
***Waterfront
Toronto***
Peer Review of
urbanMetrics
Report Dated
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Contents

1. Introduction	1
1.1. Background	1
1.2. Study Objectives	1
1.3. Scope of Review	1
1.4. Limitations	1
2. Summary of Findings	2
3. Summary of the UM Report	4
4. Methodology	6
4.1. Economic Impact Analysis	6
4.2. PwC Review Approach	7
5. PwC Review	7
5.1. Model Calibrations	7
5.1.1. Model Basis	8
5.1.2. Toronto-Level Estimates in the UM Report	8
5.1.2.1. Choice of Toronto Region borders	9
5.1.2.2. Methodology Used to Localize the Provincial Input-Output Model to Toronto	9
5.2. Estimated Expenditures	10
5.2.1. Estimation and Industry Coding of Revitalization Projects Expenditures	10
5.2.2. Estimation and Industry Coding of Port Lands Future Development Expenditures	12
5.3. Tax and Discount Rate Assumptions	13
5.3.1. Government Revenues and Taxes	14
5.3.2. Discount Rates	14
5.4. Interpretation of Results	16
5.4.1. Economic Impact Multiples	16
5.4.2. Additional Impacts	16
6. Summary	17
Appendix A: Sources Relied Upon	18

1. Introduction

1.1. Background

We understand that the Toronto Waterfront Revitalization Corporation (“Waterfront Toronto”) has a mandate to oversee and manage the revitalization of Toronto’s waterfront and has been engaged in these activities since 2001.

We further understand that Waterfront Toronto previously retained urbanMetrics Inc. (“urbanMetrics”) to evaluate the economic impact of Waterfront Toronto’s planned revitalization investment between 2014 and 2023 (the “Revitalization Projects”), as well as expected future private sector construction investment and development expected to occur between 2015 and 2041. These private sector investments would become possible as a result of Waterfront Toronto’s investments in flood protection and enabling infrastructure in the Port Lands (the “Port Lands Future Development”). urbanMetrics analysis of the economic impacts of these projects is set out in a report dated July 10, 2014 (the “UM Report”).

1.2. Study Objectives

We have been retained by the Waterfront Toronto to conduct a peer review of the UM Report as part of Waterfront Toronto’s due diligence and planning for the Revitalization Projects.

In particular, we have been asked to analyse the UM Report and to provide our comments regarding:

- urbanMetrics’ calibrations of its proprietary input-output model (the “UM Model”);
- Estimated expenditures and industry categorization used to estimate economic impacts for the Revitalization Projects and Port Lands Future Development;
- Assumptions used in analysing the economic impacts; and
- Interpretation of the economic impact model’s results.

1.3. Scope of Review

A complete list of the documents and sources we have reviewed is listed in **Appendix A**.

1.4. Limitations

Data limitations: PwC has relied on the information provided by Waterfront Toronto regarding the magnitude, composition, and timing of the Project’s expenditures. PwC has also relied upon the completeness, accuracy, and fair presentation of all information and data obtained from Waterfront Toronto and urbanMetrics as well as the various sources set out in Appendix A, which were not audited or otherwise verified by PwC. The findings in this report are conditional upon such completeness, accuracy, and fair presentation, which have not been verified independently by PwC. Accordingly, we provide no opinion, attestation or other form of assurance with respect to the results of our review.

Receipt of new data or facts: PwC reserves the right at its discretion to withdraw or make revisions to this report should we receive additional data or be made aware of facts existing at the date of the report that were not known to us when we prepared this report. The findings are as of October 2015 and PwC is under no obligation to advise any person of any change or matter brought to its attention after such date, which would affect our findings.

Input-output analysis: Input-output analysis (a model used to estimate GDP and employment footprint) has some inherent limitations. It does not address whether the inputs have been used in the most productive manner or

whether the use of these inputs in this industry promotes economic growth by more than their use in another industry or economic activity. Nor does input-output analysis evaluate whether these inputs might be employed elsewhere in the economy if they were not employed in this industry at the time of the analysis. Input-output analysis calculates the direct, indirect and induced economic impacts that can reasonably be expected to affect the economy based on historical relationships within the economy. This analysis does not take into account fundamental shifts in the relationships within the economy that may have taken place since the estimation of multipliers by Statistics Canada, nor shifts that may take place in the future.

Use limitations: Our report was prepared for the use the Waterfront Toronto. We have agreed that Waterfront Toronto may provide copies of our report to its direct stakeholders; namely: Federal Government, Ontario Government and the Municipality of Toronto. Should Waterfront Toronto wish to distribute our report to other third parties, it will require the written permission of PwC. Any use that a stakeholder (including named stakeholders above) or other third party makes of this report or reliance thereon, or any decision made based on it, is the responsibility of such stakeholder or third party. PwC accepts no responsibility for damages, if any, suffered by any stakeholder or third party as a result of decisions made or actions taken, based on this report.

This report related analysis must be considered as a whole: Selecting only portions of the analysis or the factors considered by us, without considering all factors and analysis together, could create a misleading view of our findings. The preparation of our analysis is a complex process and is not necessarily susceptible to partial analysis or summary description. Any attempt to do so could lead to undue emphasis on any particular factor or analysis.

2. Summary of Findings

In general, we find that the methodology used by urbanMetrics in the UM Report to measure economic impact of the Revitalization Projects and Port Lands Future Development to be reasonable. However, as summarized in the following table, the application of some aspects of this methodology could be improved and provide more insight to stakeholders.

Table 1: Summary of Our Findings

	Section Reference	PwC Comment
Model Calibrations		
Model Basis	5.1.1	The UM Model is based on Statistics Canada’s input-output accounts for 2001 despite 2010 accounts being available at the date of the report. This is inconsistent with best practices and may lead to inaccurate results. Our preliminary, high-level review appears to suggest that the use of 2001 data may have led to an overstatement of economic impacts, but given our scope we are not able to calculate the quantum of such overestimate.

	Section Reference	PwC Comment
Localization to Toronto	5.1.2	The UM Report likely overstates the economic impact on at the Toronto level because <i>i)</i> the localization methodology it uses, although it is widely used, has been found in various academic studies to overstate local multipliers, and <i>ii)</i> using the City of Toronto as the region for adjusting the model may not appropriately capture that fact that many people working in Toronto commute into the City and likely take their earnings home with them to spend outside city borders. We note that the economic output estimates that the UM Report presents at the Ontario and Canada level are unaffected by these comments

Estimated Expenditures

Revitalization Projects Expenditures	5.2.1	The UM Report only coded expenditures for the Revitalization Projects to six industries. However, these industries account for more than 95% of Waterfront Toronto’s historical expenditures which, in our view, is sufficiently comprehensive. Additionally, the allocation of expenses across industries appears reasonable based on more detailed budgets that Waterfront Toronto had prepared previously with urbanMetrics.
Port Lands Future Development Expenditures	5.2.2	The UM Report only codes expenditures for the Port Lands Future Development to three industries. However, these industries appear reasonable for the purposes of a high-level analysis. The estimated construction costs may understate actual construction costs given the geotechnical characteristics of the land under development, which likely leads to an underestimation of the economic impact of these development expenditures.

Taxes and Discount Rate Assumptions

Government Revenues and Taxes	5.3.1	The UM Model assumes personal income tax rates that prevailed in 2001 and corporate income tax rates as they were in 2003. Overall in Canada, the ratio of government revenues to GDP has declined by 4 percentage points from 42% to 38%. This suggests that the UM Report may have overstated expected government revenues. For illustration purposes, a 4 percentage point adjustment to the UM Model will result in a reduction of total government revenues for the initial phase of investment by Waterfront Toronto of approximately \$75 million, and approximately \$200 million for the Port Lands.
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	Section Reference	PwC Comment
Discount Rates	5.3.2	The UM Report overstates the value of future economic impacts by not incorporating a discount rate into its estimates. A preliminary sensitivity analysis shows that the incorporation of a discount rate has a significant impact. For example, a discount rate of 4.0% reduces the present value of the GDP generated by the Revitalization Projects to 82.7% of its undiscounted value, and that generated by the Port Lands Future Development to 59.3% of its undiscounted value.
Interpretation of Results		
Economic Impact Multiples	5.4.1	Based on a high-level review, the UM Report may be overstating the economic impacts of the Revitalization Projects and Future Port Lands Development, but, given our scope, we are not able to quantify this.
Additional Impacts – Waterfront Investments	5.4.2	The UM Model does not capture long-term benefits, nor potential short-term supply and demand imbalances. There may be some risk that the Revitalization Projects and Future Port Lands Development would exacerbate expected shortages in certain skilled trades, leading to cost inflation and delays. However, these shortages may not materialize if, for example, skilled workers migrate to Toronto from other regions in Canada such as Western Canada.

3. Summary of the UM Report

The UM Report states that it was commissioned by Waterfront Toronto to conduct “an analysis of the economic impacts generated by the corporation’s planned investment program over the next ten years,” and that the report was “the latest in a series of assessments of the direct, indirect and induced impacts of Waterfront Toronto’s revitalization investment.”¹

The UM Report analyzed the economic impact of two sets of projects:

1. Planned expenditures of Waterfront Toronto’s proposed investment program to be carried out between 2014 and 2023 (i.e., the Revitalization Projects);² and
2. “a high-level summary of the potential economic impacts that could ultimately be generated by new construction in the Port Lands between 2015 and 2041” (i.e., the Port Lands Future Development).³

¹ UM Report, p.1.

² UM Report, p.2.

The UM Report states that the economic impact of the Port Lands Future Development was analyzed because “much of the future capital spending included in the Waterfront Toronto 2.0 plan relates specifically to unlocking the significant development potential of the Port Lands area.”⁴

In conducting each of these economic impact analyses, the UM Report followed a similar process:

- First, urbanMetrics developed a set of expenditure inputs based on planned or expected future expenditures informed by Waterfront Toronto’s historical expenditure, their budgets and plans, as well as urbanMetrics’ experience.⁵
- Second, urbanMetrics used its proprietary input-output model (i.e., the UM Model) to estimate the economic impact these projects would have on gross output, value added (or GDP), labour income, employment, and taxes.⁶

We understand that the UM Model is based on the input-output accounts released by Statistics Canada, and models economic impacts on three different levels: municipal level (City of Toronto), provincial level (Ontario), and national level (Canada).⁷

Summaries of the UM Report’s economic impact estimates for the Revitalization Projects and the Port Lands Future Development are set out in **Table 2** and **Table 3**, respectively.

Table 2: Summary of UM Report’s Total Estimated Economic Impacts of Waterfront Toronto’s Revitalization Projects Direct Investments, 2014-2023, by Geography⁸

	Toronto	Ontario	Canada
Gross Output	\$2,524 million	\$2,823 million	\$3,856 million
Value Added (GDP)	\$1,192 million	\$1,347 million	\$1,902 million
Employment	11,328	12,682	17,429
Labour Income	\$685 million	\$753 million	\$996 million
Total Taxes	\$472 million	\$526 million	\$724 million

³ UM Report, p.38.

⁴ UM Report, p.38.

⁵ UM Report, pp. 20-24 and 38-40.

⁶ UM Report, pp. 25-29 and 38-40.

⁷ Note that these three levels of economic impact estimates are not cumulative, but rather Canada includes the economic impact in Ontario and all other provinces and territories, and Ontario includes the economic impact in Toronto and all other cities and regions within the province.

⁸ UM Report, pp.31-33. Includes direct, indirect, and induced impacts.

Table 3: Summary of UM Report’s Total Estimated Economic Impacts of Expected Port Lands Future Development, 2015-2041, by Geography⁹

	Toronto	Ontario	Canada
Gross Output	\$6,968 million	\$7,780 million	\$10,614 million
Value Added (GDP)	\$3,428 million	\$3,854 million	\$5,387 million
Employment (FTEs)	34,584	38,319	51,451
Labour Income	\$1,977 million	\$2,163 million	\$2,830 million
Total Taxes	\$1,322 million	\$1,473 million	\$2,019 million

PwC’s review of the methodological approach taken by the UM Report and the assumptions made are discussed in **Section 5** below.

4. Methodology

4.1. Economic Impact Analysis

The fundamental philosophy behind economic impact analysis is that spending on goods and services has attendant impacts throughout the economy. For example, a construction project will generate demand for inputs (e.g., labour and concrete) that in turn generate additional demand extending beyond the initial spending.

The typical starting point for modelling economic impacts are the input-output accounts released by Statistics Canada. These input-output accounts contain information on the relationships between industries at a particular point in time, and show how expenditures flow through the economy. Using these input-output accounts, it is possible to calculate “multipliers” that estimate this cascading effect of expenditures throughout the economy.

The resulting economic impacts of a particular “demand shock” for a given good or service are usually estimated using the following measures of economic activity:

- **Output** – the total gross value of goods and services produced, measured by the price paid to the producer. Output double counts the value of intermediate inputs and so GDP is usually a preferable measure of economic activity.
- **Value added or GDP** – the value added to the economy, or the unduplicated total value of goods and services. GDP includes only final goods to avoid double counting of products sold during a certain accounting period.
- **Employment** – the number of jobs created or supported. It is expressed as the number of full-time equivalent (“FTE”) jobs indicated in person years.
- **Government Revenues or Taxes**– the amount of tax revenues generated from taxes on products (e.g. trading profits, gas tax, sales taxes, and excise taxes), production (e.g., property taxes), and income generated by individuals and corporations.

⁹ UM Report, p.42. Includes direct, indirect, and induced impacts.

These economic impacts are typically estimated at the direct, indirect and induced levels:

- **Direct impacts** result from a project’s spending on suppliers and employees.
- **Indirect impacts** arise from the activities of the firms providing inputs to a project’s suppliers (in other words, the suppliers of its suppliers).
- **Induced impacts** are the result of consumer spending by employees of the businesses stimulated by direct and indirect expenditures.

The economic impacts resulting from the input-output analysis described above are inherently static, and therefore do not address economic impacts that may occur as part of markets’ dynamics over the longer term. In particular, the input-output analysis does not address issues such as:

- The supply and demand balance for the required inputs in the subject region;
- Potential alternative uses for resources required for the subject project;
- Impact of the subject project on the cost of inputs;
- Potential benefits to the region of factors such as new skills and technology arising from the subject project that could to attract future investments; and
- Potential demographic shifts.

4.2. PwC Review Approach

Our review of the UM Report has consisted of discussions with Waterfront Toronto and urbanMetrics regarding the preparation of the UM Report, as well as independent research and analysis. The scope of this review has been limited to a high-level analysis of the reasonableness of the UM Report’s expenditure inputs, model assumptions, and conclusions.

In conducting our review, we have focused on the following analyses:

- urbanMetrics’ input-output model calibration (**Section 5.1**);
- Estimated expenditures and industry categorization (**Section 5.2**);
- Tax and discount rate assumptions (**Section Error! Reference source not found.**); and
- Interpretation of the economic impact model’s results (**Section 5.4**).

5. PwC Review

5.1. Model Calibrations

Developing a model from the Statistics Canada input-output accounts requires calibrating the model to best reflect its intended use. In this case, the intended use is to estimate the economic impact of the Revitalization Projects from 2014 to 2023 and the Port Lands Future Development from 2015 to 2041 at the national, provincial and city levels.

In reviewing the calibration of the UM Model we have focused on the appropriateness of the following:

- The input-output accounts that form the basis of the UM Model (**Section 5.1.1**); and

- The methodology used to localize the input-output multipliers of Ontario to estimate economic impacts in Toronto (**Section 5.1.2**).

5.1.1. Model Basis

The UM Model was developed for an earlier report dated June 12, 2009, and is based on Statistics Canada's national and provincial input-output accounts for 2001.¹⁰

Because the input-output accounts are a snapshot of the relationships between industries at a particular point in time (2001 in this case) and these relationships can change over time, it is best practice to use the most recently released input-output accounts to model the economic impact of a future project.

Statistics Canada released 2010 national and provincial input-output accounts in February 2014, several months before the date of the UM Report.¹¹ However, the UM Model continued to be based on the 2001 input-output accounts. We also understand that the UM Model incorporated personal income tax rates from 2001, and corporate tax rates from 2003.¹²

The use of a 2001 model where a 2010 model was available is not best practice and may lead to inaccurate calculations.¹³ We have attempted to estimate the impact of the use of an outdated model on the results presented in the UM Report. Our ability to do so was limited by our mandate and the fact that we were not provided copy of the model that urbanMetrics used. Given these limitations, we have conducted a preliminary, high-level review of the multipliers showing in the UM Report. This review appears to suggest that the use of 2001 input-output accounts instead of those from 2010 has led to an overstatement of the economic impact results of the Revitalization Projects and Port Lands Future Development. In this regard, we note that since 2001 productivity growth in the construction industry has been significantly lagging productivity growth in the overall economy, which may have led to a decline in construction economic multipliers over time¹⁴. The UM Model is also likely overstating government tax revenues due to significant changes in the corporate tax rates since 2003 is discussed further in **Section 5.3.1** below.

We caution that only a full application of the 2010 model would provide a definitive answer in this regard.

5.1.2. Toronto-Level Estimates in the UM Report

We note that the comments in **Sections 5.1.2.1** and **5.1.2.2** apply only to the economic impact results at the Toronto level; the economic output estimates that the UM Report presented at the Ontario and Canada level are unaffected by these comments.

¹⁰ urbanMetrics' Responses to Information Request, p.3 (*"the urbanMetrics model is based on input-output data obtained from Statistics Canada System of National Accounts. These tables serve as the foundation of the model and are specifically used to derive the multipliers applicable to each industry category, based on historic data relating to economic flows between 62 industrial classifications."*); urbanMetrics' Responses to Follow-Up Questions, Q1 (*"The model for this particular assignment was originally developed and refined in 2008-2009 (i.e., the date of the first economic impact analysis completed by urbanMetrics on behalf of Waterfront Toronto).""); and Email from Chris White of urbanMetrics dated September 29, 2015 (*"The input-output tables used for this particular model were based on 2001 data from Statistics Canada, representing the date of inception for Waterfront Toronto."*).*

¹¹ Release Dates of Provincial Input-Output Tables, Statistics Canada, <http://www5.statcan.gc.ca/olc-ocel/olc.action?ObjId=15F0042X&ObjType=2&lang=en&Limit=1>.

¹² Email from Chris White at urbanMetrics dated September 29, 2015.

¹³ We understand from urbanMetrics that the 2001 model continued to be used for consistency with previous analyses.

¹⁴ Based on a presentation by Professor Brenda McCabe, Department of Civil Engineering, University of Toronto titled: "Productivity in the Construction Industry: Concepts, Trends, and Measurement Issues", output per employee for all industries increased by approximately 25% compared to close to no growth in the construction industry.

5.1.2.1. Choice of Toronto Region borders

Statistics Canada releases input-output accounts at national and provincial levels, but they do not produce these accounts for sub-provincial areas such as the city of Toronto. As a result, the estimation of economic impacts at the Toronto level (as is done in the UM Report), requires the application of adjustments to the provincial accounts.

The UM Model estimates economic impacts for Toronto using information based on the municipal borders (i.e., the City of Toronto), as opposed to a broader region such as the Greater Toronto Census Metropolitan Area.¹⁵

Use of the City of Toronto as the region for adjusting the model may not appropriately capture the fact that employees may be coming from outside of the municipal borders (thus taking their earnings home with them). For example, the 2006 Census reported that across all industries, the number of people working in the City of Toronto is approximately 20% higher than the number of workers living there (a net gain).¹⁶

Assuming, as the UM Report does, that all direct employment will be from Toronto (and not regions outside the municipal boundaries) is likely leading to an overestimation of the induced economic impact at the Toronto level.

5.1.2.2. Methodology Used to Localize the Provincial Input-Output Model to Toronto

As discussed in the previous section, since Statistics Canada does not produce input-output accounts at sub-provincial levels, estimating economic impacts at the Toronto level requires the application of adjustments to the Ontario input-output model.

The UM Report uses the simple location quotient (“SLQ”) methodology to adjust the provincial input-output accounts to the Toronto level.¹⁷ The SLQ methodology is a member of a broader set of location quotient methodologies that are commonly used to localize economic impacts.

The UM Report’s application of the SLQ methodology uses *“the ratio of employment in each industry at the local level to total local employment, divided by the comparable share at the Provincial level. In particular, this historical employment data was used to depict the general relationship between Toronto and Ontario and estimate the portion of Ontario economic impacts that can reasonably be expected to accrue within the City of Toronto.”*¹⁸

Research has shown that though the SLQ method is widely used, it generally overestimates regional multipliers, and therefore economic impacts. However, the quantum of this overestimate is case-specific.¹⁹ Alternative

¹⁵ urbanMetrics’ Responses to Information Request, p.4 (*“The impacts associated with Toronto relate to the City of Toronto proper and do not represent regional impacts spread more broadly throughout the Greater Toronto Area. These broader impacts were considered at the provincial and federal levels in our analysis.”*).

¹⁶ *Distribution of workers by their place of work and their place of residence, 2001 and 2006*, Statistics Canada, <http://www12.statcan.ca/census-recensement/2006/as-sa/97-561/table/t9-eng.cfm>.

¹⁷ urbanMetrics’ Responses to Information Request, p.3 (*“The model used for all of our Waterfront Toronto economic impact assignments was also customized to calculate ‘local’ impacts representative of the Toronto economy using location quotients for each industry group. These location quotients were calculated using the ratio of employment in each industry at the local level to total local employment, divided by the comparable share at the Provincial level. In particular, this historical employment data was used to depict the general relationship between Toronto and Ontario and estimate the portion of Ontario economic impacts that can reasonably be expected to accrue within the City of Toronto.”*).

¹⁸ urbanMetrics’ Responses to Information Request, p.3.

¹⁹ Flegg, A. and T. Tohmo, (2011), *Regional Input-Output Tables and the FLQ Formula: A Case Study of Finland*, ERSA conference papers, European Regional Science Association, pp.6-9. The article cites two empirical studies that found that the average overestimate of the SLQ method to be between 15% and 17%, while a Monte Carlo approach showed that the overestimate could be as much as 40%.

regionalization methods that adjust the SLQ and better account for inter-regional trade are available and require additional computation.

In addition to the SLQ methodology, the UM Model makes an adjustment to the estimated number of jobs supported by expenditure at the Toronto level by applying an 89% deflation factor.²⁰ This adjustment reduces the estimated number of jobs supported by a given level of income and was done to reflect the higher level of salaries that have historically been earned by workers in Toronto relative to the province as a whole.

The UM Report's use of an 89% employment deflation factor appears to be consistent with the current difference between median wages for construction labour in Toronto compared to the rest of the province.²¹

PwC has not been provided with the UM model for the purposes of sensitivity testing and therefore cannot comment further on the extent to which alternative regionalization methods would affect the Toronto-level results of the UM Report.

5.2. Estimated Expenditures

For the purposes of this report, we have assumed that the information provided to UM by Waterfront Toronto was complete and accurate. The impact of any changes to expenditure expectations since the date of the UM Report have not been considered.

In reviewing the UM Model inputs, we have focused on the appropriateness of the following:

- The coding used in the UM Report to assign expenditures related to the Revitalization Projects to particular industries (**Section 5.2.1**); and
- The constructions costs underlying the UM Report's estimated Port Lands Future Development expenditures and the coding used to assign these expenditures to particular industries (**Section 5.2.2**).

5.2.1. Estimation and Industry Coding of Revitalization Projects Expenditures

We understand that Waterfront Toronto provided urbanMetrics' with budgets and expenditure plans for the Revitalization Projects,²² and that urbanMetrics allocated these expenditures to six NAICS (North American Industry Classification System) categories based "*discussions with Waterfront Toronto staff and the historical spending distribution for similar items/projects for which more detailed budget information was available.*"²³ **Table 4** below provides a summary of the allocation made by urbanMetrics.

²⁰ urbanMetrics' Responses to Information Request, p.3 ("*Certain adjustments relating to labour income impacts were also made to ensure that the model outputs were comparable to known salary information for Toronto (e.g., total labour income / total employment = average salary for each industry category identified). These adjustments were made by deflating the employment outputs by a pre-determined factor, thereby increasing the estimated income generated per full-time employee to a level closer in line with historic Toronto salaries.*"); and urbanMetrics' Responses to Follow-Up Questions, Q2 ("*Specifically, we applied a factor of 0.89 (or 89%) to deflate the raw employment outputs, thereby increasing the average income per full-time equivalent. This factor was applied equally across all industry categories and was intended to represent an average for the entire City of Toronto.*").

²¹ Wage Report for Construction Trades Helpers and Labourers (NOC 7611-D), Government of Canada Job Bank, retrieved September 27, 2015, http://www.jobbank.gc.ca/LMI_report_bynoc.do?&noc=7611&reportOption=wage.

²² UM Report, p.25.

²³ urbanMetrics' Responses to Information Request, pp.1-2.

Coding expenses to only six major NAICS categories is a simplification. However, given that these six NAICS categories represent more than 95% of Waterfront Toronto’s historical expenditures,²⁴ this assumption likely does not have a significant impact on the UM Report’s conclusions.

Table 4: Revitalization Projects Expenditures by Industry, 2014-2023²⁵

Industry Category (NAICS 2007)	Expenditures ('000)	Percentage
Construction	\$1,377,950	83.5%
Professional, Scientific and Technical Services	\$201,900	12.2%
Government Sector	\$30,175	1.8%
Information and Cultural Industries	\$7,425	0.5%
Finance and Insurance, and Rental and Leasing	\$31,800	1.9%
Utilities	\$750	0.0%
Total	\$1,650,000	100.0%

The UM Report’s allocation of the Revitalization Projects’ expected expenditures among industries in Table 4 above shows that a much higher proportion of planned expenditures relate to construction than has historically been the case for Waterfront Toronto, as seen in **Table 5** below. We understand that this reflects the continued progress of Waterfront Toronto’s revitalization efforts from the conceptualization and design stages to implementation and construction of many of its projects.²⁶ The allocations in Table 4 are also consistent with the allocation of expenses for similar projects for which Waterfront Toronto had completed more detailed budgets.²⁷

²⁴ urbanMetrics’ Responses to Information Request, p.8.

²⁵ UM Report, p.23.

²⁶ UM Report, p.22.

²⁷ urbanMetrics’ Responses to Information Request, p.8, Figure A-2.

Table 5: Waterfront Toronto Historical Expenditures by Industry, 2001-2013²⁸

Industry Category (NAICS 2007)	Expenditures 2001-2013 ('000)	Percentage
Construction	\$468,807	37.2%
Professional, Scientific and Technical Services	\$346,295	27.5%
Finance, Insurance, Real Estate and Renting and Leasing	\$210,314	16.7%
Government Sector	\$139,217	11.1%
Utilities	\$37,328	3.0%
Information and Cultural Industries	\$3,191	0.3%
All Other Industries	\$53,998	4.3%
Total	\$1,259,150	100.00%

5.2.2. Estimation and Industry Coding of Port Lands Future Development Expenditures

We understand that the UM Report's estimated expenditures related to the Port lands Future Development are based on assumptions as to the expected level of construction provided by Waterfront Toronto, and construction costs estimated by urbanMetrics.²⁹

Table 6: Port Lands Future Development Expenditures by Industry, 2015-2041³⁰

Industry Category (NAICS 2007)	Expenditures ('000)	Percentage
Construction (Building Construction)	\$3,183,214	70.0%
Professional, Scientific and Technical Services (Soft Costs)	\$1,045,913	23.0%
Government Sector (Development Charges and Application Fees)	\$318,321	7.0%
Total	\$4,547,448	100.0%

We understand that the construction costs assumed in the UM Report for the future development phase of the Port Lands are based on general rates for the GTA obtained from the Altus Construction Cost Guide for 2014.³¹ The

²⁸ urbanMetrics' Responses to Information Request, p.8, Figure A-1.

²⁹ urbanMetrics' Responses to Information Request, p.5 (“The level of construction activity identified for the Port Lands was based exclusively on development forecasts provided by Waterfront Toronto and as summarized in Figure 5-1 of our report.”); and UM Report, p.40 (“Building construction costs estimated based on cost per square foot factors from the 2014 Altus Construction Cost Guide, as well as urbanMetrics estimates. It has generally been assumed that building construction will account for approximately 70% of the total construction costs, while the related soft costs and development charges/application fees will account for 23% and 7% of the total construction costs, respectively.”).

³⁰ UM Report, p.40.

ranges from the Altus Construction Cost Guide and the estimated costs per square foot are shown in **Table 7** below.

Table 7: Costs per Square Foot

UM Report Category	UM Report Estimate (\$/Sq. Ft) ³²	Altus Cost Guide Category ³³	Altus Cost Guide Range – Greater Toronto (\$/Sq. Ft) ³⁴
Residential	\$225	Residential Condominiums & Apartments: Medium Quality	\$190 – \$235
Office	\$175	Office Buildings: Under 5 Storeys / 5 – 10 Storeys	\$145 – \$235
Retail	\$150	Shopping Centres/Retail: Supermarket / Anchor / Outlet / Plaza	\$90 – \$180
Hotel	\$200	Hotel: Four-Star Full Service	\$210 – \$275

In general, the rates used in the UM Report appear to underestimate the costs involved because the geotechnical characteristics of the land under consideration are such that costs near the higher end of the ranges in the Altus Construction Cost Guide are likely more appropriate for the Office, Retail, and Hotel categories.

All else equal and ignoring our comments regarding over estimation of economic impact, this suggests that the UM Report has underestimated the economic impact of future development expenditures. We note that this comment does not apply to the initial phase of investment by Waterfront Toronto (i.e., the Revitalization Projects), but rather only to the expected subsequent Port Lands Future Development.

Regarding the coding the Port Lands Future Development expenses to particular industries, we understand that urbanMetrics assigned the estimated expenses to only three NAICS categories.³⁵ Given the nature of the expenses and the high-level nature of the UM Report’s analysis, this is not an unreasonable simplification. In addition, the split between construction, soft costs, and development charges and application fees is consistent with our experience and knowledge of the proposed future development.

5.3. Tax and Discount Rate Assumptions

We have reviewed the UM Model and its assumptions and have focused our comments on the appropriateness of the following:

³¹ UM Report, p.40.

³² UM Report, p.40. Calculated as Construction Costs divided by the Floor Area as shown in UM Report, Figure 5-1.

³³ Email from Chris White at urbanMetrics dated September 23, 2015.

³⁴ Construction Cost Guide 2014, Altus Group, p.5.

³⁵ urbanMetrics’ Responses to Questions, pp.5-6 (“*With respect to the construction related impacts of new development in the Port Lands, costs were assigned to specific NAICS codes based on our own assumptions and in particular our experience with similar development projects in other parts of Toronto (and beyond). In particular, the construction expenditures outlined in Section 5.1 of our 2014 study were allocated to three specific industry categories, which correspond directly to the three cost components identified as follows:*

- *Constructions Costs – Construction (NAICS Group 10);*
- *Soft Costs, Contingencies and Demolitions – Professional, Scientific and Technical Services (NAICS Group 43); and,*
- *Development Charges and Approval Fees – Other Municipal Government Services (NAICS Group 51)”.*

- The assumed government tax revenues (**Section 5.3.1**); and
- The absence of a discount rate (**Section 5.3.2**).

5.3.1. Government Revenues and Taxes

We understand that the UM model incorporates personal income tax rates from 2001 and corporate income tax rates from 2003.³⁶ Since that time there have been reductions in these tax rates such that the tax revenue estimates in the UM Report likely overstate expected tax revenues.

For example, the UM model assumes federal corporate income tax rates of 22% to 24%,³⁷ whereas the federal corporate income tax rate in 2014 was 15%.³⁸

Our initial analysis suggests that in Canada, government revenue as a percentage of GDP has declined from 42% to 38% between 2001 and 2015, i.e., a decline of approximately 4 percentage points.³⁹

For illustration purposes, we note that if the UM Report's estimates of government revenues as a percentage of GDP similarly declined by 4 percentage points, then total government revenues for the initial phase of investment by Waterfront Toronto would decline from \$724 million to \$638 million, and total government revenues for the Port Lands development phase would decline from \$2.0 billion to \$1.8 billion.

The above calculations are preliminary and are intended only to illustrate the potential magnitude of this particular comment.

5.3.2. Discount Rates

The UM Report does not incorporate any discount rate in its analysis of the economic impact of the expected future expenditures of the Revitalization Projects or the Port Lands Future Development.⁴⁰

Because some of the expenditures will not be realized until decades into the future and since there are risks and opportunity costs inherent in any project, it is appropriate to discount the estimated economic impact of the investment by Waterfront Toronto.

Determination of an appropriate discount rate is beyond the scope of this report. However, the following are three considerations to estimating a discount rate that are noted in economic literature:

- the cost of government debt;
- whether the proposed investment crowds out investment that would otherwise have occurred; and
- risks that circumstances will change such that the forecasted benefits would not materialize.

³⁶ Email from Chris White of urbanMetrics dated September 29, 2015 (“...the personal income tax rates used in this model are based on 2001 data...The commercial tax rates used in the model are based on 2003 data”).

³⁷ Email from Chris White of urbanMetrics dated September 29, 2015.

³⁸ Canada Revenue Agency, <http://www.cra-arc.gc.ca/tx/bsnss/tpcs/crprtns/rts-eng.html>.

³⁹ Government Revenue from CANSIM 385-0032 and GDP from CANSIM 380-0063.

⁴⁰ urbanMetrics' Responses to Information Request, pp.6-7 (“Although we recognize that there will always be some degree of inherent risk involved with investments of this magnitude, we have generally assumed for the purposes of this analysis that these risks can be appropriately mitigated by Waterfront Toronto and the planned investments will indeed be fully realized”).

For illustration purposes, we have conducted a sensitivity analysis of the present value of all investments contemplated in the UM Report using a range of discount rates from 1.5% to 4.0%, and assuming that the value of the each of the projects will accrue evenly across all years in the estimation window.

The high end of the discount rate range (4.0%) was estimated as a pre-tax real rate of return that is currently required by private investors in the construction industry. The low end of the discount rate range (1.5%) was estimated based on the average real long-term interest rate paid by the stakeholders of Waterfront Toronto on their debt.⁴¹ We note that the high end assumes that the subject proposed investment fully replaces other investments that could have been conducted by the private sector. The low end assumes no replacement of other investments and no risk to the realization of the benefits from the subject projects, thus the only opportunity cost is the cost of the stakeholders' debt. It is beyond the scope of our study to comment on where the appropriate discount rate may lie within this range.

As can be seen in Table 8 below, a discount rate of 1.5% has a relatively small impact on the present value of GDP, reducing the present value of total GDP as a percentage of the undiscounted GDP to 92.9% and 81.1% for the Revitalization Projects and the Port Lands Future Development, respectively. However, as shown in Table 9, a discount rate of 4.0% can have a significant effect, reducing the present value of total GDP as a percentage of the undiscounted GDP to 82.7% and 59.3% for the Revitalization Projects and the Port Lands Future Development, respectively. The effect of discounting is greater on the Port Lands Future Development because the time period is longer.

Table 8: Present Value of GDP of the Revitalization Projects (2014-2023) Using a Range of Discount Rates⁴²

	Toronto	Ontario	Canada	Discounted as % of Undiscounted
Undiscounted GDP	\$1,192 million	\$1,347 million	\$ 1,902 million	n.a.
PV of GDP Discounted @1.5%	\$1,107 million	\$1,251 million	\$1,767 million	92.9%
PV of GDP Discounted @4.0%	\$986 million	\$1,114 million	\$1,573 million	82.7%

⁴¹ The current real return on long-term Government of Canada bonds is 0.8% (Bank of Canada, <http://bankofcanada.ca/rates/interest-rates/canadian-bonds>). Yields for bonds from the Province of Ontario and Metropolitan Toronto are currently around 1% higher than yields for Government of Canada bonds of similar maturity, suggesting a real rate of return around 1.8% (see Bonds | Municipal Government, Report on Business <http://www.globeinvestor.com/servlet/Page/document/v5/data/bonds?type=muni>; and Canadian Bonds, Market Data <http://www.financialpost.com/markets/data/bondscanadian.html>). Averaging the bond yields for these three governments leads to an estimated real cost of borrowing of 1.5%.

⁴² Assumes that GDP accrues evenly across all years, 2014-2023, and assumes mid-year discounting.

Table 9: Present Value of GDP of the Port Lands Future Development (2015-2041) Using a Range of Discount Rates⁴³

	Toronto	Ontario	Canada	Discounted as % of Undiscounted
Undiscounted GDP	\$3,428 million	\$3,854 million	\$ 5,387 million	n.a.
PV of GDP Discounted @1.5%	\$2,781 million	\$3,127 million	\$4,371 million	81.1%
PV of GDP Discounted @4.0%	\$2,033 million	\$2,286 million	\$3,195 million	59.3%

5.4. Interpretation of Results

In reviewing the UM Report’s interpretations of the UM Model output, we have focused on the reasonableness of the following:

- The estimated economic impact multiples (**Section 5.4.1**); and
- Additional potential impacts beyond the static economic impact assessment (**Section 5.4.2**).

5.4.1. Economic Impact Multiples

Based on a high-level review, the GDP and Employment results of the UM Report’s economic impact study appear to be overstated, based on the reasons discussed in Sections 5.1 and 5.3.

5.4.2. Additional Impacts

As described in Section 4 above, the estimation of economic impact based only on input-output analysis does not capture potential dynamic effects that a particular investment will have on the economy.

The UM Report notes that there are several positive benefits unaccounted for through its analysis, such as increased tourism and permanent jobs associated with new businesses attracted to the revitalized waterfront.⁴⁴

We agree that the model does not capture these long-term benefits. However, the input-output model also does not capture potential short-term supply and demand imbalances that the contemplated expenditures may cause in the labour market and other inputs in Toronto and its resultant impact (e.g., shortages and cost inflation).

According to UM’s estimates, the Revitalization Projects will support approximately 7,000 direct full-time years of employment in Toronto during the 10 years of investment by Waterfront Toronto (i.e., on average 700 full-time jobs per year). This number of additional construction jobs is relatively small compared to a workforce of construction employees in Toronto of approximately 200,000,⁴⁵ and thus may not have a significant incremental impact on the supply and demand balance in Toronto. However, we caution that there is a currently a consensus

⁴³ Assumes that GDP accrues evenly across all years, 2015-2041, and assumes mid-year discounting.

⁴⁴ UM Report, p.37 (“For example, the capital expenditures made by Waterfront Toronto will generate not only long term capital spending by the private sector, but results in the creation of permanent jobs associated with the new businesses attracted to the water’s edge. Economic benefits will be created to the extent that these jobs are new to Toronto, Ontario and Canada. Furthermore, as a tourist destination, the capital projects produced by Waterfront Toronto will attract new visitor expenditures to the City, the Province and to Canada. These types of impacts were addressed in detail in the second and third phases of our Economic Impact Analysis (2001-2012) study of April 26, 2013”).

⁴⁵ Average construction labour force in the Toronto Economic Region, September 2014 to August 2015. Source: CANSIM Table 282-0124, Statistics Canada,

that construction activity in Toronto will increase significantly over the next few years,⁴⁶ and that there is a looming trade skill shortage in the construction industry.⁴⁷ If these forecasts materialize, it may lead to shortages in some construction trades, in which case the addition of the subject projects may exacerbate shortages in such trades and potentially in other inputs that are in short supply. This may lead to cost inflation and delays. On the other hand it is possible that construction workers who lost their jobs in Western Canada may migrate to Toronto to take advantage of these opportunities (assuming energy prices will not recover significantly over the next few years).

6. Summary

In general we find that the methodology used by urbanMetrics in the UM Report to measure economic impact to be reasonable. However, as discussed in this report, the application of some aspects of this methodology could be improved to provide more insight to stakeholders. In particular, we suggest that further attention be given to the potential impact of the following issues:

- Use of an outdated input-output model;
- Overstatement of economic benefits accruing to the City of Toronto;
- Overstatement of tax revenues;
- Consideration of a discount rate to reflect risk and opportunity costs; and
- The balance of supply demand in the markets of the required inputs.

Respectfully submitted,



Michael Dobner, Partner

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⁴⁶ *Economic Insights into 13 Canadian Metropolitan Economies – Toronto, Autumn 2015*, The Conference Board of Canada.

⁴⁷ See, for example: *Modernizing Ontario's Skilled Trades Apprenticeship and Training System*, Dawson Strategic (for Ontario Home Builders' Association), March 2015; *Survey: GTA to Lead Ontario Construction Growth in 2015 as Other Regions Express Less Certainty*, Ontario Construction Secretariat, March 3, 2015; "Would be Builders get to try out a trade," *The Globe and Mail*, April 17, 2015, retrieved October 13, 2015.

Appendix A: Sources Relied Upon

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2. urbanMetrics' Responses to Information Request.
3. Release Dates of Provincial Input-Output Tables, Statistics Canada, [http://www5.statcan.gc.ca/olc-
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4. Email from Chris White at urbanMetrics dated September 29, 2015.
5. *Distribution of workers by their place of work and their place of residence, 2001 and 2006*, Statistics Canada, <http://www12.statcan.ca/census-recensement/2006/as-sa/97-561/table/t9-eng.cfm>.
6. Flegg, A. and T. Tohmo, (2011), *Regional Input-Output Tables and the FLQ Formula: A Case Study of Finland*, ERSA conference papers, European Regional Science Association.
7. *Wage Report for Construction Trades Helpers and Labourers (NOC 7611-D)*, Government of Canada Job Bank, retrieved September 27, 2015, http://www.jobbank.gc.ca/LMI_report_bynoc.do?&noc=7611&reportOption=wage.
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11. *Labour Force Survey*, Average construction labour force in the Toronto Economic Region, September 2014 to August 2015, *CANSIM Table 282-0124*, Statistics Canada.
12. Government Revenue from CANSIM 385-0032 and GDP from CANSIM 380-0063.
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