Exhibit No. __
Witness: AR

DIRECT TESTIMONY OF
ALBERT RACCIATTI
ON BEHALF OF
TOLL ROAD INVESTORS PARTNERSHIP II, L.P.
CASE NO. PUR-2019-00218

Exhibit No. __
Witness: AR

SUMMARY OF DIRECT TESTIMONY OF ALBERT RACCIATTI

Company Witness Racciatti sponsors the comprehensive report ("Report") that supports Toll Road Investors Partnership II, L.P.'s ("TRIP II") request to increase toll prices on the Dulles Greenway ("Greenway"). Specifically, the Report provides an objective and independent analysis of why the Company's proposed tolls are reasonable in relation to the benefit obtained and why the proposed tolls will not materially discourage the use of the Greenway by the public.

Mr. Racciatti first explains the methodology utilized to prepare the Report and the benefit-to-cost analysis ("BCA") conducted to determine whether the Company's proposed toll prices are reasonable to the user in relation to the benefit obtained. In doing so, he provides a detailed explanation of the BCA process and a comparison of total benefits to current toll prices on the Greenway. And second, Mr. Racciatti explains the price elasticity of demand analysis conducted to determine whether the Company's proposed toll prices materially discourage use of the Greenway by the public. An explanation of price elasticity and how it's calculated is provided in his discussion.

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Witness: AR

DIRECT TESTIMONY
OF
ALBERT RACCIATTI
ON BEHALF OF
TOLL ROAD INVESTORS PARTNERSHIP II, L.P.
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2019-00218

Q. Please state your name and position of employment.

A. My name is Albert Racciatti. I am an independent consultant and former Vice President at WSP USA Inc. ("WSP USA"), an internationally recognized consulting firm in the transportation and infrastructure industry. A statement of my background and qualifications is included as Exhibit A.

Q. Please describe WSP USA and your role there.

A. I led the economics and transportation planning practices at WSP USA. I, along with my team, provided clients with infrastructure project development and delivery solutions, including feasibility studies, impact assessments, demand forecasts, strategic plans, value for money studies, funding and finance plans, and project delivery risk assessments.

WSP USA's parent company, WSP Global Inc. ("WSP"), is one of the world's leading professional services firms employing approximately 49,000 people globally. WSP provides technical expertise and strategic advice to clients in the Transportation & Infrastructure, Property & Buildings, Environment, Industry, Resources (including Mining and Oil & Gas) and Energy sectors, as well as offering project and program delivery and advisory services. WSP USA specifically has 9,500 employees in 150 offices across the U.S. specializing in the

buildings, transportation, energy, water, and environment markets. In particular, WSP USA has a strong group of infrastructure specialists with extensive toll road experience in economic and demand analysis, near and long-term forecasting, toll elasticity analysis, and rate setting evaluations.

Q. Please provide detail on your professional experience regarding the development of toll roads and other investments in infrastructure projects.

A. As explained above and further detailed in Exhibit A, I have over 20 years of experience evaluating infrastructure projects, specializing in transportation finance, forecasting, regional economics, and risk assessment. I have expertise in planning, financial analysis, and forecasting for toll roads, managed lanes, passenger rail, transit, parking, airports, port facilities, and social infrastructure, and have worked with a range of clients including governments, equity investors, financial sponsors, and lenders.

When I was at WSP USA, I led their economic analysis and transportation planning team, with a focus in demand and revenue forecasting for toll roads, passenger rail, parking assets, and other transport facilities. From 2001 through 2013, I was project manager for the toll revenue forecasting program for six interstate bridges and tunnels in New York City with annual revenue of over $700 million, under an assignment to the Port Authority of New York and New Jersey. In that long-term assignment, my team and I developed and maintained a set of econometric models and associated reporting tools to determine the factors that influence monthly traffic demand and to forecast demand and revenue twenty-

years out to the future. The program included the regular estimation of the toll price elasticity of demand by time of day to provide information to senior management and the Board of Directors to guide toll rate-setting decisions.

For the last six years, I provided forecast due diligence and financial advisory services for the U.S. Department of Transportation Build America Bureau to assist them in the evaluation of applications from toll authorities and states for low-interest federal loans to finance over 10 projects ranging from $100 million to $1 billion in cost.

Over the course of my career, I have worked on a number of toll road facilities across the United States, including existing toll roads and proposed new facilities in Colorado, Georgia, Illinois, Indiana, Maryland, Puerto Rico, Texas, and Virginia. I have also led forecasting assignments for existing toll roads in Mexico, Colombia, and Canada. In particular, I was recently the Project Director of a traffic and revenue study for lenders to I-66 Express Mobility Partners on the express lanes project in Fairfax County, Virginia, and was the Project Director for an economic impact study for the Metropolitan Washington Airports Authority in Northern Virginia.

Q. What is the purpose of your testimony?

A. WSP USA was retained via its wholly owned subsidiary Louis Berger U.S. Inc. to prepare the Report to support TRIP II's request for approval by the State Corporation Commission ("SCC" or the "Commission") to increase the authorized maximum tolls charged on the Greenway toll road located in Loudoun

County, Virginia. The purpose of my testimony is to introduce WSP USA's findings and conclusions detailed in the Report, which addresses two of the statutory tests required under § 56-542 of the Code of Virginia (the "Code"). Specifically, the Report details our objective, independent, expert analysis of whether the proposed tolls: (i) are reasonable in relation to the benefit obtained; and (ii) will not materially discourage use of the roadway by the public.

Q. How is your testimony organized?

A. My testimony is provided in two parts:

I. Reasonableness of Proposed Toll Prices in Relation to Benefits Obtained

II. Proposed Toll Prices' Impact on Use of Greenway by the Public.

Q. Are you sponsoring any exhibits?

A. Yes. I am sponsoring the Report, attached herein as Exhibit B.

Q. How did WSP conduct the analysis and prepare the Report?

A. My team and I analyzed multiple sets of transaction data for the Greenway over a 14 year period, from January 2005 to May 2019, to perform the necessary traffic analysis detailed in the Report, which included:

- Hourly transaction data disaggregated by method of payment, vehicle type, and location to determine traffic patterns based on time of day and location. This was also the primary data set used for the econometric analysis that identified the key factors that influence demand for the Greenway;

- Daily transaction data disaggregated by method of payment, vehicle type, and location to determine seasonal patterns in traffic by location;
- Screenline traffic counts conducted over a one-week period each fall by Dewberry & Davis LLC as a requirement under TRIP II's Comprehensive Agreement. These traffic counts take a straight line through a particular area and count the traffic crossing that line on several alternate routes to provide a view of each route's market share; and
- Greenway traffic counts conducted over a one-week period each fall by Dewberry & Davis LLC as a requirement under TRIP II's Comprehensive Agreement. These traffic counts are on the un-tolled on and off ramps on the Greenway (off ramps heading westbound and on ramps heading east bound) to indicate the Level of Service at each location. While these traffic counts do not track where each vehicle gets on and off the Greenway, they can be used to interpolate a rough trip matrix on the Greenway.

For the socioeconomic analysis in the Report that highlights certain variables other than tolls that influence traffic, the Report primarily relied on data from Woods & Poole Economics, Inc., an experienced, independent firm that specializes in assembling time-series history and future-year projections of economic and demographic indicators such as employment by industry, earnings by industry, economic output, and population for counties in the United States. The Report also relied on economic and demographic data published by the U.S. Census Bureau and U.S. Bureau of Labor Statistics.

Travel time and travel speed data was sourced from TomTom International BV, a Dutch multinational developer and creator of navigation technology and consumer electronics. This travel time and speed data was obtained for the Dulles Greenway and four alternative routes for all hours of the day for a full year from July 1, 2018 to June 30, 2019. The travel times were verified against Google Maps data queries on the Greenway and the four alternative routes using start and end locations identical to the TomTom data requests. The Google Maps data was collected from July 10, 2019 through July 27, 2019, with data for the period from July 16, 2019 to July 26, 2019, covering 24 hours in 20 minute intervals. For the other dates within that period, a sample of peak and off-peak travel times was collected.

The Report collated and synthesized this data to identify and analyze historical traffic patterns, market share of traffic flows, the demand of drivers for the Greenway, and the elasticity to historical toll prices. Some of the data was also used as key inputs to the benefit-cost analysis discussed later in my testimony.

I. Reasonableness of Proposed Toll Prices in Relation to Benefits Obtained

Q. How did you determine whether the proposed toll prices are reasonable to the user in relation to the benefit obtained?

A. We conducted a BCA to inform that determination. This is a standard industry practice that allows the analyst to draw on recognized principles for valuing driver benefits and costs. Specifically, we focused on the net benefits to Greenway users, comparing the monetized value of benefits derived by users of the

Greenway to the cost of that use (i.e. the toll price). Consistent with past analysis related to the Greenway and industry practice, we focused on the benefits to the average user.[1] Under this approach, the benefit-cost ratio ("BCR") is calculated by dividing the total user benefit by the cost, with anything above a 1.00 evidence of benefits outweighing the costs to users, or on an absolute basis where the cost is subtracted from the total benefit to obtain a net benefit. For purposes of the Report, we calculated the BCR for various users of the Greenway based on historically observed data and then examined the proportion of the net benefit that would be reduced by the proposed toll prices.

In doing so, we followed guidance from the U.S. Department of Transportation for the conduct of benefit cost evaluations as provided in their publication *Benefit-Cost Analysis Guidance for Discretionary Grant Programs, 2018*, and other best practices in user benefit analysis for surface transportation facilities, as noted in our Report. These methodologies are consistent with those used in prior applications approved by the Commission and incorporate some of the recommendations contained therein.[2]

[1] As the Hearing Examiner observed in Case No. PUE-2013-00011, "an analysis of the costs and benefits of using the Greenway cannot reasonably be determined based upon individual users."[1] Rather, such benefit-cost analysis "must, by necessity, use a more general approach that focuses on the average benefits realized by users of the Greenway as a group or subgroups, and not focus on any one individual user." *Ex Parte: In the matter of investigating the toll rates of Toll Road Investors Partnership II, L.P., under § 56-542 D of the Code of Virginia*, Case No. PUE-2013-00011, Report of A. Ann Berkebile, Hearing Examiner (Jan. 30, 2014) (citation omitted).

[2] *See, for example*, Case No. PUE-2013-00011, *Ex Parte: In the matter of investigating the toll rates of Toll Road Investors Partnership II, L.P., under § 56-542 D of the Code of Virginia*, Order Concluding Investigation (Sept. 4, 2015).

Q. What did the BCA for the Greenway entail?

A. The BCA involved ascribing a value to the net benefit enjoyed by travelers from using the Greenway as opposed to an un-tolled alternate route. The net benefit is determined by calculating the difference between the incremental benefit users realize from using the Greenway—such as faster and more reliable travel times, reduced rate of accidents, and lower vehicle operating costs relative to a trip on the alternate route—and the cost of using the Greenway (i.e. the toll price). When the benefits exceed the costs, there is, in aggregate, a net benefit to users.

To adequately account for the potential variation in total benefits obtained by different users of the Greenway, several classes of users were considered to ensure proper representation of how each class of user may value the various benefits based on their trip purpose or the class of vehicle they are operating. These included:

- Personal and Commuting: Trips by private motor vehicle to and from work and to and from other personal activities such as school, shopping, service providers, medical care, and similar trip purposes.
- Business: Trips by private motor vehicle and other two-axle vehicles during the course of official business for private industry or government. Examples include travel by employees or self-employed individuals to visit clients, or to make deliveries or pick-ups. Because these activities occur “on-the-clock” during the business day with expenses typically reimbursed by employers or

considered a cost of doing business, this user class may have different preference for valuation of travel time or route choice.

- Airport Access/Egress: In the Dulles Greenway corridor, a proportion of travelers use the Greenway to make trips to and from Washington Dulles International Airport. This class of travelers may have a different preference for valuation of travel time and route choice because of the importance of on-time arrival.

- Trucks: Heavy vehicles with three or more axles are evaluated separately to account for the higher applicable toll rates and differences in the value of travel time savings and route choice related to the increased expenses and requirements in the operation of heavy vehicles.

For each class of user, several performance measures and input assumptions were then identified and calculated following the guidance of the U.S. Department of Transportation and other best practices in user benefit analysis for surface transportation facilities. The measures we considered include the following:

- Travel time savings for travelers on the Greenway with respect to un-tolled alternate routes. This is multiplied by a proportion of median hourly income or some other benchmark measure (depending on the class of user) to determine a monetary value of travel time savings ("VTTS"). The main alternate route considered was along Route 7 and Route 28 as this connects the western and eastern ends of the Greenway and also has been the main comparison route in previous travel time saving studies on the Greenway.

However, in recognizing that for some users this route might not be the most logical alternative, we also considered a Composite Alternate route that incorporated traffic volumes at several points along each route that can be compared to several segments of the Greenway. Figure 2.9 in the Report highlights the main un-tolled alternative routes to the Greenway, and Figure 4.7 in the Report shows the various traffic count locations.

- Travel time reliability, which refers to the predictability and variation of travel times over multiple trips. Specifically, we looked at the standard deviation of travel times over a one-year period to assess travel reliability—a measure known as "buffer time" (defined as the difference between the 95th percentile travel time and the average travel time) savings—for travelers on the Greenway compared with alternate routes. This was then multiplied by a factor of the VTTS for each class of user to calculate the monetary value of reliability ("VOR").

- Vehicle operating cost savings, which includes the monetary value of reduced fuel consumption based on the average speed of travel and total distance traveled, as well as the monetary value of savings on other variable operating costs per mile of travel (such as repair and maintenance related to vehicle equipment and tire wear) and fixed operating costs per mile of travel (such as insurance, license and registration fees, permits, taxes, depreciation and finance charges).

- Safety benefits of the Greenway, which is the monetary value of crash cost savings based on the number and severity of accidents on the Greenway compared to un-tolled alternate routes. This includes consideration of the direct costs associated with property damage and medical care, as well as the opportunity cost of lost wages, reduced productivity and enjoyment associated with crashes involving injury and loss of life.

Notably, our analysis does not factor in any value for qualitative benefits enjoyed by users of the Greenway, including but not limited to, peace of mind from driving on a well-maintained, limited access highway, an increased sense of safety from driving on a roadway with limited truck traffic, or additional enjoyment from driving on a free-flow road with no traffic signals. While difficult to quantify, qualitative benefits remain relevant considerations for many users.

Q. What did you conclude with regard to the benefits to users of the Greenway?

A. In assessing the various benefits obtained by users of the Greenway, we concluded the following:

1. **Travel time savings are attractive.** With higher free flow speeds, lower levels of congestion, and lower incidence of recurrent and non-recurrent delays, the Greenway provides benefits in travel time savings to users at all times of day. With respect to the Route 7 and Route 28 un-tolled alternate route, these savings range from 2 to 3 minutes during off-peak hours and direction of travel to 5 to 8 minutes during

peak periods in the peak direction of flow. A commuter traveling during peak periods to and from work exhibits an average time saving of 14.4 minutes when compared to the Route 7 and Route 28 alternate route. The value of these time savings is estimated to be between $1.62 in off-peak periods and $5.29 in peak periods for cars, and between $3.51 and $8.92 for trucks. This value is even higher when compared to the Composite Alternate route.

2. **Greater predictability in travel time is valuable.** Trips on the Greenway are predictably faster and more consistent than the un-tolled alternate routes. For example, nearly all weekday peak period trips along the Greenway (95%) are within 1.4 minutes of the average travel time. By comparison, 95% of peak period trips on taken along Route 7 and Route 28 vary from the average by 5.8 minutes, adding a further 4.4 minutes of travel time savings to a user's weekday peak trip. This increased reliability benefit has an estimated value between $2.05 in off-peak periods and $4.81 in peak periods for cars and an estimated value between $4.52 and $8.15 for trucks when compared to the Route 7 and Route 28 un-tolled alternate route. This value is even higher when compared to the Composite Alternate route.

3. **Vehicle operating costs are lower.** The Greenway offers a non-stop option compared to the un-tolled alternate routes, which all have multiple instances of stopping and starting at traffic signals and lower travel speeds.

As a result, travelling on the Greenway results in reduced vehicle wear and tear and more efficient fuel consumption. When compared to the un-tolled alternate routes, these lower vehicle operating costs deliver per trip savings to users of the Greenway that range from $0.63 to $1.44 for cars and $2.07 to $4.27 for trucks.

4. **The Greenway is a safer road.** The incidence of accidents per mile of travel on the Greenway is substantially lower than the incidence of accidents per mile in aggregate in Loudoun County or the Commonwealth. Over the past five years, there have been only about seven crashes with injuries and no fatal accidents on the Greenway for every 100 million vehicle miles traveled, compared to 80 crashes with injuries and 0.5 fatalities for every 100 million vehicle miles driven on other roads in Loudoun County. Similar crash rate differences exist with respect to all interstate, primary, and secondary roads in the Commonwealth as a whole. This lower accident rate translates into significant savings of approximately $4.01 per trip in avoided crash costs.

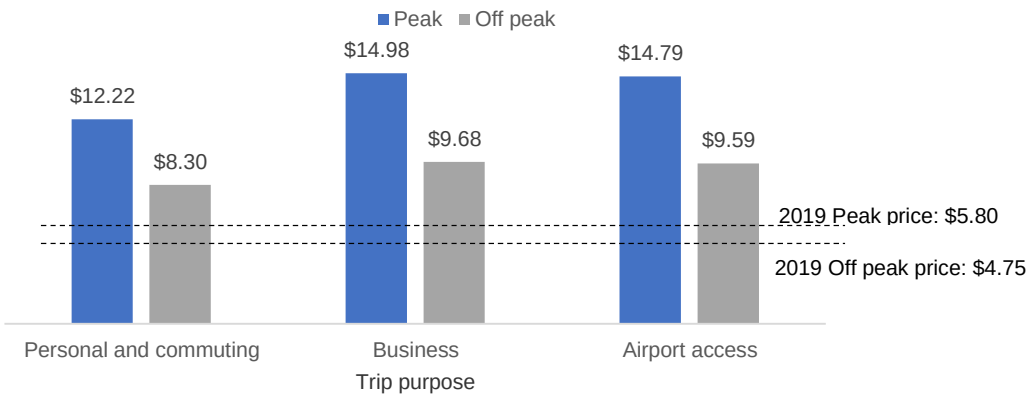
Q. How do total benefits compare to current toll prices on the Greenway?

A. Our enumeration of the individual, quantifiable benefits indicates that all users of the Greenway accrue positive benefits that are greater than the toll rate at all times of the day.

The figure below shows the total calculated benefits received by the different classes of users, as well as the current peak and off-peak toll prices. Total

benefits for car users when compared to travelling on Route 7 and 28 vary from $8.30 for commuters in the off peak, to a high of $14.98 for business users travelling in the peak.

Total Benefits to Car Users (Compared to Route 7 and Route 28)



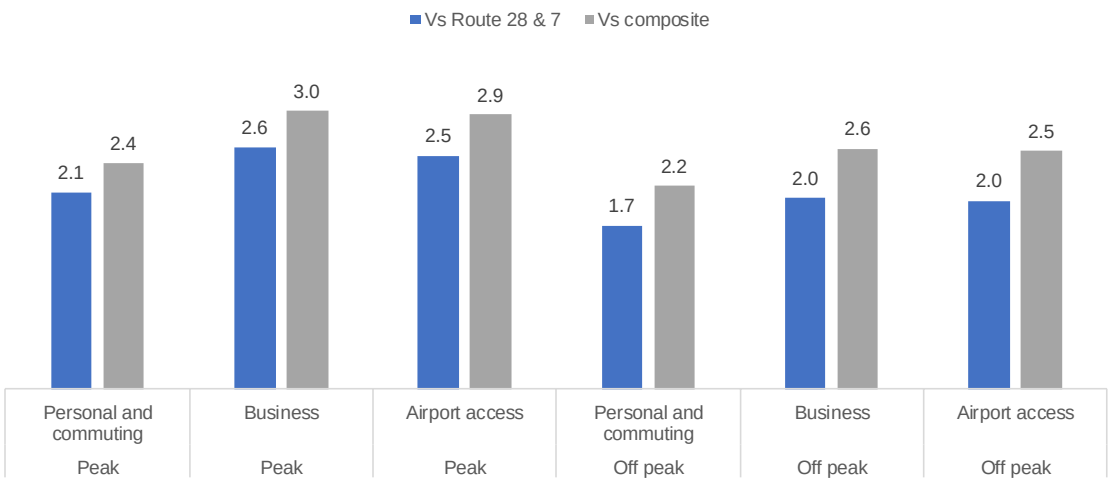
As evident in the figure above, the total benefits received by all types of car users, which account for approximately 97.6% of total Greenway traffic, exceed the toll prices on the Greenway.

While positive benefits exist at all times of day, they are most pronounced during peak periods with a weighted average BCR of 2.2 compared to the off-peak BCR of 1.8.

When compared to the Composite Alternate route, the level of benefits is substantially higher, with the overall BCR increasing to 2.4, the weighted average peak BCR increasing to 2.6, and the weighted average off-peak BCR increasing to 2.2.

The BCR for each type of auto user during the peak and off-peak periods is shown in the figure below.

Benefit Cost Ratio of Car Users



For trucks, when comparing to the Route 7 and 28 alternative we calculated a total peak benefit of $23.15 to give a peak BCR of 1.6, and an off-peak benefit of $14.77 to give an off-peak BCR of 1.2. Across all time periods, we calculated a weighted average BCR for trucks of 1.3., which increased to 1.7 when comparing to the Composite Alternate route. A lower BCR for trucks is expected as they are charged higher toll prices to account for the increased road maintenance costs associated with multi-axle vehicles.

This can be summarized into a total weighted average benefit of $10.35 across all users of the Greenway across all times of day when compared to the Route 7 and Route 28 alternative. With a weighted average toll price of $5.30, this amounts to a BCR of 2.0 times. This equates to approximately $185 million in total benefits received by users of the Greenway each year.

Q. What does this mean for the proposed toll price increases?

A. The maximum toll prices being proposed by TRIP II represent an increase of approximately 36% to the current peak toll prices and 30% to the current off-peak toll prices for two-axle vehicles over the five-year period. After adjusting for inflation, assuming an average inflation rate of approximately 2.2% per annum, this would result in these proposed tolls only reducing the weighted average net benefits enjoyed by two-axle vehicles using the Greenway by approximately 16% over the five year period. On that basis, the weighted average BCR for peak and off-peak auto users would be expected to be approximately 1.9 and 1.6 respectively in 2025, which demonstrates that users of the Greenway would still receive a significant benefit from traveling on the roadway.

Of particular note, these benefits do not factor in any of the travel time improvements anticipated from the major capital projects underway and planned on the Greenway, including widenings and improvements at the eastern end where the road merges with the Dulles Toll Road and at the western end where it merges with the Route 7/15 Bypass. These capital projects are expected to reduce congestion during peak times on the Greenway and increase the travel time savings enjoyed by Greenway users compared to un-tolled alternate routes, which should result in a higher VTTS and BCR.

Q. Based on your analysis and the findings of the Report, are the proposed toll prices reasonable to the user in relation to the benefit obtained?

A. Yes.

II. Proposed Toll Prices' Impact on Use of Greenway by the Public

Q. How did you determine whether the proposed toll prices do not materially discourage use of the roadway by the public?

A. We conducted an analysis of price elasticity of demand to determine whether the proposed toll prices would materially discourage use of the roadway by the public. Price elasticity is the economic principle that indicates that demand for a good or service is generally influenced by the price charged for use of that good or service. To evaluate the price elasticity of demand on the Greenway, we examined the extent to which the average number of transactions changed in response to previous toll price changes. Because factors other than toll price are also likely to influence the level of demand in any given month or year, it is critical to isolate the effect of price from the effects of other factors through statistical analysis. We therefore utilized econometric regression analysis, a standard practice in traffic and revenue analysis, to conduct this analysis while controlling for the effect of these other factors.

As detailed in the Report, price elasticity of demand captures a range of behavior exhibited by users in response to changes in toll prices, such as switching to alternate routes, riding the bus rather than driving, or even working from home periodically. Other methods of analysis can consider one aspect of this behavior but may overlook other aspects. For example, simply comparing changes in market share across the corridor might capture route choice decisions (i.e. taking

the Greenway versus alternate routes) but may miss other aspects such as mode switches (i.e. taking the bus rather than driving).

Q. Can you please explain price elasticity of demand in more detail?

A. As mentioned above, price elasticity is a measure of how responsive demand for a good or service is to changes in the price of that good or service. In the case of the Greenway, it is a measure of how traffic, on average, is expected to respond to changes in the level of tolls charged to use the road. An elasticity greater than 0 suggests a positive relationship (i.e. where demand increases), while elasticities less than 0 suggest a negative relationship (i.e. where demand decreases). For example, an elasticity of 0.5 means that for every 1% increase in price, demand is expected to increase by 0.5%.

Price elasticities observed on toll road facilities worldwide have an expected range between -0.03 and -0.50, while various comparable North American toll roads have a slightly tighter range of observed elasticities of -0.30 to -0.50.

Q. Please explain how you calculated the price elasticity of demand?

A. To develop the econometric models detailed in the Report, we followed four steps:

- First, we compiled a monthly data set of transactions on the Greenway, by vehicle type, entry/exit ramp (where available), and time of day. Non-revenue transactions (such as police, school buses, and other users legally exempt from paying tolls) were excluded from this data set as those users don't exhibit the same demand as those who pay the tolls.

- Second, we chose the type of econometric model, or regression analysis, to use. Ultimately, we used a method called weighted fixed effects panel regression, which allowed us to incorporate the factors influencing traffic at each gantry, weighted by transaction volume so that the analysis was not unduly influenced by traveler behavior on ramps with significantly smaller traffic counts.

- Third, we tested a wide range of possible explanatory variables with the goal of identifying variables that have a high relative impact on Greenway traffic, are independent from one another, most accurately explain historical shifts in demand, and provide as detailed a picture as possible to truly isolate the effect of toll price increases on Greenway traffic. The variables we identified include:

    - Loudoun County population
    - Loudoun County per capita real income
    - Gas prices
    - The amount of rain and snow
    - Toll prices on the Greenway
    - Toll prices on the Dulles Toll Road
    - One-off special events, such as Hurricane Sandy
    - Monthly seasonality
    - Widenings and improvements on un-tolled alternate routes that compete with the Greenway.

- Lastly, we tested the integrity of the models to ensure that they gave a reasonable reflection of the relationship between predictive variables and historical traffic levels. All the models developed have highly statistically significant explanatory variables that explain more than 98% of car demand and 79% of truck traffic on the Greenway.

As explained previously, this methodology is consistent with the methods accepted by the Commission in prior proceedings to determine whether the proposed toll prices would materially discourage demand. This method allows the analysis to incorporate and control for other confounding effects that have an impacted the past traffic data utilized in the analysis. Controlling for these other variables allows one to isolate and quantify the impact of changing prices without erroneously attributing changes in traffic that are the result of another variable to the change in tolls.

The model integrity testing and the measure of how much variation in the actual data is captured by the model (the R squared) is one key way of testing whether the model we have specified accurately captures the actual observed data. This provides a degree of confidence that the model we have specified has a strong basis in evidence, rather than simply supposing a relationship that may or may not exist.

Q. What did you conclude with regard to Greenway toll price elasticity?

A. We concluded that the demand for all classes of users of the Greenway is relatively inelastic to the level of tolls on the Greenway. As set forth more fully

in the Report, we calculated toll price elasticities of -0.21 for two-axle vehicles (i.e. cars) and -0.23 for vehicles with three or more axles (i.e. trucks).

When looking at more specific time periods, we calculated toll price elasticities for cars of -0.28 during the weekday peak, -0.23 during weekday off-peak, and -0.06 on weekends. This indicates travelers are most sensitive to tolls at peak times and are least sensitive on weekends. For trucks, we calculated toll price elasticities of -0.22 during weekdays and -0.38 during weekends, which indicates trucks are more sensitive to toll prices on the weekend than during the week.

Interestingly, our analysis showed that cars traveling on the Greenway are almost as sensitive to toll prices on the Dulles Toll Road as they are to toll prices on the Greenway, with a weighted average Dulles Toll Road price elasticity of -0.13. Despite Greenway traffic being more sensitive to Greenway toll price, the magnitude of increases in toll prices on the Dulles Toll Road over the period from 2005 to 2019 has caused a larger negative impact on Greenway traffic than increases in the Greenway toll prices themselves.

Q. What does this mean for the proposed toll price increases?

A. The toll elasticities are significantly closer to zero than -1, indicating that user demand is relatively inelastic to toll increases, so an increase in prices is expected to have a relatively low impact on demand. It also indicates that current toll prices are substantially below revenue-maximizing levels, which would be where the toll price elasticity reaches -1. This is a common feature of toll roads.

Based on the proposed prices in the Application, weighted average prices would increase by approximately 31.8%, which we would expect to result in a decline in traffic over the five-year period of approximately 6.7%, equivalent to approximately -1.3% per annum. In other words, in each year the toll prices are increased, the travel behavior of approximately 98.7% of road users would be unchanged.

This compares to an anticipated decline of approximately 3.4% in 2023 when the Dulles Toll Road toll prices are due to increase again, or an expected -0.7% to -5.7% decline in traffic volume each time construction completes on an improvement to competing un-tolled alternatives.

Q. Based on the Report and the data analyzed in this proceeding, would you conclude the proposed toll prices do not materially discourage use of the roadway by the public?

A. Yes.

Q. Does that complete your prepared direct testimony?

A. Yes, it does

Exhibit A

ALBERT RACCIATTI PP, AICP

Infrastructure Economics and Project Finance

Years in the field

26

Professional qualifications

Professional Planner (NJ), 2001

American Institute of Certified Planners, 2001

Education

BS, Labor and Industrial Relations, Cornell University, 1989

MA, International Relations (Political Economy), University of Chicago, 1991

MCRP, City and Regional Planning, Rutgers University, 1999

CAREER SUMMARY

Mr. Racciatti currently serves as Chief Economist at Itinera Infrastructure & Concessions (IIC), a global transport developer and investor, where he evaluates project demand and benefit, conducts transaction due diligence, and monitors asset performance. He recently joined IIC after serving as Vice President in the Planning and Economics practice at Louis Berger U.S., Inc., a WSP Company, where he led the firm's infrastructure economic analysis and transportation planning teams. Mr. Racciatti specializes in regional economic analysis, infrastructure project finance, and market research. With over 25 years of experience as an analyst and advisor, he has managed projects and led tasks in travel demand and revenue forecasting, demographic forecasting, project delivery risk assessment, indirect and cumulative impact analysis, economic impact assessment, benefit-cost analysis, survey research, and policy studies on the connection between transportation and land use.

SELECTED PROFESSIONAL EXPERIENCE

Indiana Finance Authority, Indiana Toll Road Traffic and Revenue Advisor, Indiana. Project director. Provided a thorough due diligence review, on behalf of the state, of a Concession Company proposal for an increase in truck toll rates. Evaluated and benchmarked commercial vehicle toll price elasticities, and econometric models for truck traffic elasticity to economic indicators, gas prices, and other factors. Worked with financial advisor to evaluate alternate cases. Provided recommendation on the company request. Professional Services: 2018

Bondholders and Counsel, Traffic and Revenue Services for Puerto Rico Toll Roads. Project Director and Expert Witness. Engaged by bondholders and their legal counsel, Louis Berger provided traffic and revenue advisory services related to three operational toll road assets: PR-20, PR-52, and PR-53 operated by the Puerto Rico Highway and Transit Authority (PRHTA). The services included review of traffic and revenue history and previous assessments of demand; development of an independent econometric forecast of near and long-term toll transactions and associated revenue; evaluation of the area served by the toll road network; assessment of toll road conditions, and OPEX/CAPEX needs; and assessment of the risk factors to traffic and revenue and operations expenses. Mr. Racciatti provided written and oral expert testimony on research findings in depositions and at trial in suit brought by bondholders in United States District Court for the District of Puerto Rico. Professional Services: 2017

Baltimore-Washington Rapid Rail, Testimony to the Maryland Public Service Commission, Baltimore Maryland. Project Director / Expert Witness. Louis Berger was engaged by Baltimore Washington Rapid Rail to provide economic advisory services in support of an application to the Maryland Public Service Commission (PSC) to reactivate a railroad franchise held by this private rail development company. The work followed on comprehensive ridership and revenue forecasting and project planning and engineering services. The engagement included estimation of the jobs, income, and tax effects of the construction and operation of passenger service with SCMaglev train technology between Washington, DC and Baltimore; estimation of station-area development economic impacts; evaluation of user benefits (e.g., travel time savings, mobility) and non-user benefits (e.g., congestion relief, emissions reduction) in a Benefit-Cost framework consistent with U.S. Department of Transportation guidelines for project economic analysis. Mr. Racciatti presented written and oral testimony on economic impacts, benefit-cost evaluation, and ridership forecasting before and administrative law judge for the Maryland Public Service Commission. The services resulted in the successful reactivation of the railroad franchise license. Professional Services: 2015

I-66 Mobility Solutions, I-66 Express Lanes Lender Traffic and Revenue Advisor, Fairfax County, Virginia. Project director. In support of potential lender consortium due diligence, led examination of sponsor traffic and revenue forecast for managed lanes project (Transform 66). Developed independent assessment of sponsor model inputs including demographic indicators, economic performance, and value of time. Assessed sponsor forecast methodology and developed alternative forecasts scenarios (Lender Base Case and Lender Stress Cases) to establish forecast risk and revenue sensitivity. Provided support to lender due diligence. Professional Services: 2016-2017

SH-130 Concession Company, SH-130 Toll Road Traffic and Revenue Advisor, Austin, Texas. Project director. In support of equity investor's due diligence, led examination of traffic and revenue performance on existing toll road concession, developed independent assessment of model inputs including demographic indicators, economic performance, value of time and other variables. Assessed inputs to demand model and developed alternative forecasts scenarios to establish forecast risk and demand sensitivity. Provided advice on toll operations assumptions. Professional Services: 2015-2019

OMERS Infrastructure, 407ETR Traffic and Revenue Advisory Services. Project manager. Led this equity investor due diligence assignment providing a thorough review of the sponsor forecast, concession company data, and third-party data sources. Assembled comprehensive profile of regional traffic trends and asset performance. Developed an independent forecast of traffic and revenue through an econometric evaluation to estimate toll price elasticity for passenger and commercial vehicle traffic, along with overall regional growth. Assembled a network travel demand model for the Greater Toronto Area to determine the impact of future congestion and proposed capacity improvements. Worked with peer reviewer to vet forecast assumptions and outputs. Coordinated with client to provide information necessary for investment committee review and approval. Professional Services: 2018-2019.

Gulf Coast Connectors, I-10 Mobile River Bridge Sponsor Traffic and Revenue Study, Project director. Developed an investment-grade forecast of traffic and revenue for new bridge crossing project, on behalf of sponsor. Oversaw development of regional and sub-area travel demand model including detailed volume and travel time model calibration. Produced forecast of future socio-economic conditions and developed alternative forecast scenarios and sensitivity tests. Produced detailed annual T&R forecast outputs for 50-year concession period. Developed presentation materials for sponsor management team, investors, and rating agencies. Professional Services: 2017-2019

The Northeast Maglev, Advisory Services. Ridership, fares, and economics task manager. Building on an investment-grade forecast developed by Berger earlier, developed refined estimate of ridership and revenue for Washington DC to Baltimore initial operating segment with a focus on station access and egress and airport access considerations. Conducted benefit-cost evaluation, financial assessment, fare setting and optimization, and economic impact assessment for proposed high-speed transportation system. Updated benefit-cost evaluation to be fully compliant with U.S. DOT guidance on analysis for potential grantees. Supported development of materials for Maryland Public Service Commission application. Advised on development of operations plan and tracking system for project planning decisions. Professional Services: 2012-2019

Chicago Skyway Concession Company, Toll Road Traffic and Revenue Forecast. Project director. Led development of a comprehensive forecast of toll traffic and revenue for the Chicago Skyway, an 8-mile bridge and toll road serving as the main southern gateway to the city. Worked with the Company to gather data on operating history since the beginning of the concession and developed econometric models relating toll transaction performance to key regional and national economic indicators. Documented forecast findings in report and presentation materials. Assisted owner's financial advisor with preparation of offering memorandum. Led T&R information sessions held for consortia of potential purchasers and assisted consortia with due diligence supporting the successful sale of the Concession. Professional Services: 2015

Indiana Toll Road Concession Company, Traffic and Revenue Forecast. Project director. Led development of a comprehensive forecast of toll traffic and revenue for the ticket and barrier sections of a 156-mile toll road. Worked with the Company to gather data on operating history since the beginning of the concession. Reviewed previous traffic and revenue studies. Developed econometric models relating toll transaction performance to key regional and national economic indicators. Documented forecast findings in report and presentation materials. Assisted owner's financial advisor (UBS Investment Bank) with preparation of offering memorandum materials. Led T&R information sessions held for consortia of potential purchasers and assisted consortia with due diligence which resulted in the successful sale of the Concession. Professional Services: 2014-2015

Private Client, Pocahontas Parkway Lender Traffic and Revenue Advisor, Richmond, Virginia. Project director. In support of lender's consortia restructuring evaluation, led examination of traffic and revenue performance on existing toll road concession, developed independent assessment of model inputs including demographic indicators, economic performance, value of time and other variables. Assessed inputs to traffic and revenue model and developed alternative forecasts scenarios to establish forecast risk and demand sensitivity. Provided advice on toll operations assumptions. Professional Services: 2013

Private Client, West by Northwest Managed Lanes Lenders' Due Diligence, Atlanta, Georgia. Task leader. Evaluated growth in travel demand and socioeconomic factors for proposed managed lanes project. Reviewed sponsor's forecast and socioeconomic reports. Gathered third party data and conducted independent review of key input factors including demographics, income, and value of time. Developed revised input assumptions for Lender's base case and downside case. Professional Services: 2010

Private Client, Northwest Parkway Traffic and Revenue Due Diligence, Denver, Colorado. Task leader. In support of a private party bid for a public-private partnership concession opportunity, developed independent assessment of demographic and economic growth, at a regional and local level. Assessed inputs to traffic and revenue model and developed alternative forecasts scenarios to establish forecast risk and demand sensitivity. Conducted field visit to assess local development potential and assembled inventory of project risks related to travel demand, demographics, and economic growth. Professional Services: 2006-2007

Port Authority of New York and New Jersey (PANYNJ), Interstate Crossing Price Elasticity Study, Project director. Led team conducting detailed quantitative analysis of the price elasticity effects of toll charges and transit fare prices on demand at the six interstate bridge and tunnel toll crossings between New York and New Jersey. Analyzed traffic and revenue history to evaluate effect of previous toll price increases. Conducted econometric analysis to isolate the impact of price changes in the context of regional economic conditions. Designed and implemented stated preference survey to determine potential cross-elasticity effects of toll price changes by facility, or alternate prices for commuter rail, bus transit, and ferry service. Survey included evaluation of commercial vehicle (heavy truck) response to toll pricing. Developed a spreadsheet-based value pricing model to estimate impacts of potential toll price changes by time of day, crossing, and method of payment. Professional Services: 2015-2016.

PANYNJ, Regional Cost-Benefit Framework Development, New York, New York. Analyst. Compiled literature review and recommended performance measures/input assumptions for use in agency's standardized cost benefit framework. Measures evaluated included: value of time and value of reliability for roadway, transit, and goods movement projects. Reviewed research and measures assembled for value of statistical life, operations of passenger/cargo aircraft, and airport parking. Professional Services: 2008-2009

PANYNJ, Interstate Crossings Toll Revenue Forecasting Program, New York, New York. Project director. Managed long-term project to provide monthly, quarterly, and annual forecasts of traffic and revenue at the six Port Authority of New York and New Jersey (PANYNJ) interstate bridge and tunnel crossings with annual revenues of more than $700M. Designed automated spreadsheet-based model for tracking and reporting traffic and revenue performance on monthly, quarterly, and annual cycles. Developed methodology for short-range projection of traffic and electronic toll collection (E-ZPass) market share including value pricing/congestion management initiative. Developed long-range (20-year) econometric models relating traffic performance to economic indicators. Evaluated elements of risk in revenue performance: E-ZPass participation, regional economic conditions, fuel prices, trends in commercial vehicle origins, destinations, and routing. Conducted annual forecast and budget presentation for senior authority management. Professional Services: 2001-2013

National Cooperative Highway Research Program (NCHRP), Project 08-100, Environmental Justice Analyses When Considering Toll Implementation or Rate Changes, Washington, DC. Researcher. Contributed to research to develop a practitioner toolbox to evaluate and address environmental justice issues that arise when implementing tolls or rate changes. Researching toll rate-setting policies and evaluation methods nationwide to provide information for decision makers on strategies to assess and offset any potential impacts on minority and low-income populations as a result of tolling. Professional Services: 2014-2018

Rhode Island DOT, Investment Grade Traffic and Revenue Study for Rhode Works Truck Tolling Program. Project director. Developed a Level III forecast of traffic and revenue for the proposed truck tolling program to be implemented on key interstate and highway routes statewide to fund bridge repair program. Developed network model of key truck routes including potential local in-state and regional out-of-state diversion routes. Developed primary data collection program of video classification counts and aerial confirmation studies. Collected data on travel times and route reliability. Supervised design and implementation of Stated Preference Survey to determine truck operator route choice decisions and willingness to pay for travel time savings. Analyzed diversion potential and developed forecast of 30-year revenue stream. Conducted sensitivity testing, forecast risk analysis, and prepared full documentation of results. Professional Services: 2016-2019

Colorado DOT High Performance Transportation Enterprise (CDOT HPTE), C-470 Express Lanes Traffic and Revenue Study, Denver, Colorado. Project manager. Developed an investment-grade forecast of traffic and revenue for 10-mile managed lanes project. Oversaw development of sub-area micro-simulation including detailed volume and travel time model calibration. Identified revenue maximizing toll schedule for peak and off-peak time periods. Produced forecast of future socio-economic conditions and developed alternative forecast scenarios and sensitivity tests. Produced detailed annual T&R forecast outputs for 35-year financing period. Coordinated with CDOT management, rating agencies, and USDOT TIFIA for transaction due diligence. Professional Services: 2014 to 2016

District of Columbia Office of Planning, Streetcar Real Estate and Finance Study, Washington, DC. Project manager. Evaluated the potential for the proposed DC Streetcar system to produce an increase in real estate development activity, value, and tax receipts that can be used to finance the project through value capture strategies. Developed a forecast of future residential and commercial development in the Streetcar Corridor, including potential zoning changes. Assessed the change in accessibility afforded by the streetcar and the potential for transit-oriented development. Estimated the jobs and tax impacts of construction and operations. Recommended affordable housing strategies. Professional Services: 2013-2014

Metropolitan Washington Airports Authority, Economic Impact Study, Washington, D.C. Project director. Used input-output modeling techniques to estimate regional economic impacts of Metropolitan Washington Airports Authority facilities and operations, including Reagan National and Dulles International Airports, the Dulles Toll Road and first phase construction of the Metro Link rail transit system. Visitor spending impacts and airport-related impacts of firms utilizing the airport for air freight shipments were also estimated. Professional Services: 2010

United States Department of Transportation (USDOT), Build America Bureau Transportation Infrastructure Finance and Innovation Act (TIFIA), Financial Advisor / Demand Risk Advisor. Program manager. Under an on-call task order contract, providing due diligence, financial model evaluation, independent financial model development and risk assessment services, as needed to assist with the Department's review of applications for the TIFIA low-interest loan and credit enhancement program. Assist with credit-worthiness review of applications for Public Private Partnership (P3) toll roads and other infrastructure. Advise on new loans and restructuring proposals. Assignments to date have included revenue risk assessment / creditworthiness evaluation for I-395 Express Lanes in Northern Virginia. Professional Services: 2013 to 2019.

ADDITIONAL EXPERIENCE

VICE PRESIDENT, PROJECT FINANCE NORTH AMERICA AT AMBAC FINANCIAL GROUP, INC.

From 2007 to 2009, Mr. Racciatti was vice president at Ambac Financial Group, Inc., where he developed credit enhancement solutions for public-private partnership (PPP) projects in the infrastructure and municipal finance sectors. At Ambac he led or participated in underwriting for toll road financings, convention center hotels, stadiums, and hospitals. He created financial models to evaluate revenue, life-cycle capital/operations expenses, and debt. He evaluated consultant revenue and feasibility studies and developed financial risk assessments, authoring credit memos, and presenting to senior credit committee for transaction approval. He proposed and negotiated terms to mitigate operational risk and additional debt exposure and conducted review of concession and loan agreements and other key transaction documents. Relevant experience includes:

Capital Beltway Managed Lanes, Washington, D.C. Analyst. Evaluated consultant revenue and feasibility studies. Developed financial risk assessment focusing on utilization of free lanes vs. HOT lanes. Reviewed proposed FHWA TIFIA loan terms. Professional Services: 2008

91 Express Lanes, Anaheim, California. Analyst. Participated in annual review of performance for bond issues insured by Ambac. Conducted on-site review of facility and assembled and evaluated updated performance measures for traffic and revenue including free-lane volumes and congestion management performance. Professional Services: 2008

North Texas Tollway Authority, Dallas, Texas. Analyst. Evaluated traffic and revenue forecast, prepared alternate stress-case forecast scenarios, developed financial model, and conducted financial risk assessment for proposed underwriting of system-wide bond issue. Professional Services: 2008

Northwest Parkway, Broomfield, Colorado. Analyst. Prepared financial model and stress-case traffic and revenue forecast scenarios to evaluate refinancing alternatives for PPP transaction. Professional Services: 2007