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Inc.**

# **Impacts of the PR Highway PPP projects**

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## SCOPE OF THE REPORT

This report presents an overview of some of the major impacts of the PR highway system in the context of a PPP Desirability Analysis.

Based on the recent concession of the PR-22 and PR-5 the document was updated to include the economic impact of the expected capital improvements (the “PR-22/PR-5 Capital Improvements”) that will be implemented for those toll roads. The PR-22/PR-5 Capital Improvements has been conservatively estimated at \$356 million. The PR-22/PR-5 Capital Improvements consist of \$56 million of Accelerated Safety Upgrades (“ASUs”) to be completed in the first three years and \$300 million of investment in the following 25 years<sup>1</sup>.

### Assets considered

The assets considered for the analysis are:

1. Existing PR-22 highway, from San Juan to Arecibo
2. Proposed extension of PR-22 from Arecibo to Aguadilla
3. Existing PR-52 highway from San Juan to Ponce
4. Existing PR-5 in Bayamón
5. Existing PR-20 in Guaynabo
6. Existing PR-66 Phase I from Carolina to Canóvanas
7. Proposed PR-66 Phase II, from Canóvanas to Río Grande
8. Existing PR-53 from Fajardo to Maunabo
9. Proposed extension of the PR-53 from Maunabo to Salinas
10. Proposed Bus Rapid Transit lane from Bayamón to Toa Baja.

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<sup>1</sup> The sum of these amounts can increase over \$400 million. However, our analysis is based on what the Public-Private Partnership Authority has revealed as the most conservative investment estimation, which corresponds to \$356 million of capital improvement investment.

### **Impacts analyzed**

For each of the assets considered, a TWO MILE BUFFER ZONE was drawn, extending one mile on each side of the center of the lanes (see following map).

For each of the buffers zones, the following indicators were computed:

1. Population
2. Number of housing units
3. Number of families and households
4. Number of businesses and estimated employment, 2006
5. Flood areas, in square meters
6. Specially Protected Areas, in square meters
7. Lineal kilometers of secondary and tertiary roads
8. Landslide susceptible areas, in square meters
9. Likely number and value of accidents
10. Amount and cost of pollution generated by traffic

In addition, for the construction of the proposed extensions, these impacts were estimated:

1. Direct Jobs Generated
2. Indirect and Induced jobs
3. Personal Income Generated
4. Fiscal Revenues for State Government
5. Fiscal Revenues for Municipal Government

### **Limitations of the Study**

The conclusions of this report are subject to the following limiting conditions:

1. This report presents preliminary estimates made with limited available data relating to the nature and scope of the projects.

2. Although the report is requested in the context of a Public Private Partnership Desirability Analysis, at this stage of the process, the scope of the partnership is not defined. This section does not, therefore compare the PSC with a PPP scenario.

## IMPACTS OF THE HIGHWAYS PROJECTS

### Measurement of Impacts

For each of the existing and proposed toll highways considered in this study, several indicators were computed in order to assess the relative economic, social and environmental importance of each segment. The indicators are presented in the table in the following page. After that, an explanation of the methodology and sources for each estimate is presented. The maps in the appendixes show the location of existing and proposed projects.

# Impacts of the PR Highway PPP projects

Macquarie Capital Advisors

## ENVIRONMENTAL, SOCIAL AND ECONOMIC IMPACTS OF SELECTED HIGHWAYS IN PUERTO RICO

	Existing Segments						Proposed Segments				Total
	PR -5	PR -20	PR -22	PR -52	PR -53	PR-66	Ext PR-22	BRT	Ext PR-66	Ext PR-53	
AADT (trips per day, average of several points) <sup>(1)</sup>	31,896	56,212	87,661	61,802	20,935	27,772	87,661	7,000	27,772	20,935	<b>429,646</b>
Length (km)	6.5	9.7	83.7	108.3	59.3	14.1	44.5	14.0	7.6	29.9	<b>378</b>
Millions of Vehicle Miles Travelled per year	2.4	6.2	83.7	76.3	14.2	4.5	44.5	1.1	2.4	7.1	<b>242</b>
<b>Accidents</b>											
Accidents with Fatalities (# /year)	5	13	172	157	29	9	91	2	5	15	<b>497</b>
Accidents with Injuries (# /year)	172	453	6,096	5,561	1,031	325	3,240	81	174	520	<b>17,655</b>
Accidents with Property Damage Only (# /year)	1,101	2,894	38,948	35,529	6,590	2,079	20,702	520	1,113	3,323	<b>112,798</b>
<b>Cost of Accidents</b>											
Cost of Fatalities (\$mill)	\$7	\$18	\$245	\$224	\$42	\$13	\$130	\$3	\$7	\$21	<b>711</b>
Cost of Injuries (\$ mill)	\$3	\$9	\$121	\$110	\$20	\$6	\$64	\$2	\$3	\$10	<b>350</b>
Cost of Property Damage (\$ mill)	\$1	\$3	\$43	\$39	\$7	\$2	\$23	\$1	\$1	\$4	<b>124</b>
<b>Emission of pollutants</b>											
Hydrocarbons emission (tons/year)	5	13	177	161	30	9	94	2	5	15	<b>512</b>
CO <sub>2</sub> emission (tons/year)	38	101	1,357	1,238	230	72	721	18	39	116	<b>3,930</b>
Nitrogen Oxide emission (tons/year)	15	39	530	483	90	28	282	7	15	45	<b>1,535</b>
<b>Cost of Pollution</b>											
Hydrocarbons emission (\$ mill cost/year)	\$0.01	\$0.02	\$0.31	\$0.29	\$0.05	\$0.02	\$0.17	\$0.00	\$0.01	\$0.03	<b>1</b>
CO <sub>2</sub> emission (\$ mill cost/year)	\$0.15	\$0.39	\$5.28	\$4.81	\$0.89	\$0.28	\$2.81	\$0.07	\$0.15	\$0.45	<b>15</b>
Nitrogen Oxide emission (\$ mill cost/year)	\$0.06	\$0.15	\$1.98	\$1.80	\$0.33	\$0.11	\$1.05	\$0.03	\$0.06	\$0.17	<b>6</b>
<b>Land Sensitivity indicators</b>											
Land with Agriculture Value (thds sq m)	5,966	372	84,052	24,701	42,413	8,970	4,747	1,992	0	0	<b>173,214</b>
Protected Natural Land (thds sq m)	-	197	10,772	264	15	-	0	0	368	1,545	<b>13,162</b>
Flood Susceptible Areas (thds sq m)	18,290	1,556	71,677	48,389	55,179	11,232	8,326	20,371	5,283	28,238	<b>268,541</b>
<b>Roads Density indicators</b>											
Primary roads segments (km)							32.2	26.1	10.2	35.6	<b>104</b>
Secondary roads segments (km)							34.7	10.9	7.2	3.0	<b>56</b>
Tertiary roads segments (km)							73.8	31.3	17.1	46.1	<b>168</b>
<b>Economic Activity Indicators</b>											
Business with payroll (#)	11,601	6,093	20,756	12,757	1,652	2,801	1,805	4,972	560	790	<b>63,787</b>
Employees in business with payroll	76,522	37,240	153,811	80,164	7,509	20,191	9,559	30,070	3,182	8,643	<b>426,890</b>
<b>Population indicators</b>											
Population (#, 2010)							74,937	99,776	29,885	43,819	<b>248,417</b>
Households (#, 2010)							24,995	31,222	9,366	14,183	<b>79,765</b>
Housing units (#, 2000)							27,848	33,832	10,383	16,490	<b>88,554</b>
Median household income (\$, 2000)							\$13,219	\$19,927	\$18,435	\$13,028	<b>64,608</b>

Source: Estudios Técnicos Inc estimates

**Methodology and sources for the estimation of impacts**

**AADT:** Annual Average Daily Traffic: The total volume of traffic passing a point or segment of a highway facility, in both directions, for one year, divided by the number of days in the year. This number was obtained averaging several observations published by the Puerto Rico Highway Authority for several points in during several years (mostly 2004-2008). For the proposed —non existing— routes, it was assumed the same AADT than their existing counterpart. For the BRT lane, it was assumed 7,000 AADT

**Land With Agricultural Value:** Soils identified by the Department of Agriculture as those with high agricultural potential soils.

**Natural Protected Areas:** Areas with great ecological value which are protected by law or regulations.

**Flood prone areas:** Areas identified by the FEMA Flood Insurance Rate Map as areas with high potential for flooding.

**Businesses with Payroll and Employment:** the establishment locations were taken from Dun and Bradstreet databases in 2006. Then, the number of establishments and employment was projected to the universe using statistics from the Department of the Treasury.

**Population, Household, Housing Unit and Median Household Income:** Data provided by Census 2000

**Other intangible impacts****Access**

The extension of PR-22, PR-53, PR-66 and the BRT will improve access as follows:

PR-22 – Will substitute PR-2 from Hatillo to Aguadilla and reduce travel time.

Given the projected development of the Old Ramey Air Force base as a cargo and

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passenger destination, the extension will increase the potential of the base and extend the catchment area for commercial establishments in the Northwest of the Island.

PR-53 – Completing PR-53 will enable the southeast tip of Puerto Rico to have much better access to the rest of the Island. This is one of the least developed regions precisely because of lack of access. Linking the region with expected developments to the north (Roosevelt Roads) and west (Port of the Americas) will improve development possibilities.

PR-66 – The extension will strengthen the potential of the Northeast region in terms of tourism development by reducing travel time from the San Juan Metro Area, including the Luis Muñoz Marín International Airport. This and subsequent extensions of PR-66 are considered as key for the development of Roosevelt Roads.

BRT – The BRT will make it possible for the residents of the Municipality of Toa Baja and Dorado to access the Metropolitan Area in an efficient manner linking with the Urban Train in Bayamón. It will have the secondary impact of increasing train ridership, since those traveling from the two municipalities to San Juan, would almost certainly not use the train.

### **Accidents**

The extension and improved private maintenance of the various routes will substitute existing roads with new and better designed roads that will reduce accidents significantly.

PR-22 – The extension will substitute PR-2 a road with serious congestion problems and since it has multiple access points, frequent accidents. The new toll road, with limited access points and better design will almost certainly reduce the number of accidents.

PR-66 – In this case it is PR 3 that is substituted with similar results as above.

PR-53 – The completion of PR-53 substitutes various existing roads, most of which are older roads with design flaws and with limited capacity.

BRT – The BRT will substitute the use of automobiles in PR-22 and other minor roads and will have a positive impact on accident prevention.

### **Land values**

Likewise, the impact on land values will be a positive result of the various proposed extensions. The impact will be particularly important in the Southeast where land values are low compared to the rest of Puerto Rico precisely because of the isolation of the region and its lack of development.

### **Maintenance**

The experience of other PPP in several countries to manage highway systems shows that one of the most visible results is the improvement of maintenance standards of the assets. In the particular case of Puerto Rico, this may represent a substantial benefit for citizens, as there is a generalized consensus that roads conditions in the Island are poor, in contrast to mainland conditions.

To improve maintenance standards, a PPP operator will most likely have to increase maintenance related expenditures. This should result in direct and indirect economic benefits associated to job and income creation.

**ECONOMIC IMPACT OF THE NEW HIGHWAY CONSTRUCTION**

At the moment, the major construction projects under considerations are these included in the following table:

**Highway & Transportation construction projects**

under consideration as of 2010

Description	Cost (\$mill)
Extension of PR-66 Canóvanas-Río Grande	\$ 180
Extension of PR-22 Arecibo- Aguadilla	\$ 825
Extension of PR-53 from Maunabo to Guayama	\$ 800
Bus Rapid Transit lane Bayamón Toa Baja	\$ 68
PR-22 / PR-5 Capital Improvement Program <sup>(1)</sup>	\$ 356
<b>Total Investment</b>	<b>\$ 2,229</b>

(1) \$56 million during the first 3 years and \$12 million annually for 25 years

Source: Macquarie Capital Advisors, form PRHTA

On June 28, 2011, an additional component was considered based on the concession of the PR-22 and PR-5 procurement process. The PR-22/PR-5 Capital Improvements has been conservatively estimated at \$356 million. The PR-22/PR-5 Capital Improvements consist of \$56 million of Accelerated Safety Upgrades (“ASUs”) to be completed in the first three years and \$300 million of investment in the following 25 years<sup>2</sup>.

This amount does not include the upfront payment related to the PR-22 and PR-5 concession.

As with any construction project, these investments have several effects that flow through the entire economy.

<sup>2</sup> The sum of these amounts can increase over \$400 million. However, our analysis is based on what the Public-Private Partnership Authority has revealed as the most conservative investment estimation, which corresponds to \$356 million of capital improvement investment.

For the sake of simplicity, it is assumed that all investment will take place in a single year. The expected effects of the investment are depicted in the following table.

**ECONOMIC IMPACTS OF THE INVESTMENT OF CONSTRUCTION IN HIGHWAY EXPANSION**
**Creation of Jobs**

	PR-66 Extension	PR-22 Extension	PR-53 Extension	BRT Extension	PR-22 / PR-5 CIP	Total
Direct Jobs	1,636	7,287	6,867	567	2,886	19,244
Indirect and Induced Jobs	1,530	6,814	6,421	530	2,699	17,994
<b>Total Jobs (Dir + Ind + Induced)</b>	<b>3,166</b>	<b>14,101</b>	<b>13,289</b>	<b>1,098</b>	<b>5,585</b>	<b>37,238</b>

**Creation of Personal Income (\$mill)**

Direct Income	\$35	\$162	\$157	\$13	\$70	\$438
Indirect and Induced Income	\$40	\$184	\$179	\$15	\$80	\$498
<b>Total Personal Income</b>	<b>\$75</b>	<b>\$346</b>	<b>\$336</b>	<b>\$29</b>	<b>\$150</b>	<b>\$936</b>

**Creation of Fiscal Revenues (\$ mill)**

to Municipal governments	\$8	\$36	\$35	\$3	\$16	\$98
to State government	\$12	\$57	\$55	\$5	\$24	\$153
<b>Total Fiscal Revenues</b>	<b>\$20</b>	<b>\$93</b>	<b>\$90</b>	<b>\$8</b>	<b>\$40</b>	<b>\$251</b>

Source: Estudios Técnicos, Inc.

