		NYSDOT Share	Betterment Share	Total Cost	Comments
Construction Costs	**Bridges**				
	Dodge Street	$295,550,761		$295,550,761	Tunnel
	Northampton Street				
	East Utica Street				
	East Ferry Street				
	Humboldt Parkway				
	Pavement, Curb and Underdrain Route 33 Side	$4,159,634		$4,691,303	Complete Humboldt roadway section(curb and underdrain on the residential side is includded in a betterment)
	Curb and Underdrain Residential Side		$531,669		
	Sidewalk	$741,228	$329,760	$1,070,987	NYSDOT Share is the sidewalk over the tunnel, Betterment is the residential sidewalk
	Drainage	$1,145,838		$1,145,838	New Humbolt Draiange System
	Driveways		$85,568	$85,568	
	Lighting	$240,646	$1,057,542	$1,298,188	Humboldt and new roadway lighting
	Signs	$115,665		$115,665	
	Trees	$246,856	$85,478	$332,334	
	Landscaping	$692,108	$220,739	$912,847	
	Traffic Signals		$1,480,000	$1,480,000	
	Utilities	$83,193		$83,193	Miscellaneous Humboldt utilities
	Restore ITS System	$300,000		$300,000	
	Environmental, Erosion and Sediment Control	$332,771		$332,771	Will require SPEDES mitigation
	Incidentals	$953,794		$953,794	Field Office, Pavement Stripes, Price Adjustments,and Unknowns etc
	Route 33				
	Pavement Costs	$27,917,540		$27,917,540	Pavement structure, including excavation not included in the structure excavation
	Ramps	$13,944,662		$13,944,662	Pavement structure and Retaining walls
	Drainage	$200,000		$200,000	Pump Station Modifications, lowered Drainage system
	Lighting	$4,200,000		$4,200,000	Tunnel lighting
	Chain-link Fencing	$12,870		$12,870	Over tunnel entrance/exit and ramp entrances/exits
	Overhead Signs	$600,000		$600,000	Replacement of existing overhead sign structures as tunnel mounted structures
	Utilities on Existing Bridges	$169,880		$169,880	Relocating Existing hanging bridge utilities
	Environmental, Erosion and Sediment Control	$418,622		$418,622	Will require SPEDES mitigation
Subtotal (2012 Dollars)		$352,026,068	$3,790,756	$355,816,823	
Work Zone Traffic Control		$4,000,000	$1,000,000	$5,000,000	
Subtotal (2012 Dollars)		$356,026,068	$4,790,756	$360,816,823	
Survey (3%)		$10,680,782	$143,723	$10,824,505	
Subtotal (2012 Dollars)		$366,706,850	$4,934,478	$371,641,328	
Contingency (25%)		$91,676,712	$1,233,620	$92,910,332	
Subtotal (2012 Dollars)		$458,383,562	$6,168,098	$464,551,660	
Field Change Order = $3,500,000		$3,500,000		$3,500,000	
Subtotal (2012 Dollars)		$461,883,562	$6,168,098	$468,051,660	
Mobilization (4%)		$18,475,342	$246,724	$18,722,066	
Subtotal (2012 Dollars)		$480,358,904	$6,414,822	$486,773,726	
Expected Award Amount (Inflated @ 3%/yr to midpoint of construction) (2018 Dollars)		$566,823,507	$7,569,490	$574,392,997	
Construction Inspection		$6,658,959		$6,658,959	3 years of construction
ROW Costs (2012 Dollars)		$100,000		$100,000	
Preliminary and Final Design Costs (4% of 2012 Dollars)		$19,214,356	$256,593	$19,470,949	
Total Project Costs		**$592,796,822**		**$600,622,905**	

Assumptions were made for this Alternative since drawings are not complete. Rock excavation was assumed to cost 70% more than standard excavation.

Appendix F -- Home Value Increase

Home Pricing Model Geographies



Home Pricing Model City-Wide Base Descriptive Statistics

	Sample Mean	Standard Deviation	Min	Max	Median
Price	$129,890.12	$117,183.19	$1,000.00	$800,000.00	$94,000.00
SqFt	2129.03	811.85	756.00	5967.00	2090.00
Vacant Lot Ratio	0.07	0.12	0.00	0.75	0.02
2 Family House	0.37	0.48	0.00	1.00	0.00
3 Family House	0.03	0.17	0.00	1.00	0.00
Med HH Income	$43,428.11	$16,167.58	$12,079.00	$83,125.00	$39,464.00
Bath/Bed	0.43	0.17	0.20	1.50	0.38
Dist. to Parkway	0.13	0.07	0.00	0.25	0.13
Highway or Parkway	0.17	0.38	0.00	1.00	0.00
Premium Location	0.16	0.36	0.00	1.00	0.00

Home Pricing Model Fit

Regression Statistics	
Multiple R	0.829236752
R Square	0.687633591
Adjusted R Square	0.682195878
Standard Error	66060.98866
Observations	527

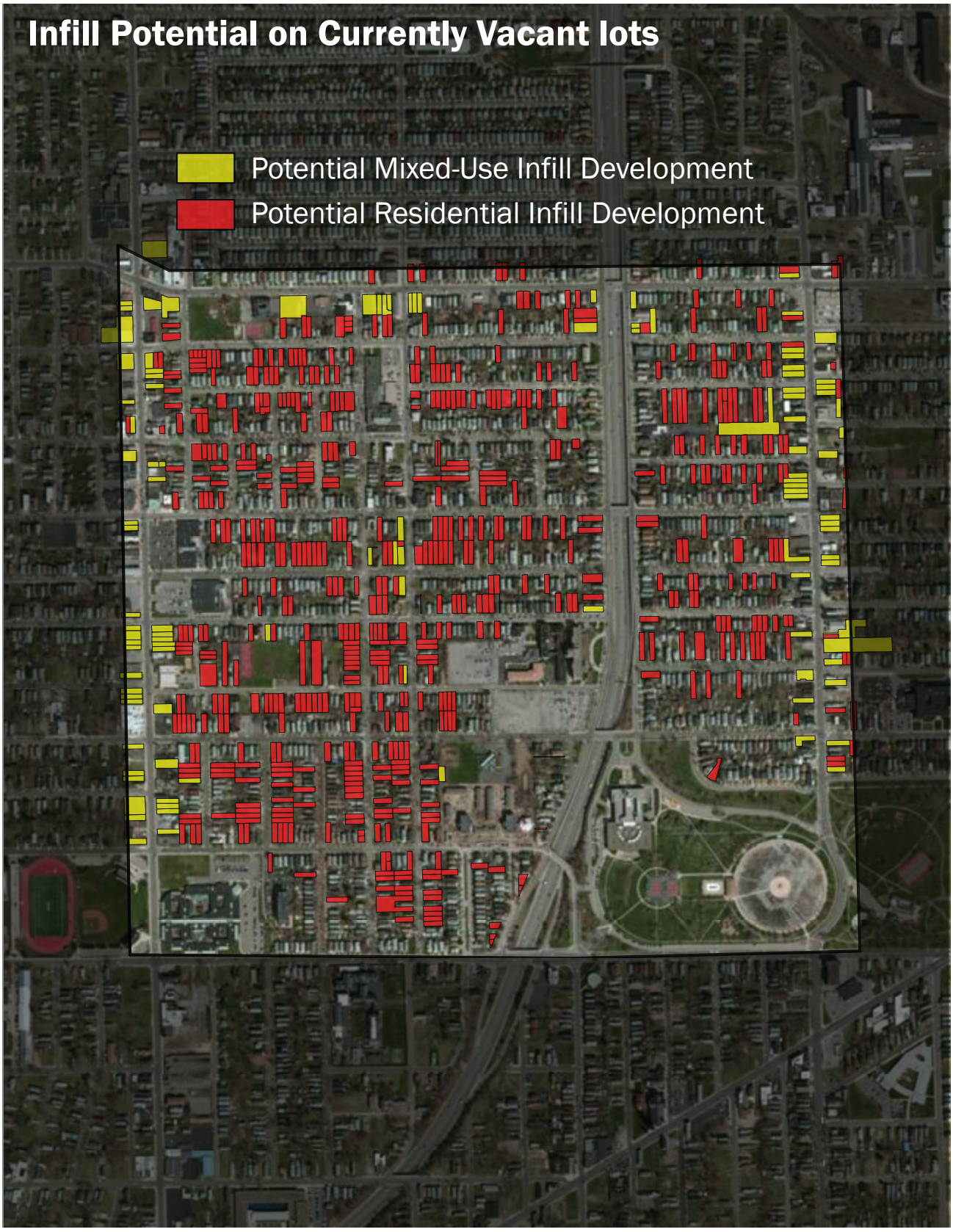
ANOVA

	df	SS	MS	F	Significance F
Regression	9	4.96676E+12	5.51863E+11	126.4563936	1.5677E-124
Residual	517	2.25622E+12	4364054223		
Total	526	7.22298E+12			

	Coefficients	**Standard Error**	**t Stat**	**P-value**	**Lower 95%**	**Upper 95%**	**Lower 95.0%**	**Upper 95.0%**
Intercept	-129398.17	15896.21	-8.14	2.9675E-15	-160627.27	-98169.06	-160627.27	-98169.06
SqFt	97.38	4.11	23.70	1.3002E-84	89.31	105.45	89.31	105.45
Vacant Lot Ratio	-86650.13	32250.58	-2.69	7.4468E-03	-150008.42	-23291.83	-150008.42	-23291.83
2 Family House	-76847.27	6744.27	-11.39	5.4686E-27	-90096.83	-63597.72	-90096.83	-63597.72
3 Family House	-137997.70	18393.74	-7.50	2.7532E-13	-174133.37	-101862.04	-174133.37	-101862.04
Median HH Income	1.17	0.21	5.48	6.6297E-08	0.75	1.59	0.75	1.59
Bath/Bed	138999.61	18525.59	7.50	2.7402E-13	102604.91	175394.31	102604.91	175394.31
Dist. To Parkway	-142230.79	44177.00	-3.22	1.3645E-03	-229019.30	-55442.28	-229019.30	-55442.28
Highway or Parkway	-29254.19	9530.78	-3.07	2.2572E-03	-47978.01	-10530.37	-47978.01	-10530.37
Premium Location	23378.62	8811.22	2.65	8.2166E-03	6068.43	40688.81	6068.43	40688.81

Appendix G -- Infill Development

Study Area Infill Potential Map



Estimated Unit Costs Per Structure

Unit Cost Summary (2009 dollars)		
Item	Single Family Detached (1,800 sq. ft.). 1 Full Bath, 1 Kitchen	Mixed Use (4,800 sq. ft.). First Floor Commercial Space, Second floor residential unit (1 Bath, 1 Kitchen)
Excavation, spread,strip footing and underground piping, foundation	$684	$4,464
Slab on grade, 4" thick, non industrial, reinforced	$2,070	$5,520
Basement excavation, basement walls	$2,754	-
Floor const., Roof cost., exterior walls, windows, doors	$38,556	$95,952
Partitions, doors, fittings (basic), stairs, wall finishes, floor finishes, ceiling finishes, roof coverings	$35,766	$107,664
Plumbing	$13,950	$37,200
Water distribution, rain water drainage, energy supply, electrical service+distribution, lighting branch wiring	$28,188	$99,312
Cooling generating systems	$8,388	$55,200
Smoke detectors	-	$1,870
Elevator	-	$59,000
Kitchen Cabinets & Countertops	$3,760	$3,760
Bath including plumbing+wall+floor finishes	$5,522	$5,522
One car attached garage	$12,594	$12,594
Oven	$458	$458
Refrigerator	$680	$680
Dishwasher	$482	$482
Architect Fees	$11,157	$38,481
Contractor's Overhead and Profit	$39,847	$123,336
Cost per Building (2009 dollars)	**$204,856**	**$651,495**
Cost per Square Foot (2009 dollars)	**$42.68**	**$361.94**

Source: Balboni B. (Eds.). (2009) R. S. Means Square Foot Costs, 30th Annual Edition. Kingston, MA: R. S. Means Company Inc.