



Land Development Financial and Economic Impact Analysis Model Methodology

August 2024 Update

Economic Development and Policy

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Section 1: Land Development Financial and Economic Impact Model Overview and Objectives

1. Model Overview

This document provides an overview of the City of Winnipeg's land development financial and economic impact model and includes details on the methodology and source of assumptions to be used in the model. The City of Winnipeg uses this model to evaluate the short and long-term implications that developing or intensifying land has on the City of Winnipeg's operating and/or capital budgets. It also includes the ability to estimate the impact land a land development may have on tax revenue for the provincial government of Manitoba and the Federal Government, along with the wider economy including economic output, gross domestic product (GDP), wages, and employment where applicable.

The needs and requirements of financial impact evaluations may evolve over time and as such, the methodology used by the model is subject to change in the future.

1.1. Model Objectives

Depending on the nature and composition of a proposed land development - whether it be greenfield residential development, employment lands, an intensified land use, or infill – each development may present its own unique set of capital and operating costs, along with revenue streams to local governments and impacts to the local economy.

The financial analysis of a proposal will provide two main outputs:

- **Constant Dollar and Net Present Value (NPV) Analysis:** this analysis contrasts municipal costs (capital, maintenance, and operating) to revenue associated with the development over a 75-year time horizon. Undiscounted cashflows are expressed in constant base year dollars (as determined by a municipal Fisher price index) whereas net present value analysis expresses the value of future cashflows in present value dollars by discounting future costs and revenues by the set discount rate.
- **Long-Term Economic Analysis:** this analysis measures how a proposed land development will impact the regional economy in terms of economic output, gross domestic product (GDP), employment, and wages, where applicable. It also provides the estimated impact it will have to municipal, provincial, and federal government revenues associated with a development at various time periods. For residential developments, this measures the property tax, utility fees, and other fees paid for by residents living in the development. For employment land developments, this includes measuring the property tax, utility fees, other fees, PST/GST, individual income tax, and corporate income taxes paid for by employees working in the development.

In general, for a development to be considered financially sustainable, its revenues should exceed its costs over the long term when looking at both undiscounted cashflows and net present value analysis.

Long term economic analysis can highlight how land development can provide varying revenue streams to all three levels of government and have different impacts on the local economy depending on factors such as the type of employment and structures that will be located on the land.

The financial and economic model relies on over 400 assumptions and over 20 equations, many of which are covered in additional detail found in the sections that follow.

1.2. Municipal Policy Alignment

The Land Development Financial Impact Model supports the goals and polices set forth in both OurWinnipeg and Complete Communities Direction Strategy 2.0 by being the primary tool used to analyze the financial sustainability and impact of land development by the City’s administration. Specifically, this tool relates to the following municipal polices adopted by council:

OurWinnipeg policy 6.7, which states the following¹:

“6.7 Fiscally Sustainable Growth: Ensure that growth is fiscally sustainable through approaches including financial tools; guidelines that outline the fair and equitable sharing of costs for servicing and the subdivision and development of land; fiscal impact analysis for new development; and collaboration with other levels of government on legislate and regulatory reform institutes, to enhance the authority of the City to collect revenue to finance land development.”

Complete Communities Direction Strategy 2.0 goal 3.3, which states the following²:

“3.3 Fiscal Impact Analysis: Where the City determines such analysis to be necessary, it may require proponents to submit a fiscal impact analysis to evaluate a development proposal’s financial implications to the City and to inform decision-making.

3.3.1: Review the City’s expectations for this analysis, including how the tool will be applied, in consultation with stakeholders.

3.3.2: Where a fiscal impact analysis is requested, the City may retain, at the proponent’s expense, a third-party qualified professional consultant to peer review the proponent’s analysis and provide independent conclusions and recommendations to the City.”

While Communities Direction Strategy 2.0 goal 3.3, allows for development proponents to procure and submit their own fiscal impact analysis at their own expense, and for the City administration to retain a third-party consultant to review said fiscal impact analysis also at the developer’s own expense, the City-developed and administered fiscal impact model may negate the need for either of those actions should the City administration and development proponent agree to the results produced by the City’s own fiscal impact model. To this end, the methodology, assumptions, and results of the City’s own land development fiscal impact model should be made available publicly to ensure accuracy, transparency, and consistency with best practices observed across the industry.

¹ City of Winnipeg, By-law 120/2020, *OurWinnipeg* (26 May, 2022), Policy 6.7 (pg. 32).

² City of Winnipeg, By-law 119/2020, *Complete Communities Direction Strategy 2.0* (26 May, 2022), Goal 3.3 (pg. 32).

1.3. Model Development History

In 2021, City Council identified the need to conduct a benefit-cost analysis of providing municipal servicing to the Airport Area West/CentrePort Canada development in the north-west quadrant of Winnipeg, adjacent to Winnipeg James Armstrong Richardson International Airport. Specifically, analysis was requested to better understand and contrast the capital and operating costs of providing municipal services (including the regional water and wastewater infrastructure) to the revenues associated with land development.

To fulfill this request, the administration developed a land development financial impact model that considered forecasted capital and operating costs along with tax and fee revenue over a 75-year time horizon to see if/when municipal revenues would exceed municipal expenses. The model also provided tax revenue estimates to all three levels of government at full build-out so to assist with tri-level funding agreements. Preliminary results were discussed with industry stakeholders and peer-reviewed by a third-party consultant. The final results of the study were published and made available to the public in January 2022 and can be found [here](#).

It was then suggested that the successful development and implementation of the financial analysis tool could be generalized such that future land developments could be analyzed in a fair, transparent, and consistent manner at no additional cost to the city administration or development proponents.

1.4. Model Peer Review

As part of the process for the Airport Area West fiscal impact study, the City engaged the third-party consultant Watson & Associates Economists Ltd. to provide objective feedback on the fiscal impact model built by the City Administration, and to recommend improvements to align with the industry's best practices observed across Canada. The results of Watson & Associates peer review can be found [here](#), and many of the recommend improvements have been implemented in generalized version of the City's land development fiscal impact model.

Section 2: Undiscounted Cashflow and Net Present Value (NPV) Methodology and Assumptions

2. Undiscounted Cashflow and Net Present Value Analysis

This section provides detail and guidance on how calculations are performed in the undiscounted cashflow/net present value (NPV) analysis. As stated in section 1, the objective of this analysis is to contrast the annual municipal costs to municipal revenues received from providing municipal services and infrastructure to a proposed land development. To do this, several inputs must be projected over the benefit time horizon of 75 years.

The intention of the model is to take the policy directions and decisions of the current council and apply them to the proposed development over the benefit time horizon such that the financial implications of the proposed development are reflective of current municipal policies and guidelines. This means that current adopted budgets and other financial metrics, capital financing conditions, levels of service standards, population and employment projections, and other economic statistics are cast forward over the analysis time horizon.

As the focus of the model is on analyzing specific land developments, fiscal analysis is strictly focused on cost and revenues directly attributable to the development. Revenues directly attributable to a development include property tax, frontage fees, utility fees, and businesses taxes. Further, expenses attributable to a development include required capital, maintenance, and general operating net of grants and own-source revenue. A summary of municipal revenues and expenditures used in this analysis are presented in tables 1A and 1B below.

Table 1A: Revenue Streams:³

Operating Entity	Revenue Stream
Tax-Supported Revenue	Municipal Property Taxes and Frontage Levies
	Permit Fees
	Business Tax
	Utility Dividends
Utilities	Water and Sewer Utility Fees
	Water Meter Fees
Transit	Transit Fare Revenue

Table 1B: Expenditure Streams³

Operating Entity	Expenditure Stream
Tax-Supported	Per-Capita Operating Costs net of grants and own-source revenue
	Incremental Operating Costs (if applicable)
	Road Lifecycle maintenance and snow clearing costs
	Capital Costs
Utilities	Water and Wastewater Treatment Costs
	Capital Costs
	Capital Maintenance Costs
Transit	Transit Route Operating Costs
	Capital Costs
	Capital Maintenance Costs

³ Depending on the nature of the study, some revenue/expenditure streams may be excluded from the analysis.

To forecast the revenues and expenditure streams associated with a land development, several inputs are required. Table 2 documents the main inputs required, who is responsible for generating the input, and the recommended sources of data for the inputs.

In general, the City is to provide most of the inputs required for the fiscal impact model, but some key items such as the proposed development profile, including information about land use, sizes, and absorption rates, along with the proposed layout of the internal road network, should be provided by or develop the development proponent where possible when evaluating developments in the latter stages of planning.

Table 2: Fiscal Impact Model Inputs and Data Providers

Data Provider ⁴	Model Input	Recommended Data Sources ⁵
City of Winnipeg	Capital Data	Property, Planning & Development; Assets & Project Management; City Capital Budgets; individual departments
	Demographic Data	Statistics Canada; Property, Planning & Development; Long-Term and Population & Employment Projections
	Financial Parameters	Treasury; Corporate Finance; Assessment & Taxation; Economic Development & Policy
	Operating Data	City Operating Budgets
	Utility Data	Water & Waste; MBNCanada
Development Proponent ⁶	Land Development Profile	Secondary Plans; Maps; Planning Documents; Stakeholder Consultation
	Road Network Data	Public Works; Secondary Plans; Maps; Planning Documents; Stakeholder Consultation

A generalized diagram of the financial model is shown on the next page.

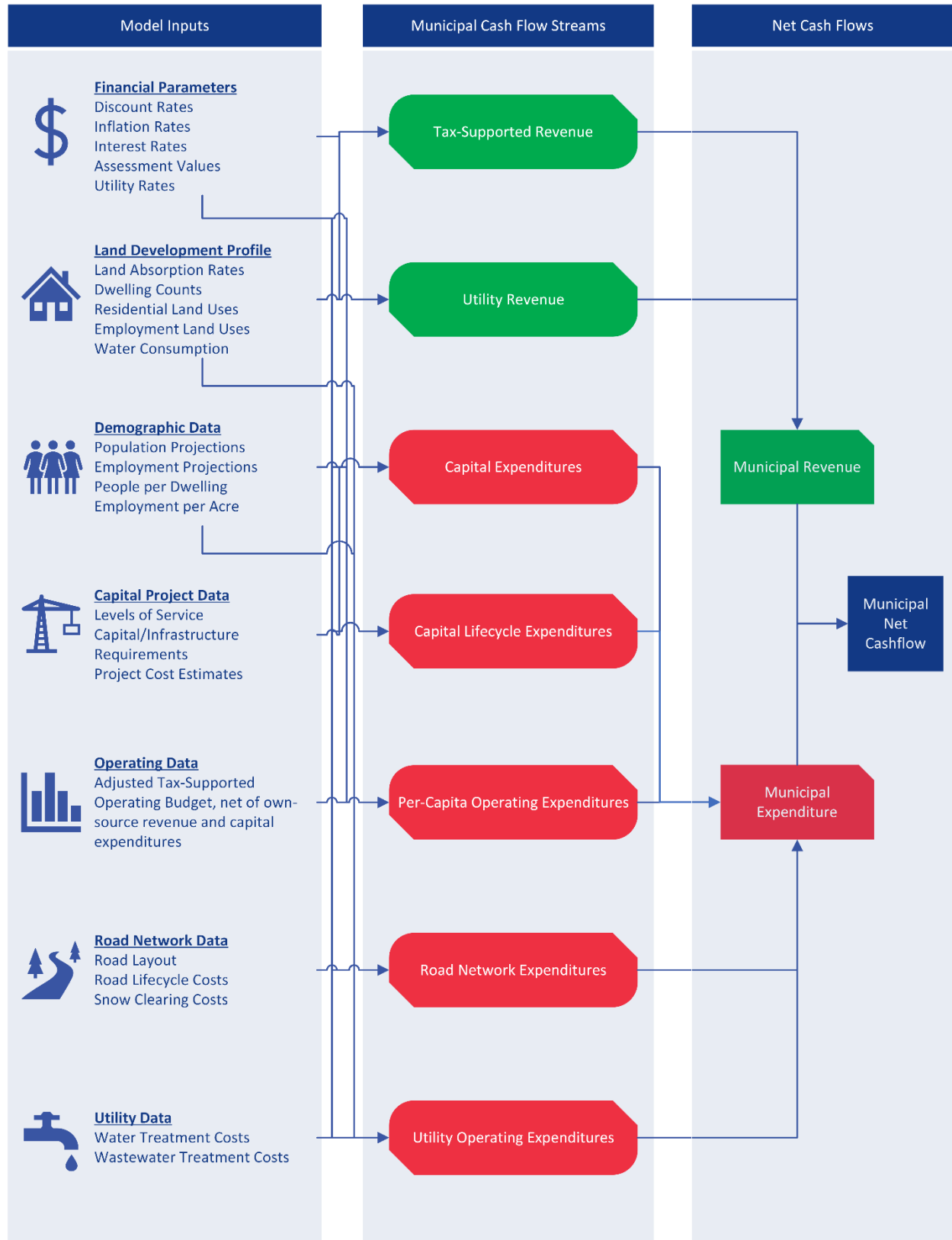
The methodology used to calculate each of the above revenue and expenditure streams is described in the following subsections. Undiscounted cashflow analysis is the summation of the annual municipal revenue minus the projected annual municipal expenses incurred from a proposed land development over a 75-year time horizon. Net present value (NPV) analysis takes these same cashflows and discounts them at a set discount rate such that net cashflows further into the future are discounted at greater rates.

⁴ In the absence of required data from the development proponent, the City may use reasonable estimates based on similar developments with known data.

⁵ The sources listed here include various recommended data sources and departments that should be consulted when completing a fiscal analysis, though the final list of sources consulted is not bound or limited to those presented in this table.

⁶ Inputs from development proponents are only applicable for financial analysis occurring in the latter stages of planning. For long-range financial analysis where potential land developments are further in the future and less information is known, development profiles and road network data will be sourced internally with departments such as Property, Planning & Development and Public Works.

Undiscounted Cashflow and Net Present Value Fiscal Model Diagram



2.1. General Model Parameters and Revenue/Expenditure Streams

General parameters to the undiscounted cashflow/NPV model include variables such as the base year, assumed operating inflation rate, construction inflation rate, and discount rate, development size and timeline, municipal tax-supported operating budget, and development-specific and city-wide population/employment forecasts.

Base Year

- **Description:** The calendar year in which the fiscal analysis starts. The analysis extends for 75 years, inclusive of the base year.
- **Recommended Value:** The current calendar year.
- **Data Source:** A calendar.

Operating Inflation Rate

- **Description:** The value at which many, though not all, operating budget expenditures are to be escalated at on an annual basis.
- **Recommended Value:** 2.0%
- **Data Source:** Bank of Canada CPI inflation target.

Construction Inflation Rate

- **Description:** The value at which construction-related expenditures are to be escalated at on an annual basis.
- **Recommended Value:** 3.0%
- **Data Source:** City of Winnipeg Economic and Demographic Variables guidelines (latest publication)

Discount Rate

- **Description:** The value at which future cashflows are to be discounted at.
- **Recommended Value:** 5.5%
- **Data Source:** City of Winnipeg Economic and Demographic Variables guidelines (latest publication)

Development Size

- **Description:** The size of the proposed land development, measured in net U.S. acres, by type of land use. The land use categories are as follows:
 - Residential: *single-detached, semi-detached, rowhouse, apartments below 5 stories, apartments 5 or more stories*
 - Non-Residential: *industrial (regular), industrial (wet), warehousing, retail, office, education, services, primary*
- **Recommended Value:** Values will be based on development profile.
- **Data Source:** Provided by City of Winnipeg Property, Planning and Development department in consultation with development proponent, where applicable.

Development Timeline

- **Description:** The rate at which land is absorbed annually, measured in net U.S. acres, by type of land use.
- **Recommended Value:** Values will be based on development profile.
- **Data Source:** Provided by City of Winnipeg Property, Planning and Development department in consultation with development proponent, where applicable.

Adjusted Tax-Supported Operating Budget – Tax Funded Only

- **Description:** The City of Winnipeg’s most recent adopted tax-supported operating budget, adjusted to net out each department’s own-source revenue (e.g., enforcement finds, recreation fees, sales of goods and services, etc.) and general operating grants from provincial and federal governments. This provides the net amount of taxation required for each department that must be funded by property, frontage, or business tax. This eliminates the need to also forecast own-source and government grant revenue specific to the proposed development.
- **Recommended Value:** Values will be based on adopted budget data, net of own-source revenues, government grants, and capital-related expenditures.
- **Data Source:** City of Winnipeg Adopted Budget data.

Development-specific Population and Employment Projections

- **Description:** The estimated population and/or employment located on the proposed land development, on an annual basis.
- **Recommended Value:** Values will be based on development profile.
- **Data Source:** Calculated by City of Winnipeg Economic Development and Policy group based on land absorption rates and typical dwellings-per-acre, population-per-dwelling, and/or employment-per-acre metrics as required, calculated via the most recently available Statistics Canada census data and/or other sources.

City-wide Population and Employment Projections

- **Description:** The City of Winnipeg’s long-term population and employment projections.
- **Recommended Value:** Values will be based on the latest long-term population and employment projections.
- **Data Source:** City of Winnipeg Population Estimates and Long-Term Projections (latest publication); linear extrapolation for values that extend beyond existing population projections but are required for the 75-year time horizon in the fiscal impact model.

2.2. Municipal Revenue Streams

The following municipal revenue streams are considered in the model, and their general guidelines for estimation are provided.

Tax-Supported Operations

Municipal Property Tax and Frontage Levy Revenue

- **Description:** The summation of the net increase in municipal property taxes and frontage levies generated in the proposed land development each year compared to the existing tax and frontage levy revenue.
- **Recommended Value:** Recommended assessment and portion values are to be derived using the latest available assessment parcel dataset (typically via the OpenData portal) for the geographic quadrant, development type, and land use type(s) under consideration. The City of Winnipeg maintains a process to take the latest assessment parcel dataset and obtain assessment, portion, and frontage feet values on a per-acre basis for the land use types listed above, for a given quadrant in the city (or city-wide), given neighborhood vintage, and given structure age (e.g., recent structures or old/unknown age structures). Assessment and portion values may be estimated in consultation with the development proponent, but proposed values must reasonably align with existing values for recent and comparable developments. The current mill rate set by council is then applied to total acres of development each year, subject to an escalation rate based on current council policy.
- **Data Source:** City of Winnipeg Assessment Parcels dataset, City of Winnipeg Economic Development and Policy calculations.
- **Escalation Rate:** Current trend in property tax/frontage levy increases as observed in city council delegations/decisions, or the most recent year's property tax/frontage levy increase rate. The objective is to convey how the current council's financial decisions on property tax/frontage levy rate changes translates to the financial viability of the proposed development.
- **Generalized Formula:**

$$\text{Property Tax}_t = \left(\sum_{i=1}^I \left(\frac{\text{Portion Value per Acre}_i}{1000} \right) (\text{Absorbed Acres}_{it}) (\text{base year mill rate}) (1 + \text{escalation rate})^{t-1} \right) - ((\text{Existing Portion Value})(\text{base year mill rate})(1 + \text{escalation rate})^{t-1})$$

Where: The total property tax revenue from a land development in year "t" is defined as the sum of all: portion values across "I" land uses, divided by 1,000, multiplied by total absorbed acres for land use "I" in time "t", multiplied by the base year mill rate, which is increased by the escalation rate that is compounded by the given year, minus the existing tax revenue derived from the unimproved portion value.

$$\text{Frontage Levy}_t = \left(\sum_{i=1}^I (\text{Frontage Feet per Acre}_i) (\text{Absorbed Acres}_{it}) (\text{base year frontage rate}) (1 + \text{escalation rate})^{t-1} \right) - ((\text{Existing Frontage Feet})(\text{base year frontage rate})(1 + \text{escalation rate})^{t-1})$$

Where: The total frontage levy revenue from a land development in year "t" is defined as the sum of all: frontage feet per acre across "I" land uses, multiplied by total absorbed acres for land use "I" in time "t", multiplied by the base year combined frontage rate, which is increased by the escalation rate that is compounded by the given year, minus the existing frontage fee revenue derived from the unimproved area.

Permit Fees

- **Description:** The total amount of permit fees paid by residential and/or non-residential construction activities each year of development until the development is fully built-out, prescribed on a per net-acre of development basis, by land use type.
- **Recommended Value:** N/A
- **Data Source:** City of Winnipeg Economic Development and Policy calculations
- **Escalation Rate:** Operating Inflation Rate
- **Generalized Formula:**

$$\text{Permit Fees}_t = \sum_{i=1}^I (\text{Absorbed Acres}_{it})(\text{Permit Fees per Acre}_i)(1 + \text{escalation rate})^{t-1}$$

Where: The total permit fee revenue from a land development in year “t” is defined as the sum of all: total absorbed acres by land use “l” in year “t”, multiplied by the permit fees per acre value for land use “l”, which is increased by the escalation rate that is compounded by the given year.

Business Tax

- **Description:** The total amount of business taxes paid for by business located on employment lands in the development. Note that whether this revenue stream is included in the analysis will depend on the current council’s policy decisions towards business taxation, along with relative certainty at which the business tax can be estimated – typically on a per-employment basis.
- **Recommended Value:** N/A
- **Data Source:** City of Winnipeg adopted tax-supported budgets and projections; Statistics Canada, Table 14-10-0392-01, Employment by industry, annual (for the Winnipeg Economic Region)
- **Escalation Rate:** Current trend in business tax rate increases as observed in current city council decisions, or the most recent year’s business tax rate increase rate. The objective is to convey how the current council’s financial decisions on business tax rate changes translates to the financial viability of the proposed development.
- **Generalized Formula:**

$$\text{Business Tax}_t = \left(\frac{(\text{Budgeted Total Business Tax Revenue}_b)(1 + \text{Business Tax Growth Rate})^{t-1}}{\text{Total Employment}_t} \right) (\text{Development Employment}_t)$$

Where: The total business tax revenue from a land development in year “t” is defined as: the amount of expected business tax revenue in the base tax-supported operating budget year “b” escalated by the assumed compounded growth rate in total business tax revenue, divided by city-wide projected employment in year “t”, multiplied by the total employment located specifically within the proposed development in year “t”.

Utility Dividend

- **Description:** The total amount of utility dividends that go towards the tax-supported operating budget that are paid for by ratepayers within proposed development. Note: to avoid double-counting revenues, the utility dividend also acts as an expenditure within utility operations. As such, the utility dividend is a revenue-neutral revenue stream, as it simply re-allocates a portion of utility revenues away from utilities and into the tax-supported operating budget.
- **Recommended Value:** 11% of total utility revenue generated within the proposed development.
- **Data Source:** The latest City of Winnipeg water and sewer rate report; City of Winnipeg Economic Development and Policy calculations
- **Escalation Rate:** N/A
- **Generalized Formula:**

$$\text{Utility Dividend Revenue}_t = (\text{Total Utility Revenue}_t)(\text{Utility Dividend Rate}_t)$$

Where: The total amount of utility dividend revenue supplementing the tax-supported operating budget in year “t” is defined as: the total amount of total utility revenue generated by the proposed development in year “t” multiplied by the utility dividend rate established by council in year “t”.

Utility Operations

Water and Sewer Utility Revenue

- **Description:** The total amount of utility revenue paid by the residential population and/or the employment located within the proposed development. Unless stated otherwise, it is assumed that water consumption equals wastewater discharge across all land uses.
- **Recommended Value:**
 - Utility rates: based on latest water and sewer rate report, internal projections, and/or approved rates from council
 - Water Consumption/Wastewater Discharge:
 - Residential: 248 litres per day per person
 - Non-Residential - Industrial: 9,105 litres per day per net acre
 - Non-Residential - Wet Industrial: 13,597 litres per day per net acre
 - Non-Residential – all other employment lands: 6,799 litres per day per net acre
- **Data Source:** City of Winnipeg Water & Waste Department; City of Winnipeg Economic Development and Policy calculations
- **Escalation Rate:** Determined by Council Policy and/or operating inflation rate
- **Generalized Formula:**

$$\text{Utility Revenue}_t = \sum_{i=1}^l (\text{population or employment}_{i,t})(\text{Water Consumption Rate}_i)(365)(\text{Water Rate}_b + \text{Sewer Rate}_b)(1 + \text{escalation rate})^{t-1}$$

Where: The total amount of utility revenue in year “t” is defined as: the total population or employment located on land use “l” in year “t”, multiplied by the assumed daily water consumption rate, multiplied by the number of days in a year, multiplied by the water plus sewer utility rates in the base year escalated by the assumed compounded growth rate in utility rates in year “t”.

Water Meter Fees

- **Description:** The total amount of water meter fees paid by structures located on residential and/or employment lands.
- **Recommended Value:**
 - Water meter fees: based on latest utility rate report, internal projections, and/or approved rates from council
 - Water meter counts (unless otherwise stated, the following is assumed):
 - Residential – Single Family: one 5/8” meter per dwelling
 - Residential – Multi-Family: one 2” meter per dwelling
 - Employment lands: based on representative sample of all meter sizes per acre of employment lands.
- **Data Source:** City of Winnipeg Water & Waste Department; City of Winnipeg Economic Development and Policy calculations
- **Escalation Rate:** Determined by Council Policy and/or operating inflation rate
- **Generalized Formula:**

$$\text{Residential Water Meter Fees}_t = \sum_{i=1}^{I_r} (\text{dwellings}_{I_r,t}) (\text{Water Meter Fee}_{I_r}) (1 + \text{escalation rate})^{t-1}$$
$$\text{Employment Lands Water Meter Fees}_t = \sum_{i=1}^{I_e} (\text{Absorbed Acres}_{I_e,t}) (\text{Water Meter Fee}_{I_e}) (1 + \text{escalation rate})^{t-1}$$

Where: The total amount of water meter fee revenue in year “t” is defined as the sum of: the total amount of existing residential dwellings (or absorbed acres of employment land) in year “t” across residential land use “I_r” (or employment land use “I_e”), multiplied by the water meter fee for residential land use “I_r” (or employment land use “I_e”), multiplied by the assumed compound growth rate in water meter fees in year “t”.

Transit Operations

Transit Fare Revenue

- **Description:** The total amount of annual fare revenue expected from transit riders originating from the proposed development.
- **Recommended Value:** N/A
- **Data Source:** Winnipeg Transit
- **Escalation Rate:** 2.0%
- **Generalized Formula:** N/A – annual estimates will be provided by Winnipeg Transit.

2.3. Municipal Expenditure Streams

The following municipal expenditure streams are considered in the model, and their general guidelines for estimation are provided.

Tax-Supported Operating Expenditures

Per-Capita Operating Costs (net of grants and own-source revenue)

- **Description:** These expenditures represent the ongoing tax-supported operating cost associated with the development, allocated on a per-capita and/or per-employment basis. They represent the net cost of municipal operations after deducting departmental own-source and general government grant revenue, and therefore the portion of municipal operations that must be funded via property taxation, frontage levy, or business tax. These per-capita tax-funded operating costs exclude capital-related expenditures, such as local and regional street renewal, as development-specific capital costs are captured elsewhere in the model. Further, these per-capita tax-funded operating costs are allocated between the residential and employment sector on the assumption that both sectors are responsible for driving costs based on their respective proportion of the population plus employment total, with the exception that community service and museum costs are driven entirely by the residential sector.
- **Recommended Value:** Varies over time depending on the municipal tax-supported operating budget and projections.
- **Data Source:** City of Winnipeg Corporate Finance; City of Winnipeg Economic Development and Policy calculations
- **Escalation Rate:** The compound annual growth rate (CAGR) observed tax-funded operating costs over the last ten years.
- **Generalized Formula:**
$$\text{Per Capita Operating Cost}_t = \left(\frac{(\text{Tax Funded Operating Costs}_b)(1 + \text{Tax Funded Operating Cost Growth Rate})^{t-1}}{\text{Total Population}_t + \text{Total Employment}_t} \right) (\text{Development Population}_t + \text{Development Employment}_t)$$

Where: The total per-capita operating cost in year “t” is defined as: the tax-funded tax-supported operating costs in the base year escalated by an assumed overall compound growth rate in the budget, that is then divided by the total population plus employment in Winnipeg in year “t”. This is then allocated to the proposed development based on its own population and/or employment in year “t”.

Incremental Operating Expenditures

- **Description:** These expenditures represent any incremental additions not currently budgeted for in the city’s tax-supported budget that must be incurred due to the proposed development. For example, if a development requires a new additional fire/paramedic station, recreation center, wastewater pumping station that adds additional staffing costs to the municipal budget that are not currently accounted for, these should be included in the model as an ongoing operating expense.
- **Recommended Value:** N/A
- **Data Source:** N/A
- **Escalation Rate:** Operating inflation rate.

Utility Operating Expenditures

Water and Wastewater Treatment Costs

- **Description:** These expenditures represent the incremental direct costs associated with water and wastewater treatment from the water consumed and wastewater discharge produced by the land development. It is important to note that the city's Water & Waste utility operates on a cost-recovery basis, and costs that are to be covered by utility rates include current and future operational costs include infrastructure lifecycle maintenance, current and future capital requirements, staffing, and all other utility operations. The objective of this metric is to solely account for the **direct treatment costs** of the water and wastewater, as development-specific incremental capital, maintenance, and operating obligations related to the utility should be covered under other utility expenditure streams captured elsewhere in the model. Therefore, treatment costs will be less than utility revenue fees. Further, unless stated otherwise, it is assumed that water consumption equals wastewater discharge across all land uses.
- **Recommended Value:**
 - Water Treatment: \$1,190 per megalitre of water consumed (2024 dollars)
 - Wastewater Treatment: \$1,357 per megalitre of wastewater discharge (2024 dollars)
- **Data Source:** Municipal Benchmarking Network Canada (MBNCanada; WATR315T for water treatment cost data and WWTR315T data for wastewater treatment cost data)
- **Escalation Rate:** Operating inflation rate
- **Generalized Formula:**

Water Treatment Costs

$$= \sum_{i=1}^t (\text{population or employment}_{i,t}) \left(\frac{\text{Water Consumption Rate}_i}{1,000,000} \right) (365) (\text{Water Treatment Costs}_b) (1 + \text{escalation rate})^{t-1}$$

Where: The total amount of water treatment costs in year "t" is defined as: the total population or employment located on land use "l" in year "t", multiplied by the assumed daily water consumption rate in litres per day, divided by one million (to convert to megalitres), multiplied by the number of days in a year, multiplied by the water treatment cost per megalitre in the base year escalated by the assumed compounded growth rate in water treatment costs in year "t".

Wastewater Treatment Costs

$$= \sum_{i=1}^t (\text{population or employment}_{i,t}) \left(\frac{\text{Wastewater Discharge Rate}_i}{1,000,000} \right) (365) (\text{Wastewater Treatment Costs}_b) (1 + \text{escalation rate})^{t-1}$$

Where: The total amount of wastewater discharge treatment costs in year "t" is defined as: the total population or employment located on land use "l" in year "t", multiplied by the assumed daily wastewater discharge rate in litres per day, divided by one million (to convert to megalitres), multiplied by the number of days in a year, multiplied by the wastewater discharge treatment cost per megalitre in the base year escalated by the assumed compounded growth rate in wastewater treatment costs in year "t".

Transit Operating Expenditures

Transit Operating Costs

- **Description:** The total amount of operating expenditures related to adding transit service to the proposed development.
- **Recommended Value:** N/A
- **Data Source:** Winnipeg Transit
- **Escalation Rate:** 2.0%
- **Generalized Formula:** N/A – annual estimates will be provided by Winnipeg Transit.

Road Network Expenditures

Road Network Lifecycle Maintenance Costs

- **Description:** These expenditures represent the annualized lifecycle and maintenance costs of incremental road added to the city’s road renewal liabilities. They do not represent the capital cost of initially building the road network as those are either paid for by developers or captured in the municipal capital cost stream if paid for by the municipality. Annualized lifecycle and maintenance costs only begin to accrue when newly constructed roads reach a certain age, and real costs are evenly distributed throughout their remaining lifecycle years. At the end of their lifecycle, it is assumed a road is fully replaced to the same standard, with the city bearing the entire cost in a single year; however, as road lifecycles tend to extend beyond the 75-year analysis timeframe, road replacement costs will likely not be included in the analysis period unless stated otherwise. Data on the road layout and physical size that is added by a specific development will be provided by the development proponent (via maps or estimates) and/or will be estimated by the City of Winnipeg using comparable developments and/or recommended best practices as proxies.
- **Recommended Value:** Varies by year and road type.
- **Data Source:** City of Winnipeg Public Works department; City of Winnipeg Economic Development and Policy calculations
- **Escalation Rate:** Construction inflation rate
- **Generalized Formula:**

Each development may add up to “k” types of road network to the city’s inventory. The types of road network modelled are as follows:

- Local residential streets
- Local non-residential streets
- Collector roads
- Industrial roads
- Regional roads

Not every development will add all types of road networks. The calculation for road lifecycle maintenance requires first estimating the volume of road segments constructed in each year as the development builds out, and then the annual lifecycle maintenance cost in future years associated with each segment that was added.

$$\text{Road Network Size (m}^2\text{)}_{tk} = \sum_{i=1}^k \left(\frac{\text{net acres absorbed}_{tk}}{\text{total development acres}} \right) (\text{Final Road Network Size (m}^2\text{)})_k$$

Where: The total size of road type “k” in year “t” is equal to: the proportion of built-up area applicable to road type “k”, multiplied by the anticipated final size of the road network for road network type “k”.

$$\text{Total Road Network Maintenance Cost}_{tk} = \begin{cases} \sum_{i=1}^k (\text{Road Network Size (m}^2)_{tk}) (\text{Annualized Lifecycle Cost per m}^2_{bk}) (1 + \text{escalation rate})^{t-1} & \text{if } t (\geq t_{k,ls} \text{ \& } \leq t_{k,le}) \\ 0 & \text{if } t < t_{k,ls} \end{cases}$$

Where: The road network maintenance costs for road network type “k” in year “t” is equal to:

- For year “t”, for all road segments that fall within the road lifecycle maintenance time period (where “t” is greater than or equal to the lifecycle maintenance start year for “t_{k,ls}” for road type “k” and before the lifecycle maintenance end year “t_{k,le}” for road type “k”), then total road network maintenance costs are defined as: the total road network size for road type “k” in year “t” (as measured in square meters), multiplied by the annualized cost of road lifecycle maintenance per square meters in base year “b” for road type “k” escalated by the assumed compounded growth rate in road maintenance costs in year “t”.
- For year “t”, if a segment of road falls outside the road lifecycle maintenance period, then road network maintenance costs are zero.

Road Network Snow Clearing, Reactive Maintenance, and Beautification (SRB) Costs

- **Description:** These expenditures represent the annual costs associated with snow clearing and ice control, reactive (unplanned) maintenance outside regular lifecycle renewal, and beautification (boulevards and tree upkeep) from the road network added by the proposed development.
- **Recommended Value:** Varies by year and road type.
- **Data Source:** City of Winnipeg Public Works department; City of Winnipeg Economic Development and Policy calculations
- **Escalation Rate:** Operating inflation rate
- **Generalized Formula:**

$$\text{Total SRB Costs}_t = \sum_{i=1}^k (\text{Road Network Size (lane kms)}_{tk}) (\text{SRB costs per lane km}^2_{bk}) (1 + \text{escalation rate})^{t-1}$$

Where: The amount of snow clearing, reactive maintenance, and beautification (SRB) costs in year “t” is equal to: the total road network size for road type “k” in year “t” (measured in lane kilometers), multiplied by the SRB costs per lane kilometer in base year “b” escalated by the assumed compounded growth rate in SRB costs in year “t”.

Municipal Capital Expenditures

Capital Expenditures

- **Description:** These expenditures represent the initial construction cost of providing capital projects required to sufficiently service the proposed development such that the requirements of forming a complete community are satisfied, as defined by the City of Winnipeg. This may include the capital costs associated with building new infrastructure assets or upgrading existing assets to service the proposed development. This may include municipal costs associated with community centers, libraries, local and regional roads (including upgrades), fire/paramedic stations, police stations, transit infrastructure, parks, recreation areas, local or regional water/wastewater infrastructure, or other municipal infrastructure. The need for additional infrastructure and its associated costs will be defined by the relevant departments within the City of Winnipeg in accordance with defined levels of service, strategic plans, and other guiding policies. Some important distinctions are as follows:
 - **Cost Sharing with Other Levels of Government:** the financial analysis will only include the municipality's share of a capital project's overall cost after deducting costs expected to be paid for other levels of government (or other third-parties), where applicable. For future projects where cost-sharing details are uncertain or unknown, reasonable assumptions will be made based on previously constructed capital projects of similar nature and/or departmental guidance. For example, if the total cost of a capital project required for a proposed development is \$10 million with the federal and provincial governments expected to each cover one-third of the total cost, only the remaining one-third cost (\$3.3 million) to the municipality will be considered as a capital cost in the fiscal analysis.
 - **Shared and Off-site Infrastructure:** for upgraded or new infrastructure required for the proposed development that is either on-site or off-site, if the asset is to be largely shared or used by population and/or employment located outside the proposed development, then the municipal capital cost will be reduced in proportion to the share of users originating from the proposed development. For example, if the municipal cost of a capital project required for a proposed development is \$8 million, but it is estimated that only 50% of population and/or employment utilizing capital project will be from the proposed development at full build-out, then only 50% of the capital cost (\$4 million) will be considered as a capital cost in the fiscal analysis.
 - **Capital Project Timing:** the timing of capital project construction will be determined in the following sequence: the timing presented in the latest adopted capital budget; if not available, then plans adopted by council; if not available, then relevant departments within the City of Winnipeg in accordance with guiding policies and documents such as the a project's basis of estimate, the Infrastructure Plan, OurWinnipeg, Complete Communities, and/or other relevant municipal policies and procedures.
 - **Capital Financing Structure:** to model cashflows related to capital projects, the share of a project that is financed by debt and cash/reserves will be determined by the relevant department in the absence of an adopted capital plan. Annual cashflows that fall within the analysis time horizon related to both the sinking fund and 30-year external debt issuance rate are included.
 - **Capital Cost Escalation:** Capital projects will have their total cost inflated by the capital inflation rate defined in the model, where applicable.

- **Recommended Value:** Varies depending on capital requirements.
- **Data Source:** City of Winnipeg
- **Escalation Rate:** Construction inflation rate
- **Generalized Formula:** The cost associated with a capital project is modelled in two parts. The first part is the initial cash outlay in the year construction starts, and the second part are the ongoing debt and finance charges that are incurred starting in the construction year and ending in the final year of debt servicing obligations (typically 30 years).

$$\text{Initial Cash Outlay}_c = (\text{Municipal Capital Cost}_c)(\% \text{ Cash Financed})$$

Where: The initial cash outlay required for capital project “c” is equal to: the total municipal capital cost of capital project “c” multiplied by the percentage of costs that are to be financed for in cash.

$$\begin{aligned} \text{Debt Servicing Payments}_{ct} \\ = (\text{Municipal Capital Cost}_c - \text{Initial Cash Outlay}_c)(\text{Sinking Fund Rate} \\ + 30 \text{ Year External Debt Issuance Rate}) \end{aligned}$$

Where: The debt servicing payments associated with capital project “c” in year “t” is equal to: the total municipal capital cost of project “c” minus the initial cash outlay, multiplied by the City of Winnipeg’s sinking fund rate plus 30 year external debt issuance rate.

Incremental Capital Maintenance Expenditures

- **Description:** Where applicable, these expenditures represent the ongoing annual capital costs associated with the lifecycle maintenance costs of upgraded/new capital added required to service the development, with the same guidelines defined in the “Capital Expenditures” section above. These values, if applicable, will be generated ad-hoc basis and have no generalized formula available to estimate them.
- **Recommended Value:** N/A
- **Data Source:** City of Winnipeg
- **Escalation Rate:** Construction inflation rate
- **Generalized Formula:** Varies depending on capital requirements.

2.4 Undiscounted Cashflow Inflationary Adjustments and Net Present Valuation

Inflationary Adjustments and Constant Dollar Calculations

Inflationary price changes are included in the fiscal analysis model, though the rate of price change may be different and depend on if the revenue/expense stream is more related to operating or construction-related price changes.

Given this, undiscounted cashflows will be expressed in constant base year dollars which adjusts for inflationary components. Figures presented in constant dollars have been adjusted for each operating entity (tax-supported, utilities, and transit) using a Fisher Price Index. The Fisher Price index is the geometric average of the calculated Laspeyres Index and the Paasche Index. Price indices are derived using the relative expenditures of operating and capital and their associated inflation rates for each operating entity.

The Fisher Price index is used to best illustrate municipal inflation rates used by the model as it accounts for varying inflation rates (operating and capital), and the unequal quantity in which operating and capital goods and services are purchased by the municipality over time. Municipal revenues and costs, by entity, are both adjusted using this index to reflect their values in today's constant dollar terms.

Net Present Value (NPV) Calculations

Net present value (NPV) analysis is today's value of expected future net cashflows to the municipality generated by the proposed development. NPV analysis takes the net municipal cashflow (revenue minus expenditure) for each year and applies a discount rate. In other words, net cashflows closer to the present day are worth more (discounted less) and net cashflows further in the future are worth less (discounted more). Discount rates are applied to generally reflect the time value of money from the perspective of a public institution which may include considerations such as the cost of borrowing, expected rate of return, and/or risk.

The generalized formula for NPV analysis is as follows:

$$NPV = \sum_{t=1}^n \frac{R_t}{(1 + \text{Discount Rate})^t}$$

Where: The Net Present Value (NPV) of a proposed development is equal to the sum of: net municipal cashflow "R" in year "t" divided by the discount rate compounded discount rate in year "t", over the total analysis time period "n".

Section 3: Long-Term Economic Impact Analysis

Long-Term Economic Impact Analysis

This section provides detail and guidance on how calculations are performed in the long-term economic impact analysis. As stated in section 1, the objective of this analysis is to measure the estimated impact a proposed land development has on the regional economy, along with its associated tax revenues to municipal, provincial, and federal governments. This includes estimating property tax revenue (municipal and education), personal and corporate income taxes, and consumption taxes (PST and GST) generated by employment and/or residential structures within the proposed development. Off-site revenues induced by demand generated on-site may also be taken into consideration. The economic output and gross domestic product (GDP) produced by employment located on the land may also be calculated when applicable. Table 3A summarizes the long-term economic impacts measured, and table 3B summarizes the government revenues measured and the sources of those revenues.

It is important to note that all economic impact values provided are tied to the year from which the multipliers are taken, and all municipal, provincial, and federal tax rates should also be of the same year. For example, if 2019 input-output multipliers are utilized, 2019 tax rates should also be utilized to provide tax revenue estimates.

Table 3A: Long-Term Economic Impacts Measured

Land Use	Economic Impact
Residential Lands	Property Assessment Values
	Utility Fees
Employment Lands	Property Assessment Values
	Utility Fees
	Economic Output & Gross Domestic Product (GDP)
	Wages & Salaries
	Employment

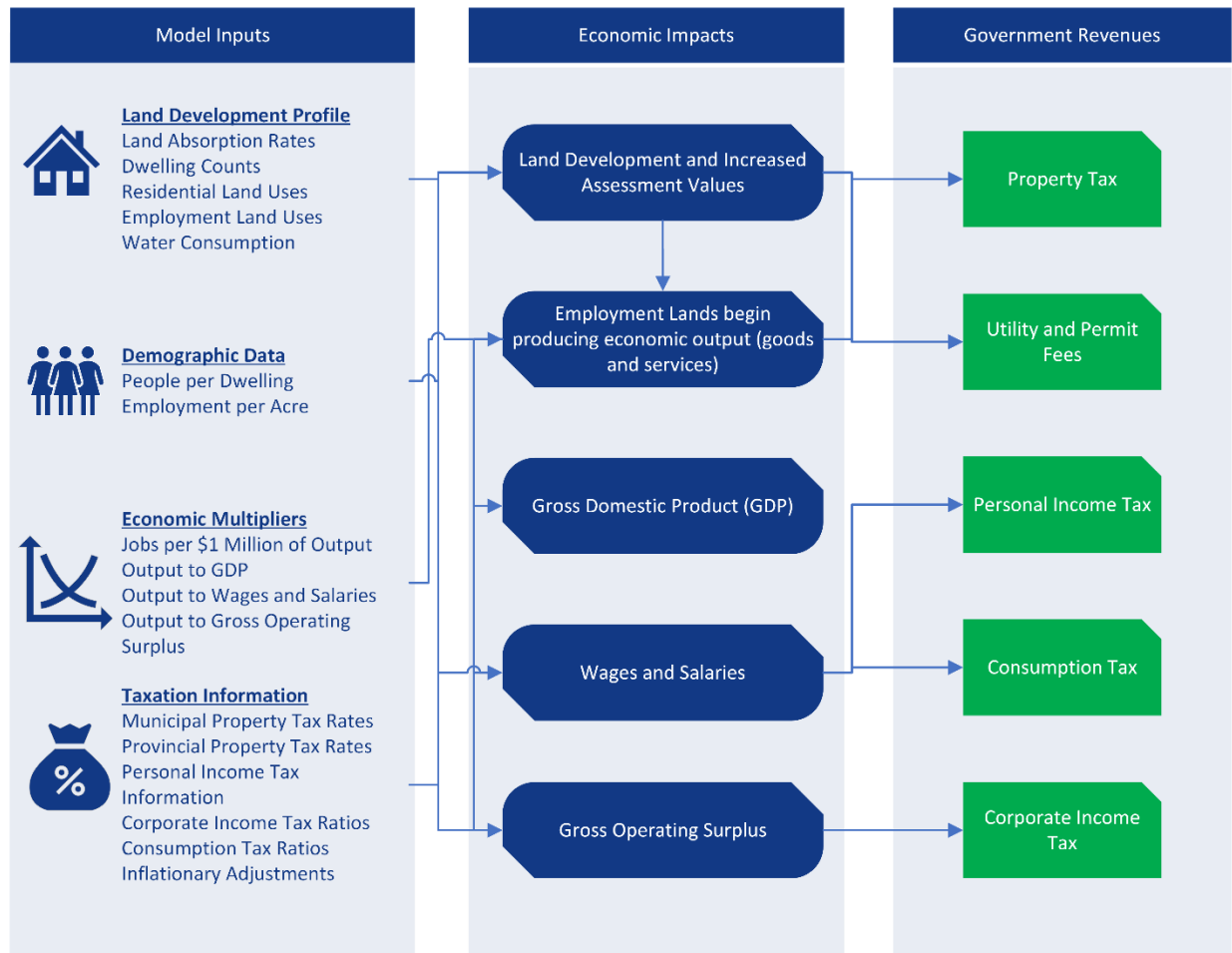
Table 3B: Government Revenues Measured

Level of Government	Revenue Stream	Sourced From
Municipal	Property Tax	Property Assessment Values
	Utility Fees	Population & Employment
	Permits and Other Fees	Land Development
Provincial	Property Tax	Property Assessment Values
	Individual Income Tax	Wages & Salaries
	Corporate Income Tax	Economic Output
	Consumption Tax (PST)	Wages & Salaries
Federal	Individual Income Tax	Wages & Salaries
	Corporate Income Tax	Economic Output
	Consumption Tax (GST)	Wages & Salaries

It should be noted that the long-term economic impact model is based upon assumptions that continually change over time, including dwelling demand to employment ratios, tax rates and tax brackets, and average wages. As such, specific values for certain assumptions may not be documented here but rather the recommended best practice for obtaining the values and how they are to be used within the model is provided.

A generalized diagram of the fiscal model is shown below and the methodology used to calculate each of the above economic impacts and revenue streams is described in the following subsections.

Long-Term Economic Impact Model Diagram



3.1 General Model Parameters

In addition to some of the assumptions and parameters used in the undiscounted cashflow and NPV analysis model, the following parameters are used in the long-term economic impact calculations.

Economic Impact Analysis Base Year Dollars

- **Description:** This is the base year in which the dollar value of economic impacts of a proposed development are stated in, including estimated tax revenue to other levels of government. As the economic impacts are directly tied to Statistics Canada’s Input-output multipliers, the values expressed by the model are going to be in the same base year as those used for the input-output multipliers. As such, all economic impact values provided are tied to the year from which the multipliers are taken and all municipal, provincial, and federal tax rates should also be of the same year. For example, if 2019 input-output multipliers are utilized, 2019 tax rates should also be utilized to provide tax revenue estimates.
- **Methodology:** N/A
- **Data Source:** Statistics Canada, Table 36-10-0113-01, Input-output multipliers, provincial and territorial, summary level

Industry to Land Use Concordance

- **Description:** To estimate the economic output, gross domestic product (GDP), wages and salaries, and tax revenue associated with employment lands, the industries available in Statistics Canada’s Input-output tables and economic accounts are assigned to a city land use category. This assumes that certain industries only operate on certain land uses.
- **Methodology:** The following concordance shows what industries are assumed to be able to operate under the given land use.

Land Use	Industry
Industrial	Manufacturing [BS3A0]
	Non-residential building construction [BS23B]
	Residential building construction [BS23A]
	Engineering construction [BS23C]
	Repair construction [BS23D]
	Other activities of the construction industry [BS23E]
Warehousing	Transportation and warehousing [BS4B0]
Retail	Wholesale trade [BS410]
	Retail trade [BS4A0]
Office	Finance, insurance, real estate, rental and leasing and holding companies [BS5B0]
	Professional, scientific and technical services [BS540]
	Administrative and support, waste management and remediation services [BS560]
	Other federal government services [GS911]
	Other provincial and territorial government services [GS912]
	Other municipal government services [GS913]
Education	Other aboriginal government services [GS914]
	Educational services [BS610]
	Government education services [GS610]

Services	Information and cultural industries [BS510]
	Health care and social assistance [BS620]
	Arts, entertainment and recreation [BS710]
	Accommodation and food services [BS720]
	Other services (except public administration) [BS810]
	Non-profit institutions serving households [NP000]
	Government health services [GS620]
Primary	Crop and animal production [BS11A]
	Forestry and logging [BS113]
	Fishing, hunting and trapping [BS114]
	Support activities for agriculture and forestry [BS115]
	Mining, quarrying, and oil and gas extraction [BS210]
	Utilities [BS220]

- **Data Source:** Statistics Canada, Table 36-10-0113-01, Input-output multipliers, provincial and territorial, summary level; Economic Development and Policy calculations

Offsite Dwelling Demand

- **Description:** If a proposed development will accommodate future employment on employment lands and does not contain sufficient residential housing development to accommodate employees and their families, then there is a spillover effect of driving housing demand elsewhere within the City. The offsite dwelling demand is calculated by first comparing how many dwelling units are required to house employees working on employment lands in the proposed development based on recent trends in housing starts and employment growth in the region. If there are insufficient dwellings being built in the proposed development, then the difference is considered offsite dwelling demand. The associated property tax and utility revenue derived from the offsite dwelling demand is considered an offsite source of revenue.
- **Methodology:** The ratio of dwellings built in the Winnipeg Economic Region (ER) to employment growth in recent years is calculated using data from the CMH and Statistics Canada. From there, the total employment located in the proposed development is used to calculate total dwellings needed. If there is insufficient residential capacity within the same proposed development, the spillover dwelling counts are calculated. The same financial values used in the undiscounted cashflow model are then used to estimate offsite property taxes and utility fees paid.
- **Data Source:** Statistics Canada, Table 14-10-0393-01, Labour Force Characteristics Annual for the Winnipeg Economic Region (for employment statistics); CMHC Housing Starts and Completions Survey for the City of Winnipeg (for housing starts by type statistics); Statistics Canada 2021 Census of Population (for people per dwelling unit by housing type statistics)

3.2. Economic Impacts

The economic impacts that are modelled are dependent on Statistics Canada’s Input-output multipliers at a provincial level. As such, all economic impact values provided are tied to the year from which the multipliers are taken and all municipal, provincial, and federal tax rates should also be of the same year. For example, if 2019 input-output multipliers are utilized, 2019 tax rates should also be utilized to provide tax revenue estimates.

The following describes how the economic impacts of the proposed land development are calculated.

Land Development and Increased Assessment Values

- **Description:** See the “*Municipal Property Tax and Frontage Levy Revenue*” methodology described in section 2.2 above.
- **Adjustment Note:** As municipal property taxes are calculated in base year dollars using base year assessment values, these values may need to be deflated to match the economic input-output multiplier year. In this case, the change in the assessment value for the average or representative residential property between the input-output multiplier year and the analysis base year is used to deflate assessment values.
- **Escalation Rate:** N/A – values are not escalated; they are held constant in the input-output multiplier year.

Economic Output

- **Description:** This represents the dollar value of output (goods and services) generated by employment taking place on the employment lands of a development.
- **Recommended Value:** Values will be based on anticipated employment occurring on the land by industry and land use. Output is estimated using the number of net acres of employment land to be developed, by land use type, which is then used to estimate total jobs occurring on the land. Total jobs is then used to estimate economic output using Statistics Canada’s Input-output multipliers by industry. Industry to land use conversions is estimated using general knowledge of the proposed land development and/or the characteristics of existing and comparable employment lands nearby.
- **Data Source:** Statistics Canada, Table 36-10-0113-01, Input-output multipliers, provincial and territorial, summary level
- **Escalation Rate:** N/A – values are not escalated; they are held constant in the input-output multiplier year.
- **Generalized Formula:**

$$\text{Output}_{le,t} = \frac{(\text{Absorbed Acres}_{le,t})(\text{employment per acre}_{le})}{\text{jobs per dollar of output}_{le}}$$

Where: The dollar value of economic output on employment land use “le” is equal to: the absorbed acres for land use “le” at time “t”, multiplied by the employment per acre for land use “le”, divided by the jobs per dollar of output for land use “le”.

Gross Domestic Product (GDP) at Market Prices

- **Description:** This represents the gross domestic product (GDP) at market prices produced on employment lands, which is the final market value of the goods and/or services produced. It is less than the economic output measure because GDP subtracts out the value of intermediate inputs used in the production process.
- **Recommended Value:** Values will depend on employment, industry, and land use.
- **Data Source:** Statistics Canada, Table 36-10-0113-01, Input-output multipliers, provincial and territorial, summary level
- **Escalation Rate:** N/A – values are not escalated; they are held constant in the input-output multiplier year.
- **Generalized Formula:**

$$\text{GDP at Market Prices}_{le,t} = \text{Output}_{le,t} * \text{GDP Multiplier}_{le}$$

Where: The gross domestic product (GDP) at market prices generated on land use “le” is equal to: the output produced on land use “le” at time “t”, multiplied by the output to GDP multiplier for land use “le”.

Wages and Salaries

- **Description:** This represents the value of wages and salaries earned by workers employed on the employment lands.
- **Recommended Value:** Values will depend on industry and land use.
- **Data Source:** Statistics Canada, Table 36-10-0113-01, Input-output multipliers, provincial and territorial, summary level
- **Escalation Rate:** N/A – values are not escalated; they are held constant in the input-output multiplier year.
- **Generalized Formula:**

$$\text{Wages}_{le,t} = \text{Output}_{le,t} * \text{Wages and Salaries Multiplier}_{le}$$

Where: The wages and salaries generated on land use “le” is equal to: the output produced on land use “le” at time “t”, multiplied by the output to wages and salaries multiplier for land use “le”.

Gross Operating Surplus

- **Description:** This represents the income of corporations, governments, and non-profit institutions serving households accruing to the capital factor of production (as opposed to labour and its associated wages and salaries) from the production of goods and services.
- **Recommended Value:** Values will depend on industry and land use.
- **Data Source:** Statistics Canada, Table 36-10-0113-01, Input-output multipliers, provincial and territorial, summary level
- **Escalation Rate:** N/A – values are not escalated; they are held constant in the input-output multiplier year.
- **Generalized Formula:**

$$\text{Gross Operating Surplus}_{le,t} = \text{Output}_{le,t} * \text{Gross Operating Surplus Multiplier}_{le}$$

Where: The gross operating surplus generated on land use “le” is equal to: the output produced on land use “le” at time “t”, multiplied by the output to gross operating surplus multiplier for land use “le”.

3.3. Government Tax Revenue

The following describes how the government tax revenue impacts of the proposed land development are calculated.

Property Tax

- **Description:** See the “*Municipal Property Tax and Frontage Levy Revenue*” methodology described in section 2.2 above.
- **Adjustment Note:** The mill rates used to calculate property taxes should be of the same year as the input-output multiplier year.

Utility and Permit Fees

- **Description:** See the “*Permit Fees*” and “*Water and Sewer Utility Revenue*” methodology described in section 2.2 above.
- **Adjustment Note:** The utility rates used to estimate utility revenue should be of the same year as the input-output multiplier year. Permit fee revenue will be deflated by 2.0% annually.

Personal Income Tax

- **Description:** This represents the value of personal income tax remitted to the provincial and federal governments from wages and salaries generated on employment lands. It is a function of wages and salaries generated, along with the most recent provincial and federal tax brackets, basic personal exemptions, CPP, and EI deductions.
- **Adjustment Note:** The personal income tax brackets, personal basic amounts, CPP rates, and EI rates used to estimate provincial and federal income taxes should be of the same year as the input-output multiplier year.
- **Recommended Value:** N/A
- **Data Source:** Tax bracket, exemptions, CPP, and EI contribution data are sourced the Manitoba Department of Finance and the Canada Revenue Agency.
- **Escalation Rate:** N/A – values are not escalated; they are held constant in the input-output multiplier year.
- **Generalized Formula:**

$$\text{Personal Income Tax}_{le,t,g} = \text{Wages}_{le,t} * \text{Effective Tax Rate}_{t,g}$$

Where: The total personal income tax levied from land use “*le*” in year “*t*” to government level “*g*” is equal to the total wages generated on land use “*l*” in year “*t*” multiplied by the effective tax rate in year “*t*” for government level “*g*” for that annual wage rate.

Consumption Tax

- **Description:** This represents the value of consumption tax (PST and GST) remitted to the provincial and federal governments derived from individuals spending a portion of their wages and salaries on goods and services subject to PST and/or GST. Calculations are based on data from Statistics Canada economic accounts, where ratios of total gross provincial wages and salaries to PST and GST revenue are used.
- **Recommended Value:** PST revenue is equal to 3.67% and GST revenue is equal to 2.99% of gross wages generated.
- **Data Source:** Statistics Canada, Table 36-10-0221-01, Gross Domestic Product, Income Based, Provincial and Territorial Annual; Statistics Canada, Table 36-10-0224-01, Household Sector, Current Accounts, Provincial and Territorial, Annual; Statistics Canada, Table 36-10-0432-01, Detailed Household Final Consumption Expenditure Sales Taxes and expenditure excluding sales taxes, Provincial and Territorial, Annual
- **Escalation Rate:** N/A – values are not escalated; they are held constant in the input-output multiplier year.
- **Generalized Formula:**

$$\text{Consumption Tax}_{le,t,g} = \text{Wages}_{le,t} * \frac{\text{MB Household Expenditure on Tax}_g}{\text{MB Gross Household Wages and Salaries}}$$

Where: The total consumption tax levied by employment occurring on land use “le” in year “t” to government level “g” (provincial is PST; federal is GST) is equal to the wages earned on land use “le” in year “t”, multiplied by the ratio between consumption tax revenue to government level “g” in Manitoba and gross wages and salaries earned in Manitoba (the most recent five-year average of this ratio is used).

Corporate Income Tax

- **Description:** This represents the value of corporate income tax remitted to the provincial and federal governments derived from corporate net income arising from economic output occurring on employment lands. Calculations are based on data from Statistics Canada economic accounts, where ratios of total gross operating surplus to corporate income tax at a provincial and federal level are used.
- **Recommended Value:** Provincial corporate income tax revenue is equal to 3.64% and federal corporate income tax revenue is equal to 7.53% of gross operating surplus generated.
- **Data Source:** Statistics Canada, Table 36-10-0221-01, Gross Domestic Product, Income-based, Provincial and Territorial, Annual; Statistics Canada, Table 36-10-0450-01, Revenue Expenditure and Budgetary Balance - General Governments, provincial and territorial economic accounts
- **Escalation Rate:** N/A – values are not escalated; they are held constant in the input-output multiplier year.
- **Generalized Formula:**

$$\text{Corporate Income Tax}_{le,t,g} = \text{Gross Operating Surplus}_{le,t} * \frac{\text{MB Tax Revenue from Corporations \& GBES}_g}{\text{MB Total Gross Operating Surplus of Corporations}}$$

Where: The total corporate income tax levied by gross operating surplus occurring on land use “le” in year “t” to government level “g” is equal to the gross operating surplus generated on land use “le” in year “t”, multiplied by the ratio between corporate tax revenue to government level “g” in Manitoba and total gross operating surplus generated in Manitoba (the most recent five-year average of this ratio is used).



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