FINAL DRAFT REPORT:

Micro Economic Impact Study of Container Activity at Port Metro Vancouver

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& tourism
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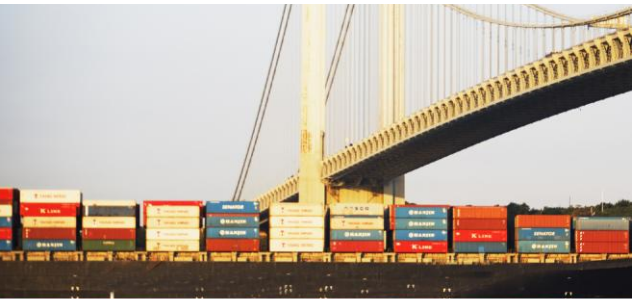

Prepared for

WorleyParsons Canada Ltd.

Prepared by

Inter*VISTAS* Consulting Inc.

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1. Introduction

Inter*VISTAS* Consulting Inc. (Inter*VISTAS*) was commissioned to provide an update to the economic impact of containers at Port Metro Vancouver (PMV). Inter*VISTAS* completed a full economic impact study for Port Metro Vancouver in 2008, after the three Lower Mainland port authorities amalgamated to form Port Metro Vancouver.[1] An update on the economic impact of containers at PMV is required as part of PMV's Container Capacity Improvement Program for a project definition report that is currently in progress for the development of increased marine terminal capacity at Roberts Bank. The purpose of this study is to document the current and projected economic contributions of container traffic at PMV to the province of British Columbia. This study does not quantify the full economic impact of the port and its operations. In addition to this economic impact, revenues to the federal, provincial and municipal governments are included in this report.

1.1 What is Economic Impact?

Economic impact is a measure of the spending and employment associated with a sector of the economy, a specific project (such as the construction of a new facility), or a change in government policy or regulation. Economic impact can be measured in various ways. Two of the most popular ways to assess economic impact are in terms of the dollar value of industrial output produced, or in terms of person years (full-time equivalents (FTEs)) of employment generated. Other measures are value-added (GDP) and value of capital used and/or created. All of these are used to express the gross level of activity or expenditure from a sector of the economy, a specific project or a change in policy or regulation. As such, they are not "net" measures that weigh benefits against costs; nevertheless, these measures can be useful in developing an appreciation of projects, investments and economic sectors.

The economic impact can be broken down into the following categories:

Direct employment is employment that can be directly attributable to the operations in an industry, firm, etc. In the case of container traffic at Port Metro Vancouver, all of the jobs involved in moving containers through Port Metro Vancouver would be considered direct employment. The direct employment base includes employees of terminal operators, tug operators, ship pilots, rail and other related firms.

Indirect employment is employment at a supplier industry that is supported by expenditures by port businesses. For container traffic at Port Metro Vancouver, it would include the portion of employment in supplier industries, which are dependent on sales to the Port container terminals. For example, a repair company that provides repair services to the terminals would be considered indirect employment.

Induced employment is employment generated from expenditures by individuals employed indirectly or directly. For example, if a longshoreman decides to expand or re-model his/her home, this would result in additional (induced) employment hours in the general economy. The home

[1] See **Appendix C** for a review of the methodology and multipliers used from the economic impact study conducted in 2008 for Port Metro Vancouver in comparison to the current study.

renovation project would support hours of induced employment in the construction industry, the construction materials industry, etc.

Total employment is the sum of direct, indirect and induced effects. The multiplier (indirect and induced) economic impacts represent the maximum potential stimulus to the economy resulting from container traffic at PMV.

1.2 Scope of the Study

Micro studies measure the economic impact of specific activities. In micro studies, the different trades and corresponding person hours required to service a particular transportation service is described and explained. These are then added up to present the total impact of that one specific service. These analyses are called micro studies to differentiate them from the broader economic impact studies of a port that take into account all employment and economic activity at a port, not just that associated with a given service.

This micro study estimates the economic impact generated by current and future estimated container traffic at PMV.[2] The future economic impact analysis is based upon forecasted container volumes which were provided by Port Metro Vancouver to Inter*VISTAS*. This study also provides an assessment of the revenue contributions to all levels of government resulting from current and forecasted future container activity at PMV.

1.3 Outline of the Study

This report provides an estimate of the economic impacts of employment related to container traffic at Port Metro Vancouver.

- **Chapter 2** explains the methodology for estimating the current and potential future economic impact of container traffic at Port Metro Vancouver.
- **Chapter 3** measures and describes the economic impacts related to current container volumes at Port Metro Vancouver.
- **Chapter 4** measures and describes the potential economic impacts related to future estimated container volumes at Port Metro Vancouver.
- **Chapter 5** measures the estimated government revenue contribution of container activity at Port Metro Vancouver by estimating taxes paid by employers, employees and property taxes paid by marine terminal operators and firms directly involved in container handling. The container share of the PMV Gross Revenue Charge (Federal Stipend) is also estimated as part of government revenue.
- **Chapter 6** summarises the results.

[2] Current impacts are based on 2010 container traffic, while potential impacts are based on forecasted container volumes for 2015, 2020 and 2030 provided by PMV to Inter*VISTAS*, as indicated in the Base Case projections from the *Preliminary Container Traffic Projections for Port Metro Vancouver: 2011 to 2030, Container Capacity Improvement Program (CCIP) Project Definition Report (PDR) Phase – Executive Summary* (page 8) by WorleyParsons Canada Services Ltd. and Seaport Consultants Canada Inc.

2. Methodology

2.1 Introduction

This micro study assesses the impact of all activities related to the movement of containers through Port Metro Vancouver. Container movements through Port Metro Vancouver generate labour hours for individuals with jobs involved in handling the containers. The estimated labour hours in this micro study includes the employment involved in processing containers, such as terminal operators, longshoremen, tug operators, harbour pilots, truck drivers and rail.[3] The figures in this micro study represent the average labour impacts. It includes the sum of all of the labour hours from all associated jobs – both "hands-on" jobs as well as "overhead" jobs.

This section provides a brief overview of the methods employed in the analysis.

2.2 Estimating Economic Impact

The direct economic impact of containers at PMV was based on an analysis of employment associated with servicing the movement of containers through the Port. Employment figures are generally more understandable by the public than more abstract measures, such as economic output or Gross Domestic Product (GDP). Employment figures also have the advantage of being a more accurate measure, both because the firms are more likely to provide data on employment, as opposed to information on revenues, wages and other monetary amounts, and because there is less chance of double counting economic activity. For the specific purpose of this micro study, the size of the employment base involved in the movement of containers through PMV and the impact it has on the economy is examined.

In addition, economic multipliers were used to infer other economic impacts from the employment figures, such as wages, GDP and economic output. Economic multipliers were also used to estimate the indirect and induced (or multiplier) impacts. The economic multipliers produced by Statistics Canada translate the number of direct person years of employment in a specific economic sector into the associated monetary measures of economic activity.

2.3 Surveying Direct Employment

Employment attributable to container movements through PMV was estimated through interviews with relevant industry operators and observing actual operations at facilities, as well as through an analysis of related data sources, such as labour hours data received from the British Columbia Maritime Employers Association (BCMEA). The interview responses, observations and analyses were used as the primary inputs to modeling the total estimated amount of employment that is associated with containers at Port Metro Vancouver. The projected impacts were estimated by applying the current ratio of employment and container traffic to the forecasted container volumes provided by Port Metro Vancouver. This assumes minimal productivity improvements.

[3] See **Appendix B** for details on the different job functions involved in handling containers.

2.4 Economic Multipliers

Indirect and induced effects are typically measured by the use of *economic multipliers.* Economic multipliers account for the inter-industry relationships within regions and describe how local economies are likely to respond to various changes. Multipliers are based on complex accounting and economic "input-output" analyses, which shows the distribution of the inputs purchased and the outputs sold for particular industries as provided by Statistics Canada.[4] They come in a variety of forms and differ greatly in definition and application. Thus, analysts must exercise great care in choosing the appropriate set of multipliers to use. In addition, the use of multiplier analysis is limited by a number of factors, these being:

- the accuracy of the structure and parameters of the underlying model;
- the level of unemployment in the economy;
- the assumption of constant returns to scale in production;
- the assumption that the economy's structure is static over time; and
- the assumption that there are no displacement effects.

The multiplier impacts present the best estimate of potential indirect and induced impacts that can be achieved under a given set of economic conditions. They do not necessarily represent the maximum impact. In reality, these conditions may not all apply, and the multiplier impacts may be somewhat different. However, no information is available on the possible range of these impacts. That said, the multipliers used are based on the best model and data available. The multipliers represent the best estimate of the impacts, based on a well-tested and well-established model, developed and supported by the government. They represent the industry standard in estimating indirect and induced impacts. In general, the focus of our report is on the direct impacts which are the most accurate and verifiable figures. While multiplier impacts are useful and important, the user should be mindful of their limitations, and should focus on the magnitude of the impacts instead of the exact figures.

2.5 Gross Domestic Product and Economic Output Impacts

In addition to employment, the economic impact can be measured in terms of the dollar impacts on the economy.

The two most common measures of economic contribution (in addition to employment) are *gross domestic product (GDP)* and *economic output.* Economic output roughly corresponds to the *gross* revenues of goods or services produced by an economic sector, while GDP measures only *value-added* revenues. As such, GDP removes the revenues to suppliers of *intermediate* goods and services and only includes the revenues from value-added production. Alternatively, economic output adds all revenues at each stage of production together as a measure of total production in the economy. Economic output will always be greater than GDP (also termed value-added).

One approach to measuring economic output and GDP is to ask firms in a survey to provide information on their gross revenues and payments to suppliers. However, there are several

[4] The multipliers used for the analysis are based on Statistics Canada economic multipliers for British Columbia from the 2007 Interprovincial Input-Output model, the most recent available. These multipliers were updated with Consumer Price Indices to account for inflation.

problems with the approach. First, it is much too expensive. Second, the double counting problem makes this approach impractical.

An alternative is to infer economic output and GDP for an economic sector from employment data using economic multipliers. Statistics Canada produces economic multipliers both for Canada and all of the provinces and territories, and these are both more cost effective and more accurate than obtaining the data from surveys. This method, using Statistics Canada economic multipliers for British Columbia, is the approach adopted here.

2.6 Government Revenue Impacts

Container activity at Port Metro Vancouver also generates significant government revenues. This includes revenues received by the federal, provincial, and municipal levels of government.

Revenue contributions are divided into three groups, based on who is making the payment:

- **Taxes paid by employers and employees.** These include income and payroll taxes, social insurance contributions (such as employment insurance premiums) for all direct employment associated with container activity at Port Metro Vancouver, and the federal corporate income taxes paid by employers. Included as well are the property taxes paid by the operators of the PMV container terminals.[5]
- **Property taxes paid by marine terminal operators and firms**. These include property taxes paid by marine terminal operators and firms directly involved in container handling.[6]
- **Gross Revenue Charge paid by the Port Authority.** This includes the portion of Gross Revenue Charges paid by Port Metro Vancouver to the federal government that is related to container activity at the Port.[7]

For each category, taxes paid to the federal, provincial and municipal governments are separately identified.

This study presents the government revenue contributions resulting from container activity at Port Metro Vancouver. As with all such studies, a conceptual decision has to be made as to how broad a definition of *economic activity* should be used in measuring the impacts. For this study, a relatively narrow definition has been taken, for example, the following have **not** been included:

- Taxes associated with indirect or induced employment (i.e., multiplier effects);
- Consumption taxes (GST and PST) paid by employees when they spend their income;
- Customs and excise duties and taxes levied on cargo arriving in the country through the Port.

The current and future tax revenues have been calculated using 2010 tax codes. As such, future changes to the tax levels will impact on the amount of tax revenue collected.

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[5] For the most part, this study **estimates** taxes paid from information on employers and employees associated with container activity at Port Metro Vancouver. In a few situations, such as the corporate income tax paid by employers, an approximate method was used to estimate taxes paid. In every case, conservative methods were used. No major tax has been excluded.

[6] The property taxes are estimated based on the ratio of property taxes to direct person years of employment.

[7] Gross Revenue Charges are estimated based on the following assumptions: total revenues are estimated to increase 5% per annum; total gross revenue charges are estimated to be 3% of total revenues; and, the container portion of gross revenue charges is estimated to be 40%, as per PMV.

3. Economic Impact of Current Container Traffic at Port Metro Vancouver

3.1 Direct Employment Impact of Container Traffic

In 2010, Port Metro Vancouver handled 2.51 million twenty-foot equivalent units (TEUs). **Figure 3-1** illustrates the direct employment impact of handling containers on a per vessel basis, and also indicates the annual impact based on the total container traffic through PMV in 2010.[10] The table shows that approximately 28 person years of employment is generated per vessel and more than 10,900 person years of employment is supported annually.[11]

Figure 3-1: *Direct* Employment Impact of Container Traffic at Port Metro Vancouver, 2010

Direct Employment	Per Vessel	Annual Employment
Person Years	28	10,900

3.2 Current Economic Impact of Container Traffic

The handling of containers generates more than 10,900 person years of *direct* employment at Port Metro Vancouver. Containers are major contributors to the British Columbia economy, supporting over 21,700 person years of total employment, when multiplier effects are taken into account.[12] The *direct* GDP associated with the container traffic logistics system contributes close to $1.4 billion to the economy. If multiplier effects are considered, the total GDP impact rises to as high as $1.9 billion. The employment and other economic impacts for current container traffic at Port Metro Vancouver are presented in **Figure 3-2.**

Figure 3-2: Annual Economic Impacts of Container Traffic at Port Metro Vancouver, 2010

	Person Years	Wages ($Millions)	GDP ($Millions)	Economic Output ($Millions)
Direct	10,900	570	1,390	2,520
Indirect	5,800	160	280	650
Induced	5,000	120	270	520
Total	***21,700***	***850***	***1,940***	***3,690***

Note: Monetary impacts (wages, GDP and economic output) are in 2011 dollars.

[10] According to TSI Terminals at Deltaport, there are approximately 6,500 TEUs per ship.

[11] See **Appendix B** for details on the total annual direct person years per job function.

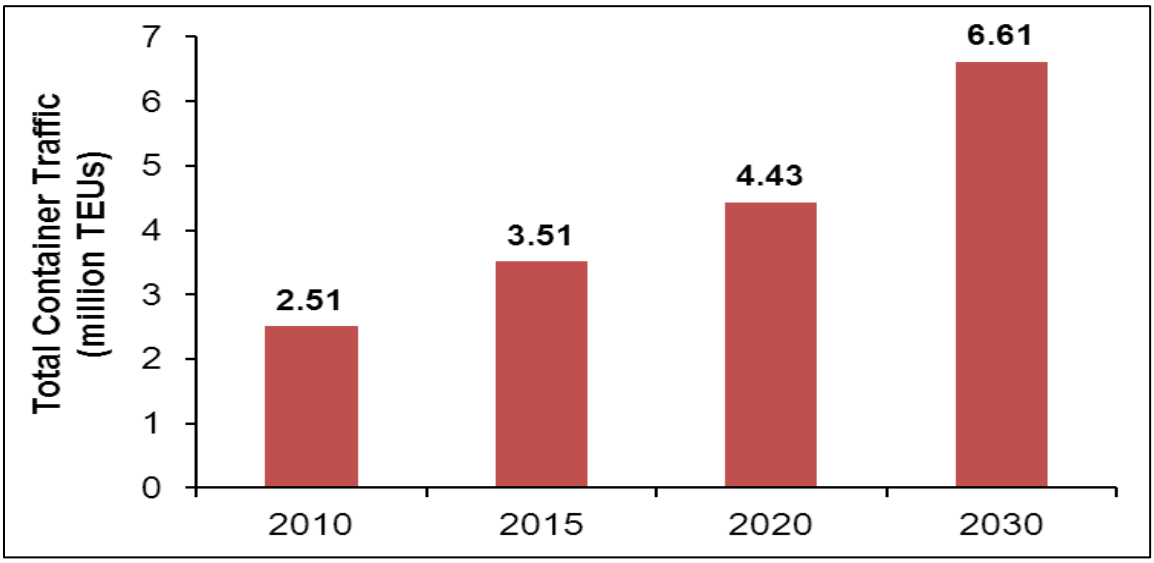
[12] Rail employment associated with PMV container activity may not necessarily take place within British Columbia.

4. Potential Economic Impact of Future Estimated Container Traffic at Port Metro Vancouver

4.1 Future Estimated Container Traffic at Port Metro Vancouver

According to forecasted container volumes provided by Port Metro Vancouver to Inter*VISTAS*, total container traffic through the Port is projected to increase to 3.51 million TEUs by 2015.[13] The total container traffic through Port Metro Vancouver in 2020 and 2030 is estimated to be 4.43 million TEUs and 6.61 million TEUs, respectively. **Figure 4-1** provides a summary of the current and forecasted container volumes at PMV.

Figure 4-1: Current and Forecasted Total Container Traffic through Port Metro Vancouver



Source: Port Metro Vancouver as indicated in the Base Case projections from the *Preliminary Container Traffic Projections for Port Metro Vancouver: 2011 to 2030, Container Capacity Improvement Program (CCIP) Project Definition Report (PDR) Phase – Executive Summary* (page 8) by WorleyParsons Canada Services Ltd. and Seaport Consultants Canada Inc.

[13] Forecasted container volumes for 2015, 2020 and 2030 were provided by PMV to Inter*VISTAS*, as indicated in the Base Case projections from the *Preliminary Container Traffic Projections for Port Metro Vancouver: 2011 to 2030, Container Capacity Improvement Program (CCIP) Project Definition Report (PDR) Phase – Executive Summary* (page 8) by WorleyParsons Canada Services Ltd. and Seaport Consultants Canada Inc.

4.2 Potential Economic Impact of Future Estimated Container Traffic: 2015

By 2015, it is estimated that the handling of containers will generate more than 15,300 person years of *direct* employment at Port Metro Vancouver, and will support nearly 30,400 person years of total employment when multiplier effects are taken into account. The *direct* GDP contribution to the economy that is associated with the container traffic logistics system in 2015 is assessed to be more than $1.9 billion. The total GDP impact is forecasted to rise to as high as $2.7 billion in 2015 if multiplier effects are considered. **Figure 4-2** summarises the employment and other economic impacts for future estimated container traffic at Port Metro Vancouver in 2015.

Figure 4-2: Annual Economic Impacts of Container Traffic at Port Metro Vancouver, 2015

	Person Years	Wages ($Millions)	GDP ($Millions)	Economic Output ($Millions)
Direct	15,300	800	1,940	3,530
Indirect	8,100	220	400	900
Induced	7,000	160	370	730
Total	***30,400***	***1,180***	***2,710***	***5,160***

Note: Monetary impacts (wages, GDP and economic output) are in 2011 dollars.

4.3 Potential Economic Impact of Future Estimated Container Traffic: 2020

The handling of containers in 2020 is projected to generate more than 19,300 person years of *direct* employment at Port Metro Vancouver, and contribute close to $2.5 billion in *direct* GDP to the British Columbia economy. Containers are expected to still be major contributors to the economy, supporting nearly 38,400 person years of total employment and as high as $3.4 billion in total GDP to the Province of British Columbia, when multiplier effects are taken into account. The employment and other economic impacts for 2020 container traffic at Port Metro Vancouver are summarised in **Figure 4-3.**

Figure 4-3: Annual Economic Impacts of Container Traffic at Port Metro Vancouver, 2020

	Person Years	Wages ($Millions)	GDP ($Millions)	Economic Output ($Millions)
Direct	19,300	1,010	2,450	4,450
Indirect	10,200	270	500	1,140
Induced	8,900	210	470	920
Total	***38,400***	***1,490***	***3,420***	***6,510***

Note: Monetary impacts (wages, GDP and economic output) are in 2011 dollars.

4.4 Potential Economic Impact of Future Estimated Container Traffic: 2030

The handling of containers is forecasted to generate more than 28,800 person years of *direct* employment at Port Metro Vancouver by 2030, and support over 57,200 person years of total employment when multiplier effects are taken into account. By 2030, the container traffic logistics system is estimated to contribute close to $3.7 billion in *direct* GDP to the provincial economy, and as high as $5.1 billion in total GDP if multiplier effects are considered. The 2030 employment and other economic impacts for container traffic at Port Metro Vancouver are presented in **Figure 4-4.**

Figure 4-4: Annual Economic Impacts of Container Traffic at Port Metro Vancouver, 2030

	Person Years	Wages ($Millions)	GDP ($Millions)	Economic Output ($Millions)
Direct	28,800	1,510	3,650	6,650
Indirect	15,200	410	750	1,700
Induced	13,200	310	710	1,370
Total	***57,200***	***2,230***	***5,110***	***9,720***

Note: Monetary impacts (wages, GDP and economic output) are in 2011 dollars.

5. Government Revenue Impacts of Current and Forecasted Container Traffic at Port Metro Vancouver

5.1 Current Government Revenue Impact of Container Traffic: 2010

The handling of containers generated government revenue contributions to all levels of government, estimated to be in the order of $263 million in 2010. The federal government was the largest recipient of government revenue, receiving nearly $153 million (58% of the total). The provincial government received approximately $75 million in government revenue (28% of the total). Municipal governments collected more than $35 million in taxes (14% of the total) related to the property taxes paid by the Port Metro Vancouver container terminals and firms involved in container handling activity. A complete summary of government revenue contributions resulting from container activity at Port Metro Vancouver in 2010 is provided in **Figure 5-1**.

Figure 5-1: Annual Government Revenue Contributions of Container Traffic at Port Metro Vancouver, 2010

SUMMARY OF GOVERNMENT REVENUE CONTRIBUTIONS FROM PMV CONTAINER ACTIVITY - 2010

	Federal		Provincial		Municipal		All Gov'ts
	Tax	Amount ($m)	Tax	Amount ($m)	Tax	Amount ($m)	Amount ($m)
Paid by Employers or Employees	Personal Income Tax	61.5	Personal Income Tax	22.3	Property Tax	35.4	
	Corporate Income Tax	17.9	Corporate Income Tax	5.9			
	EI - Employer	11.5	WCB	8.9			
	EI - Employee	8.2	MSP	7.5			
	CPP - Employer	25.6	Property Tax	30.1			
	CPP- Employee	25.6					
	Total	**150.3**	**Total**	**74.7**	**Total**	**35.4**	**260.4**
Paid by Port Metro Vancouver	Gross Revenue Charge	2.2					
	Total	**2.2**	**Total**	**0.0**	**Total**	**0.0**	**2.2**
	Grand Total	**152.5**	**Grand Total**	**74.7**	**Grand Total**	**35.4**	**262.6**

Note:

- Tax contribution estimates are based on 2010 tax codes.
- The property taxes are estimated based on the ratio of property taxes to direct person years of employment.
- Gross Revenue Charges are estimated based on the following assumptions: total revenues are estimated to increase 5% per annum; total gross revenue charges are estimated to be 3% of total revenues; and, the container portion of gross revenue charges is estimated to be 40%, as per PMV.

5.2 Potential Government Revenue Impact of Future Estimated Container Traffic: 2015

The future estimated increase in container traffic in 2015 will also generate revenues for all levels of government. The total government revenue impact of 2015 container activity at Port Metro Vancouver is estimated to be $367 million in current day dollars. The federal government is assessed to receive approximately $213 million (58% of the total), while the provincial government is projected to receive over $104 million (28% of the total). Close to $50 million in taxes (14% of the total) is estimated to be collected by municipal governments, which includes an estimate of property taxes. **Figure 5-2** shows a complete summary of government revenue contributions resulting from container activity at Port Metro Vancouver in 2015.

Figure 5-2: Annual Government Revenue Contributions of Container Traffic at Port Metro Vancouver, 2015 (in 2011 dollars)

SUMMARY OF GOVERNMENT REVENUE CONTRIBUTIONS FROM PMV CONTAINER ACTIVITY - 2015

	Federal		Provincial		Municipal		All Gov'ts
	Tax	Amount ($m)	Tax	Amount ($m)	Tax	Amount ($m)	Amount ($m)
Paid by Employers or Employees	Personal Income Tax	86.0	Personal Income Tax	31.2	Property Tax	49.5	
	Corporate Income Tax	25.1	Corporate Income Tax	8.3			
	EI - Employer	16.0	WCB	12.5			
	EI - Employee	11.4	MSP	10.5			
	CPP - Employer	35.8	Property Tax	42.1			
	CPP- Employee	35.8					
	Total	**210.1**	**Total**	**104.4**	**Total**	**49.5**	**364.1**
Paid by Port Metro Vancouver	Gross Revenue Charge	2.8					
	Total	**2.8**	**Total**	**0.0**	**Total**	**0.0**	**2.8**
	Grand Total	**212.9**	**Grand Total**	**104.4**	**Grand Total**	**49.5**	**366.9**

Note:
- Tax contribution estimates are based on 2010 tax codes.
- The property taxes are estimated based on the ratio of property taxes to direct person years of employment.
- Gross Revenue Charges are estimated based on the following assumptions: total revenues are estimated to increase 5% per annum; total gross revenue charges are estimated to be 3% of total revenues; and, the container portion of gross revenue charges is estimated to be 40%, as per PMV.
- Amounts presented are in 2011 dollars.

5.3 Potential Government Revenue Impact of Future Estimated Container Traffic: 2020

The overall government revenue contribution to all levels of government generated by the forecasted container traffic in 2020 is estimated to be approximately $463 million in current day dollars. The federal government and the provincial government are projected to receive approximately $269 million (58% of the total) and $132 million (28% of the total), respectively. Municipal governments collected more than $62 million in taxes (14% of the total) related to the property taxes paid by the Port Metro Vancouver container terminals and firms involved in container handling activity. A complete summary of government revenue contributions resulting from container activity at Port Metro Vancouver in 2020 is provided in **Figure 5-3**.

Figure 5-3: Annual Government Revenue Contributions of Container Traffic at Port Metro Vancouver, 2020 (in 2011 dollars)

SUMMARY OF GOVERNMENT REVENUE CONTRIBUTIONS FROM PMV CONTAINER ACTIVITY - 2020

	Federal		Provincial		Municipal		All Gov'ts
	Tax	Amount ($m)	Tax	Amount ($m)	Tax	Amount ($m)	Amount ($m)
Paid by Employers or Employees	Personal Income Tax	108.5	Personal Income Tax	39.3	Property Tax	62.5	
	Corporate Income Tax	31.7	Corporate Income Tax	10.4			
	EI - Employer	20.2	WCB	15.8			
	EI - Employee	14.4	MSP	13.2			
	CPP - Employer	45.2	Property Tax	53.1			
	CPP- Employee	45.2					
	Total	**265.2**	**Total**	**131.8**	**Total**	**62.5**	**459.5**
Paid by Port Metro Vancouver	Gross Revenue Charge	3.5					
	Total	**3.5**	**Total**	**0.0**	**Total**	**0.0**	**3.5**
	Grand Total	**268.7**	**Grand Total**	**131.8**	**Grand Total**	**62.5**	**463.0**

Note:
- Tax contribution estimates are based on 2010 tax codes.
- The property taxes are estimated based on the ratio of property taxes to direct person years of employment.
- Gross Revenue Charges are estimated based on the following assumptions: total revenues are estimated to increase 5% per annum; total gross revenue charges are estimated to be 3% of total revenues; and, the container portion of gross revenue charges is estimated to be 40%, as per PMV.
- Amounts presented are in 2011 dollars.

5.4 Potential Government Revenue Impact of Future Estimated Container Traffic: 2030

The handling of containers in 2030 is forecasted to generate government revenue contributions in the order of $691 million. The federal government is estimated to receive over $401 million (58% of the total). The provincial government is assessed to receive approximately $197 million in government revenue (28% of the total). Municipal governments are projected to collect more than $93 million in taxes (14% of the total) related to the property taxes paid by the Port Metro Vancouver container terminals and firms involved in container handling activity. **Figure 5-4** provides a complete summary of government contributions resulting from container activity at Port Metro Vancouver in 2030.

Figure 5-4: Annual Government Revenue Contributions of Container Traffic at Port Metro Vancouver, 2030 (in 2011 dollars)

SUMMARY OF GOVERNMENT REVENUE CONTRIBUTIONS FROM PMV CONTAINER ACTIVITY - 2030

	Federal		Provincial		Municipal		All Gov'ts
	Tax	Amount ($m)	Tax	Amount ($m)	Tax	Amount ($m)	Amount ($m)
Paid by Employers or Employees	Personal Income Tax	162.0	Personal Income Tax	58.7	Property Tax	93.2	
	Corporate Income Tax	47.3	Corporate Income Tax	15.5			
	EI - Employer	30.2	WCB	23.5			
	EI - Employee	21.6	MSP	19.7			
	CPP - Employer	67.4	Property Tax	79.2			
	CPP- Employee	67.4					
	Total	**395.7**	**Total**	**196.7**	**Total**	**93.2**	**685.6**
Paid by Port Metro Vancouver	Gross Revenue Charge	5.8					
	Total	**5.8**	**Total**	**0.0**	**Total**	**0.0**	**5.8**
	Grand Total	**401.5**	**Grand Total**	**196.7**	**Grand Total**	**93.2**	**691.4**

Note:
- Tax contribution estimates are based on 2010 tax codes.
- The property taxes are estimated based on the ratio of property taxes to direct person years of employment.
- Gross Revenue Charges are estimated based on the following assumptions: total revenues are estimated to increase 5% per annum; total gross revenue charges are estimated to be 3% of total revenues; and, the container portion of gross revenue charges is estimated to be 40%, as per PMV.
- Amounts presented are in 2011 dollars.

6. Summary

Inter*VISTAS* Consulting Inc. (Inter*VISTAS*) was commissioned to conduct an update to the economic impact of containers at Port Metro Vancouver (PMV).[14] An update on the impact of containers at PMV is required as part of PMV's Container Capacity Improvement Program for a project definition report that is currently in progress for the development of a second terminal at Roberts Bank. The purpose of this study is to document the economic contribution of container traffic at PMV to the Province of British Columbia.

Containers are major contributors to the British Columbia economy. This study found that current container operations at PMV support 10,900 *direct* person years of employment and contribute $1.4 billion in *direct* GDP to the Province of British Columbia.[15] Including indirect and induced effects, the total impacts of the current container traffic logistics system includes 21,700 total person years of employment and $1.9 billion in total GDP. **Figure 6-1** summarises the total annual economic impacts of current container operations at Port Metro Vancouver.

Figure 6-1: Annual Economic Impacts of Container Traffic at Port Metro Vancouver, 2010

	Person Years	Wages ($Millions)	GDP ($Millions)	Economic Output ($Millions)
Direct	10,900	570	1,390	2,520
Indirect	5,800	160	280	650
Induced	5,000	120	270	520
Total	***21,700***	***850***	***1,940***	***3,690***

Note: Monetary impacts (wages, GDP and economic output) are in 2011 dollars.

Based on forecasted container volumes provided by Port Metro Vancouver to Inter*VISTAS*, the potential economic impact of future estimated container traffic is estimated.[16] Containers are expected to be even larger contributors to the economy, supporting nearly 30,400 person years of total employment and as high as $2.7 billion in total GDP to the Province of British Columbia in 2015, when multiplier effects are taken into account. In 2020 container traffic is estimated to generate nearly 38,400 person years of total employment and as high as $3.4 billion in total GDP,

[14] Inter*VISTAS* completed a full economic impact study for Port Metro Vancouver in 2008, after the three Lower Mainland port authorities amalgamated to form Port Metro Vancouver. See **Appendix C** for details on the differences in the methodology and multipliers used from the economic impact study conducted in 2008.

[15] Rail employment associated with PMV container activity may not necessarily take place within British Columbia.

[16] Forecasted container volumes for 2015, 2020 and 2030 were provided by PMV to Inter*VISTAS*, as indicated in the Base Case projections from the *Preliminary Container Traffic Projections for Port Metro Vancouver: 2011 to 2030, Container Capacity Improvement Program (CCIP) Project Definition Report (PDR) Phase – Executive Summary* (page 8) by WorleyParsons Canada Services Ltd. and Seaport Consultants Canada Inc.

while in 2030 container traffic is projected to contribute over 57,200 person years of total employment and as high as $5.1 billion in total GDP, including multiplier effects. The potential employment and other economic impacts for future estimated container traffic at Port Metro Vancouver in 2015, 2020 and 2030 are summarised in **Table 6-2**, **Table 6-3** and **Table 6-4**, respectively.

Figure 6-2: Annual Economic Impacts of Container Traffic at Port Metro Vancouver, 2015

	Person Years	Wages ($Millions)	GDP ($Millions)	Economic Output ($Millions)
Direct	15,300	800	1,940	3,530
Indirect	8,100	220	400	900
Induced	7,000	160	370	730
Total	***30,400***	***1,180***	***2,710***	***5,160***

Note: Monetary impacts (wages, GDP and economic output) are in 2011 dollars.

Figure 6-3: Annual Economic Impacts of Container Traffic at Port Metro Vancouver, 2020

	Person Years	Wages ($Millions)	GDP ($Millions)	Economic Output ($Millions)
Direct	19,300	1,010	2,450	4,450
Indirect	10,200	270	500	1,140
Induced	8,900	210	470	920
Total	***38,400***	***1,490***	***3,420***	***6,510***

Note: Monetary impacts (wages, GDP and economic output) are in 2011 dollars.

Figure 6-4: Annual Economic Impacts of Container Traffic at Port Metro Vancouver, 2030

	Person Years	Wages ($Millions)	GDP ($Millions)	Economic Output ($Millions)
Direct	28,800	1,510	3,650	6,650
Indirect	15,200	410	750	1,700
Induced	13,200	310	710	1,370
Total	***57,200***	***2,230***	***5,110***	***9,720***

Note: Monetary impacts (wages, GDP and economic output) are in 2011 dollars.

In addition to direct, indirect and induced economic impacts, container activity at Port Metro Vancouver also generates government revenues. This includes revenues received by the federal, provincial and municipal governments. The total government revenue impact on current container activity at Port Metro Vancouver was close to $263 million in 2010. The increased future estimated container traffic in 2015 and 2020 will also generate revenues for all levels of government. Total government revenue is projected to increase to $367 million in 2015 and to $463 million in 2020, in current day dollars. By 2030, container activity at PMV is forecasted to generate approximately $691 million, in current day dollars. The federal government is expected to be the largest recipient of government revenue, receiving approximately 58% of the total each year. The estimated total government revenue contribution of container activity at Port Metro Vancouver in 2010, 2015, 2020 and 2030 are provided in **Figure 6-5**, **Figure 6-6**, **Figure 6-7** and **Figure 6-8**, respectively.

Figure 6-5: Annual Government Revenue Contributions of Container Traffic at Port Metro Vancouver, 2010

SUMMARY OF GOVERNMENT REVENUE CONTRIBUTIONS FROM PMV CONTAINER ACTIVITY - 2010

	Federal		Provincial		Municipal		All Gov'ts
	Tax	Amount ($m)	Tax	Amount ($m)	Tax	Amount ($m)	Amount ($m)
Paid by Employers or Employees	Personal Income Tax	61.5	Personal Income Tax	22.3	Property Tax	35.4	
	Corporate Income Tax	17.9	Corporate Income Tax	5.9			
	EI - Employer	11.5	WCB	8.9			
	EI - Employee	8.2	MSP	7.5			
	CPP - Employer	25.6	Property Tax	30.1			
	CPP- Employee	25.6					
	Total	**150.3**	**Total**	**74.7**	**Total**	**35.4**	**260.4**
Paid by Port Metro Vancouver	Gross Revenue Charge	2.2					
	Total	**2.2**	**Total**	**0.0**	**Total**	**0.0**	**2.2**
	Grand Total	**152.5**	**Grand Total**	**74.7**	**Grand Total**	**35.4**	**262.6**

Note:
- Tax contribution estimates are based on 2010 tax codes.
- The property taxes are estimated based on the ratio of property taxes to direct person years of employment.
- Gross Revenue Charges are estimated based on the following assumptions: total revenues are estimated to increase 5% per annum; total gross revenue charges are estimated to be 3% of total revenues; and, the container portion of gross revenue charges is estimated to be 40%, as per PMV.
- Amounts presented are in 2011 dollars.

Figure 6-6: Annual Government Revenue Contributions of Container Traffic at Port Metro Vancouver, 2015 (in 2011 dollars)

SUMMARY OF GOVERNMENT REVENUE CONTRIBUTIONS FROM PMV CONTAINER ACTIVITY - 2015

	Federal		Provincial		Municipal		All Gov'ts
	Tax	Amount ($m)	Tax	Amount ($m)	Tax	Amount ($m)	Amount ($m)
Paid by Employers or Employees	Personal Income Tax	86.0	Personal Income Tax	31.2	Property Tax	49.5	
	Corporate Income Tax	25.1	Corporate Income Tax	8.3			
	EI - Employer	16.0	WCB	12.5			
	EI - Employee	11.4	MSP	10.5			
	CPP - Employer	35.8	Property Tax	42.1			
	CPP- Employee	35.8					
	Total	**210.1**	**Total**	**104.4**	**Total**	**49.5**	**364.1**
Paid by Port Metro Vancouver	Gross Revenue Charge	2.8					
	Total	**2.8**	**Total**	**0.0**	**Total**	**0.0**	**2.8**
	Grand Total	**212.9**	**Grand Total**	**104.4**	**Grand Total**	**49.5**	**366.9**

Note:
- Tax contribution estimates are based on 2010 tax codes.
- The property taxes are estimated based on the ratio of property taxes to direct person years of employment.
- Gross Revenue Charges are estimated based on the following assumptions: total revenues are estimated to increase 5% per annum; total gross revenue charges are estimated to be 3% of total revenues; and, the container portion of gross revenue charges is estimated to be 40%, as per PMV.
- Amounts presented are in 2011 dollars.

Figure 6-7: Annual Government Revenue Contributions of Container Traffic at Port Metro Vancouver, 2020 (in 2011 dollars)

SUMMARY OF GOVERNMENT REVENUE CONTRIBUTIONS FROM PMV CONTAINER ACTIVITY - 2020

	Federal		Provincial		Municipal		All Gov'ts
	Tax	Amount ($m)	Tax	Amount ($m)	Tax	Amount ($m)	Amount ($m)
Paid by Employers or Employees	Personal Income Tax	108.5	Personal Income Tax	39.3	Property Tax	62.5	
	Corporate Income Tax	31.7	Corporate Income Tax	10.4			
	EI - Employer	20.2	WCB	15.8			
	EI - Employee	14.4	MSP	13.2			
	CPP - Employer	45.2	Property Tax	53.1			
	CPP- Employee	45.2					
	Total	**265.2**	**Total**	**131.8**	**Total**	**62.5**	**459.5**
Paid by Port Metro Vancouver	Gross Revenue Charge	3.5					
	Total	**3.5**	**Total**	**0.0**	**Total**	**0.0**	**3.5**
	Grand Total	**268.7**	**Grand Total**	**131.8**	**Grand Total**	**62.5**	**463.0**

Note:
- Tax contribution estimates are based on 2010 tax codes.
- The property taxes are estimated based on the ratio of property taxes to direct person years of employment.
- Gross Revenue Charges are estimated based on the following assumptions: total revenues are estimated to increase 5% per annum; total gross revenue charges are estimated to be 3% of total revenues; and, the container portion of gross revenue charges is estimated to be 40%, as per PMV.
- Amounts presented are in 2011 dollars.

Figure 6-8: Annual Government Revenue Contributions of Container Traffic at Port Metro Vancouver, 2030 (in 2011 dollars)

SUMMARY OF GOVERNMENT REVENUE CONTRIBUTIONS FROM PMV CONTAINER ACTIVITY - 2030

	Federal		Provincial		Municipal		All Gov'ts
	Tax	Amount ($m)	Tax	Amount ($m)	Tax	Amount ($m)	Amount ($m)
Paid by Employers or Employees	Personal Income Tax	162.0	Personal Income Tax	58.7	Property Tax	93.2	
	Corporate Income Tax	47.3	Corporate Income Tax	15.5			
	EI - Employer	30.2	WCB	23.5			
	EI - Employee	21.6	MSP	19.7			
	CPP - Employer	67.4	Property Tax	79.2			
	CPP- Employee	67.4					
	Total	**395.7**	**Total**	**196.7**	**Total**	**93.2**	**685.6**
Paid by Port Metro Vancouver	Gross Revenue Charge	5.8					
	Total	**5.8**	**Total**	**0.0**	**Total**	**0.0**	**5.8**
	Grand Total	**401.5**	**Grand Total**	**196.7**	**Grand Total**	**93.2**	**691.4**

Note:

- Tax contribution estimates are based on 2010 tax codes.
- The property taxes are estimated based on the ratio of property taxes to direct person years of employment.
- Gross Revenue Charges are estimated based on the following assumptions: total revenues are estimated to increase 5% per annum; total gross revenue charges are estimated to be 3% of total revenues; and, the container portion of gross revenue charges is estimated to be 40%, as per PMV.
- Amounts presented are in 2011 dollars.

Appendix A: Calculation of Person Hours per Year

The following are details of calculations for the average number of hours per person year (PY).

Table A-1: Person Hours per Year

Calculation of person hours per year:

	365	days per year
Less:	(104)	weekend days
	(11)	legal holidays
	(15)	average vacation days
	(6)	sick leave
	229	days per person year
	* 8	hours per work day

1,832 hours per person year

Workdays vary anywhere from 6.5 to 8 hours; however, in order to be conservative, an 8 hour workday was assumed.[17] Similarly, numbers of vacation and sick leave days may also vary.

[17] Essentially, we are using a measure of paid hours per year. Using a measure of productive hours per year with 6.5 hour workdays (8 hours less 1 hour for lunch less two 15 minute work breaks) would give 1,489 hours per person year. Using this lower figure would result in inferring a greater number of person years from seasonal and part-time jobs. Using the 1,840 figure, we infer a lower number of person years.

Appendix B: Total Annual Direct Person Years per Job Function

The following are details on the total annual direct person years per job function.

Table B-1: Total Annual Direct Person Years per Job Function

Job Function	Annual Direct Person Years			
	2010	2015	2020	2030
Canada Customs and OGA	274.2	383.4	483.9	722.0
Chandlering	6.3	8.8	11.2	16.7
Customs Brokers	395.4	553.0	697.9	1,041.3
Freight Forwarders	790.8	1,105.9	1,395.8	2,082.7
Terminal, Longshoremen & Foremen	1,982.7	2,772.6	3,499.3	5,221.4
Harbour Pilots	5.9	8.3	10.4	15.5
Rail	3,962.9	5,541.7	6,994.2	10,436.1
Shipping Agents	182.7	255.5	322.4	481.1
Transport Canada Inspections	1.7	2.4	3.0	4.4
Trucking	1,739.0	2,431.8	3,069.2	4,579.5
Tugs	6.7	9.4	11.9	17.8
Warehouses/ CFSs	1,602.8	2,241.4	2,828.8	4,220.9
Total	***10,951.1***	***15,314.1***	***19,328.0***	***28,839.3***

Notes: Data and analysis is based on primary research conducted by InterVISTAS Consulting Inc.

Appendix C: Comparison of 2008 and 2011 Study Methodologies

Inter*VISTAS* completed a full economic impact study for Port Metro Vancouver in 2008, after the three Lower Mainland port authorities amalgamated to form Port Metro Vancouver. This included an assessment of the economic impact of container activity in 2008. Below is a brief discussion of the differences in the economic impact multiplier results from the 2008 economic impact study and the current 2011 study.

The differences in the multiplier (indirect and induced) impacts in the 2008 and 2011 studies can be explained by the following:

- Note that two different methodologies were used in determining total employment related to moving containers through Port Metro Vancouver.
  - In **2008**: Employment related to container activity was estimated by applying the percentage share of container traffic at the port to total PMV employment.
  - In **2011**: Employment related to container activity was estimated through a detailed analysis of average annual hours per job function necessary in handling containers.
- Since the **2008** analysis is based on the share of total PMV employment, the analysis includes multipliers for a wide range of industries (such as manufacturing, retail, etc.), while the **2011** analysis includes multipliers for the specific job functions involved in container movements only (such as shipping, rail, trucking, etc.). The use of different multipliers also affects the indirect and induced impacts.
- The differences can also be explained by the changes in the multipliers themselves over the last three years. In **2008**, the multipliers used for the analysis were based on Statistics Canada economic multipliers for British Columbia from the 2004 Interprovincial Input-Output model, the most recently available at that time. In **2011**, the most recently available multipliers used for the analysis are based on Statistics Canada economic multipliers for British Columbia from the 2007 Interprovincial Input-Output model. The multipliers were updated with Consumer Price Indices to account for inflation in both the 2008 and the 2011 studies.

Prepared by
Inter*VISTAS* Consulting Inc.

Airport Square – Suite 550
1200 West 73rd Avenue
Vancouver, BC
Canada V6P 6G5

Telephone: 604-717-1800
Facsimile: 604-717-1818
www.intervistas.com