Ottawa

Office of the Auditor General

Audit of City Estimates

Tabled at Audit Committee
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Acknowledgements

The team responsible for this audit, comprised of Sarah Parr from the Office of the Auditor General (OAG) and Samson & Associates, under the supervision of Sonia Brennan, Deputy Auditor General and the direction of Ken Hughes, Auditor General, would like to thank those individuals who contributed to this project, and particularly, those who provided insights and comments as part of this audit.

Original signed by:

Auditor General

Executive summary

Purpose

The Audit of City Estimates examined the effectiveness of the City's estimation processes and related governance structures supporting the following estimates: OC Transpo short-term and long-term ridership, the Long Range Financial Plan (LRFP) Transit and stormwater rates.

Background and rationale

The City of Ottawa uses estimates and models to support strategic, financial and operational decisions. Effective estimation and modelling processes support better decision-making, financial and service outcomes. This audit was intended to provide assurance that these processes and related governance structures are functioning effectively for selected estimates.

The Service Planning Branch within OC Transpo and the Transportation Planning Service produce short-term and long-term ridership forecasts respectively. Short-term ridership forecasts are used during the annual budget cycle to estimate total fare revenue and as an input to decisions regarding aggregate service hours[1]. Accurate short-term forecasts help ensure that the budget is met and over the longer term, that the revenue/cost ratio of 55% for transit fares identified as a target within the City's Fiscal Framework is achieved. Long-term ridership forecasts are used within the City's Transportation Master Plan (TMP) and Official Plan. They are also used to calculate transit development charges, develop business cases (e.g. Stage 1 and Stage 2 LRT), plan infrastructure projects and conduct affordability modelling to support the Long Range Financial Plan (LRFP) Transit.

The Financial Strategy, Planning and Budgeting Branch within Corporate Finance produces the LRFP Transit and estimates stormwater costs to calculate stormwater rates. The LRFP Transit reflects the City's operating and capital requirements for the transit system over a 30-year period (i.e. to 2048). Affordability modelling is conducted in order to test the plan's affordability, based on defined parameters. Given the financial significance of the LRFP Transit, the affordability of the plan is essential to the City's long-term financial viability. Stormwater services are delivered on a rate-supported

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[1] The total number of bus hours provided to OC Transpo customers across the transit system.

basis. As a result, the accuracy of estimated stormwater operating and capital costs is necessary to ensure ratepayers are charged appropriately and services can continue to be provided in a sustainable manner.

Findings

The key findings associated with each estimate are as follows.

Short-term ridership

1. **Governance:** We found that Service Strategy staff at OC Transpo are responsible for the development of short-term ridership forecasts and OC Transpo's Departmental Leadership Team (DLT) oversees issues related to ridership. However, the availability of data to support the Transit Commission's oversight role is currently limited as operational and performance reporting related to the transit system has been suspended since 2015.

2. **Continuous improvement:** We found that current revenue and ridership forecasting methods have been in use since at least 2012. A third-party review of the regression model in 2015 made eight recommendations, three of which remain outstanding.

3. **Retention of specialized knowledge and expertise:** We found that short-term ridership forecasts are prepared by City staff, all of whom have worked on this file for several years. However, existing practices and processes are not well documented.

4. **Data inputs:** We found that fare evasion is not taken into consideration in calculating ridership or developing ridership forecasts.

5. **Assumptions:** We found that the calculation and rationale for the number of STO passengers transferring to OC Transpo, which is used in the short-term ridership forecast, are not documented. The values currently in use for STO passengers transferring to OC Transpo and seniors using transit on no-charge days for seniors have been in use for many years.

6. **Variance analysis:** We found that staff review other data representing ridership on a periodic basis. While this is a good practice, current data limitations impact the value of this analysis.

Long-term ridership

1. **Governance:** The City is generally meeting expectations. We found that Transportation Modelling staff are responsible for the development, maintenance and application of the model used to produce long-term ridership forecasts. The TRANS Committee[2] provides oversight of the TRANS regional transportation model used to produce long-term ridership forecasts.

2. **Continuous improvement:** We found that third-party reviews were performed in 2014 and 2015 and that most of the recommendations from the 2015 review were actioned. Modelling projects to further improve the TRANS model are outlined in the TRANS five-year work plan.

3. **Retention of specialized knowledge and expertise:** We found that third parties performing model development work are generally required to conduct workshops to ensure knowledge transfer to in-house staff. However, given the size of the in-house team, there is a risk of loss of experience and knowledge with respect to the model.

4. **Data inputs:** We found that data collected through the Origin Destination travel survey, as well as the model built upon this data, are validated using traffic and transit counts. However, seasonal variations in demand and travel trends cannot be assessed by staff as there are currently no permanent traffic counting stations in Ottawa.

5. **Analysis and use of model outputs:** We found that sensitivity and scenario testing is often carried out either by consultants or members of the TRANS Committee.

6. **Assumptions:** We found that data related to future land use and the transportation network used as inputs to the model are validated by other City departments.

7. **Protection from unauthorized access, changes and loss:** We found that within the City of Ottawa, all networked employees have access to the Transportation Systems sub-directory and some personally identifiable

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[2] A multi-jurisdictional committee responsible for transportation data collection and modelling in the National Capital Region (NCR).

information (PII) is stored there. We also found that staff back up their work to an external hard drive once or twice a year.

Long Range Financial Plan (LRFP) Transit

1. **Governance:** We found that a core working group including a third party performs the affordability modelling supporting the LRFP Transit. An extended working group and representatives from Finance and Transportation Services' management teams review and approve the results before they are submitted to Committee and Council.

2. **Continuous improvement:** We found that benchmarking of the affordability model is not undertaken as the model is specific to the City's current transit system and planned transit projects.

3. **Retention of specialized knowledge and expertise:** The City has outsourced the development and update of the affordability model; however, it owns the intellectual property and therefore can obtain specialized knowledge and expertise from the third party currently under contract or another third party.

4. **Data inputs:** Although there is a process to ensure that inputs to the affordability model are accurate, complete and timely, the performance of this process by Financial Strategy, Planning and Budgeting staff is not documented.

5. **Analysis and use of model outputs:** Although reconciliations and validations are performed by the third party and the Financial Planner, documentation of the Financial Planner's review was not available.

6. **Assumptions:** Although assumptions are reviewed and validated by the core working group and the Deputy City Treasurer, Corporate Finance (henceforth referred to as "Deputy City Treasurer"), documentation of this was not available.

Stormwater rates

1. **Governance:** The City is generally meeting expectations. The Financial Planner uses stormwater cost allocations estimated by departmental managers to determine the annual revenue required to meet the annual operating and capital cost requirements. Costs are recovered through the stormwater rate paid by residential and Industrial, Commercial and Institutional (ICI) properties based on the approved rate structure. Senior Finance staff review the results before they are submitted to Committee and Council as part of the annual budget.

2. **Continuous improvement:** We found that assessments of the methodology used to estimate stormwater costs have not been undertaken due to delays in implementing the new rate structure.

3. **Retention of specialized knowledge and expertise:** We found that the process used to identify and allocate stormwater costs is not complex and is performed by City staff.

4. **Data inputs:** We found that a process exists to identify the stormwater costs to be recovered however sufficient documentation is not retained to support management's estimated allocation of indirect costs used for both stormwater costing and Financial Information Reporting (FIR).

Conclusion

The estimates reviewed were generally governed effectively. Roles and responsibilities were clearly articulated, and oversight was commensurate with each estimate's complexity and materiality. Opportunities for improvement were noted related to the short-term ridership forecast and stormwater cost estimates.

The estimation processes used to evaluate complex and uncertain future conditions were mostly effective, with some exceptions. Although processes are generally in place to ensure that data inputs are accurate, complete and timely, most of the estimates reviewed would benefit from improvements in the data used to produce them or to validate them. In addition, documentation to support estimate assumptions and managerial review and approval could be enhanced in some cases.

For all estimates reviewed, we noted that staff have the expertise necessary to derive the estimates or have engaged a third party with the required skill set. We also observed that sensitivity analysis is being conducted for the long-term ridership forecast and LRFP Transit to assess how changes in key variables impact outcomes. The results of this type of analysis can be used to inform decision-making.

Recommendations and responses

Recommendation #1

The City should include metrics related to short-term ridership (e.g. total ridership, ridership by fare type, comparisons of revenue and ridership to budgets and/or prior year actuals) in the scorecard to be produced.

Management response:

Management agrees with the recommendation.

Staff will recommend to the Transit Commission that ridership be one of the metrics included in the future performance measurement program, to be presented to the Commission in 2020.

Recommendation #2

The City should:

a. Conduct a fare survey or similar exercise in order to update trip rates by fare product used to calculate and forecast short-term ridership;

b. Review and update the short-term ridership model, taking into consideration the findings of CUTA's Ridership Methodology Project and recommendations from RSG's 2015 review; and

c. Document the new model logic based on review and update of the short-term ridership model undertaken under item "b".

Management response:

2.a

Management agrees with the recommendation.

Staff will review the most appropriate means of updating trip rates, whether by survey or by other data-based analyses and will update trip rates by the end of 2020.

2.b

Management agrees with the recommendation.

Staff will update the short-term ridership model once CUTA publishes their ridership methodology project recommendations.

2.c

Management agrees with the recommendation.

All updates to the short-term ridership model will be formally documented within six months of CUTA publishing their ridership methodology project recommendations.

Recommendation #3

The City should ensure that key decisions and processes related to the short-term ridership forecast are formally documented and maintained to ensure its long-term consistency and continuity.

Management response:

Management agrees with the recommendation.

Decisions and processes related to short-term ridership forecasting will be enhanced, documented and maintained beginning in 2020.

Recommendation #4

In addition to Council's direction on October 26, 2016 to review the new stormwater rate structure in future long-range financial plans, the City should review the processes used to identify stormwater costs.

Management response:

Management agrees with the recommendation.

Staff have been directed by Council to review the rate structure and update the LRFP Water, Wastewater and Stormwater during this term of Council. The process used to identify stormwater costs will be included in this review.

The Review findings and subsequent recommendations will be presented to the Finance and Economic Development Committee and Council, as part of the next LRFP planned to be completed by Q3 2021.

Recommendation #5

The City should determine how a system-wide fare evasion rate should be derived, taking into consideration the practices of other transit agencies.

Management response:

Management agrees with the recommendation.

Staff will review the practices of other transit agencies, through Canadian and international contacts, industry associations and benchmarking groups, to determine the most appropriate ways to estimate and report system-wide non-payment of fares on multimodal systems with a mix of fare gates and front and rear boarding if possible, by the end of 2021.

Recommendation #6

With respect to fixed values used in short-term ridership calculations and forecasts, the City should:

a. perform a review of assumption calculation / rationale, which may include conducting a current survey;

b. document assumption calculation / rationale and its approval; and

c. establish a review frequency for assumptions based on their degree of materiality.

Management response:

6.a

Management agrees with the recommendation.

Staff will perform a review of the few fixed values used in current ridership calculations and will assess if there are existing data sources that will help improve their accuracy. If existing data sources are found to improve accuracy, they will replace the fixed value. If insufficient data exists, staff will determine appropriate means of obtaining more accurate data and will replace the existing fixed value with the updated value. Staff will complete this review and include any updated values by the end of 2020.

6.b

Management agrees with the recommendation.

Staff will ensure fixed value ridership calculations are documented, as they are reviewed in 2020, and moving forward.

6.c

Management agrees with the recommendation.

For any ridership calculations that continue to depend on fixed values, staff will review the fixed value on an annual basis and update it if necessary.

Recommendation #7

As it relates to short-term ridership, the City should examine how other data representing ridership can be improved, for example greater use of automated

passenger counters (APCs)[3], leveraging fare gate data, communications related to the importance of smartcard taps etc.

Management response:

Management agrees with the recommendation and implementation is in progress.

APC equipment has been included on all buses and trains procured in recent years and will be included on all future bus and train purchases. All current trains have APC equipment. When non-APC buses reach their end of useful life, they will be replaced with APC-equipped buses. Staff have begun using fare gate data for O-Train Line 1 and Line 2 ridership analyses.

Recommendation #8

In order to further improve long-term ridership forecasts, the City should develop a business case to obtain the funding and resources necessary to implement permanent traffic counting stations in Ottawa, in consultation with Transportation Planning, MTO and the TRANS Committee.

Management response:

Management agrees with the recommendation.

Traffic Services will develop a business case in consultation with Transportation Planning by the end of Q2 2020 that will serve to identify resource requirements related to continuous count stations (CCS). This information will be brought forward to Committee and Council for review and funding approval consideration as part of the 2021 Budget.

Recommendation #9

The City should limit access to long-term ridership files within the Transportation Systems sub-directory to employees with a "need to know".

Management response:

Management agrees with the recommendation and it has been implemented.

Transportation Planning staff have limited access to employees with a "need to know" to the long-term ridership files within the Transportation Systems sub-directory. Moving

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[3] Automated passenger counters (APCs) are infrared sensors that count the number of people boarding and disembarking from a transit vehicle.

forward, access to the files will only be granted to staff in a position with a "need to know", as determined by the Program Manager of Transportation Policy & Networks.

Recommendation #10

The City should perform more frequent backups of long-term ridership modelling files to minimize the risk of loss.

Management response:

Management agrees with the recommendation.

Transportation Planning staff are working to implement daily automatic back-ups of the long-term ridership files by the end of Q1 2020. ITS staff are assisting to provide technical support, including identifying system requirements (e.g. hard disk space) and costs to implement.

Recommendation #11

The City should ensure the review and validation of affordability model outputs which support the LRFP Transit are appropriately documented and retained.

Management response:

Management agrees with the recommendation and it has been implemented.

All change requests and updates to the model are documented and verified by the Financial Planners in an affordability model version tracking document.

Recommendation #12

As it relates to the LRFP Transit, the City should:

   a. document and retain affordability model sensitivity testing results; and

   b. communicate relevant affordability model sensitivity testing results to Committee and Council.

Management response:

Management agrees with the recommendation and it has been partially implemented.

Key sensitivity testing results are captured within the affordability model. The results of the model sensitivity testing will be documented and included in the next Transit LRFP planned for Q2 2022.

Recommendation #13

During the identification of stormwater costs, the City should ensure the rationale supporting the departments' allocations are corroborated and documented.

Management response:

Management agrees with the recommendation.

Staff have been directed by Council to review the rate structure and update the LRFP Water, Wastewater and Stormwater. The process used to identify stormwater costs will be included in this review and the allocation of these costs will be validated by the supporting departments. All cost and assumptions will be documented and retained within the stormwater model. The next LRFP is planned for Q3 2021.

Detailed audit report

Introduction

The Audit of City Estimates (originally the Audit of Staff Estimates) was included in the 2018 Audit Plan of the Office of the Auditor General, approved by Council November 22, 2017.

Background and context

Estimates are approximations of future outcomes developed to assist with policy and program decisions and can ultimately have an impact on the City's financial resources. Complex estimates are generally produced using models, which invariably present model risk: the potential for negative outcomes from decisions based on incorrect or misused model outputs. Model risk increases as model complexity, breadth of model use and potential impacts increase.

The City of Ottawa uses estimates and models to support strategic, financial and operational decisions. As a result of model risk, the City is exposed to potential financial loss, poor decision-making and negative service outcomes. Estimates from various City departments involving high dollar values and high impacts to City operations and residents were considered for inclusion within this audit. The following estimates were selected for examination.

Short-term ridership

Short-term ridership forecasts are produced by the Service Strategy Unit within OC Transpo's Service Planning Branch (Figure 1).

Canadian transit agencies, including OC Transpo define ridership as the number of linked passenger trips. A linked trip is the journey from origin to destination, no matter how many transfers are made. Linked trips are not known with certainty; they are estimated based on fare revenue. The process used to convert fare revenue to linked trips relies on a series of assumptions based on data gathered through fare surveys, travel surveys and smartcard tap data. A fare survey collects information from a sample of passengers about how many trips they take each month using their pass. The data gathered is then extrapolated to the passenger population to estimate ridership. The Origin-Destination travel survey is described in detail in the Long-Term Ridership section.
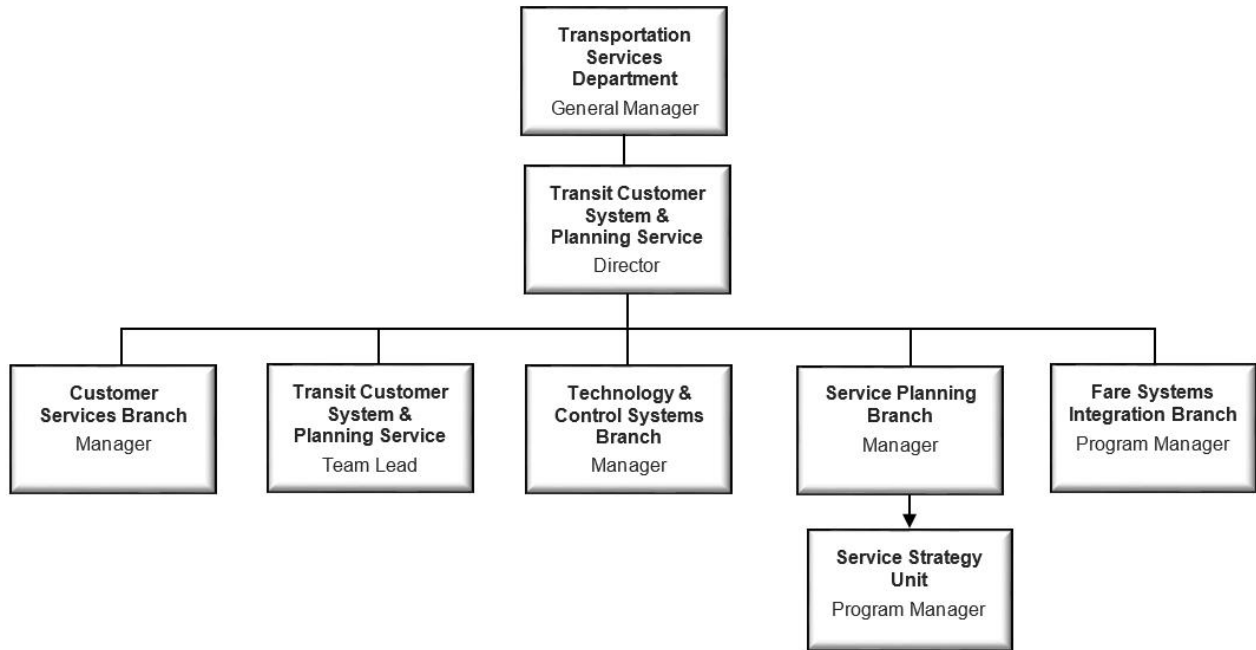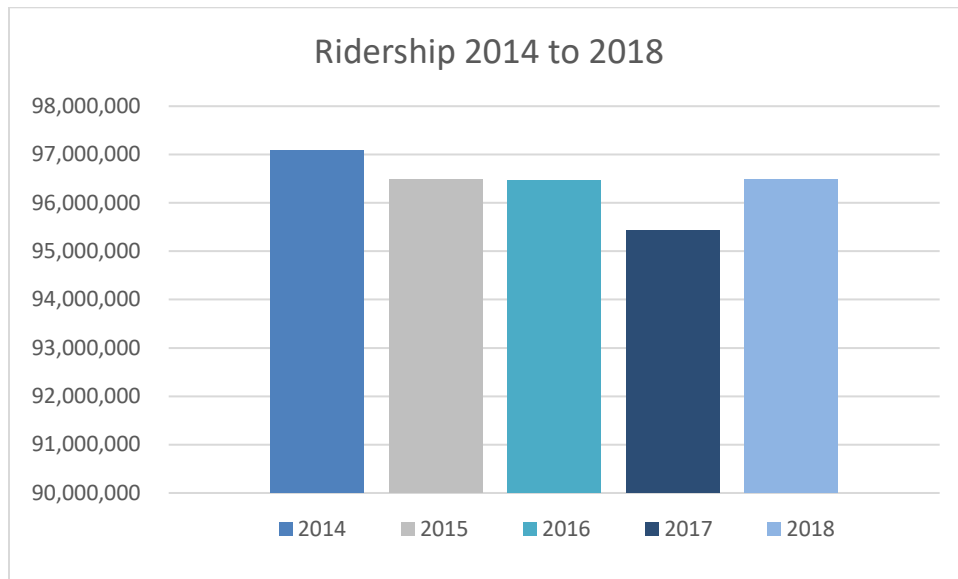
Figure 1: OC Transpo's Service Strategy Unit

Figure 2: OC Transpo Ridership from 2014 to 2018

Ridership for 2014 to 2018 is displayed in Figure 2. Ridership declined from 97.1 million trips in 2014 to 96.5 million trips in 2015 and 2016. Trips declined further to 95.4 million in 2017 before increasing to 96.4 million trips in 2018. Fare revenue for 2014 to 2017 was between $178.7 and $181.7 million before increasing to $186.3 million in 2018.

As part of the annual budgeting process, short-term ridership is forecasted by month for the next 12 months, primarily based on ridership from the previous 12 months. Ridership forecasts are used to estimate total fare revenue and as an input to decisions regarding aggregate service hours for the next 12 months. For example, a forecasted increase in ridership may necessitate an increase in service hours. The accuracy of ridership data and forecasts is important as OC Transpo incurs additional costs when service hours are increased. If ridership falls below the forecasted level, additional funding from Transit reserves may be required to address the corresponding budget deficit and over the longer term, the revenue/cost ratio of 55% for transit fares identified as a target within the City's Fiscal Framework may not be met.

Long-Term Ridership

Long-term ridership forecasts are produced by Transportation Modelling staff within the Transportation Policy and Networks Branch (Figure 3).
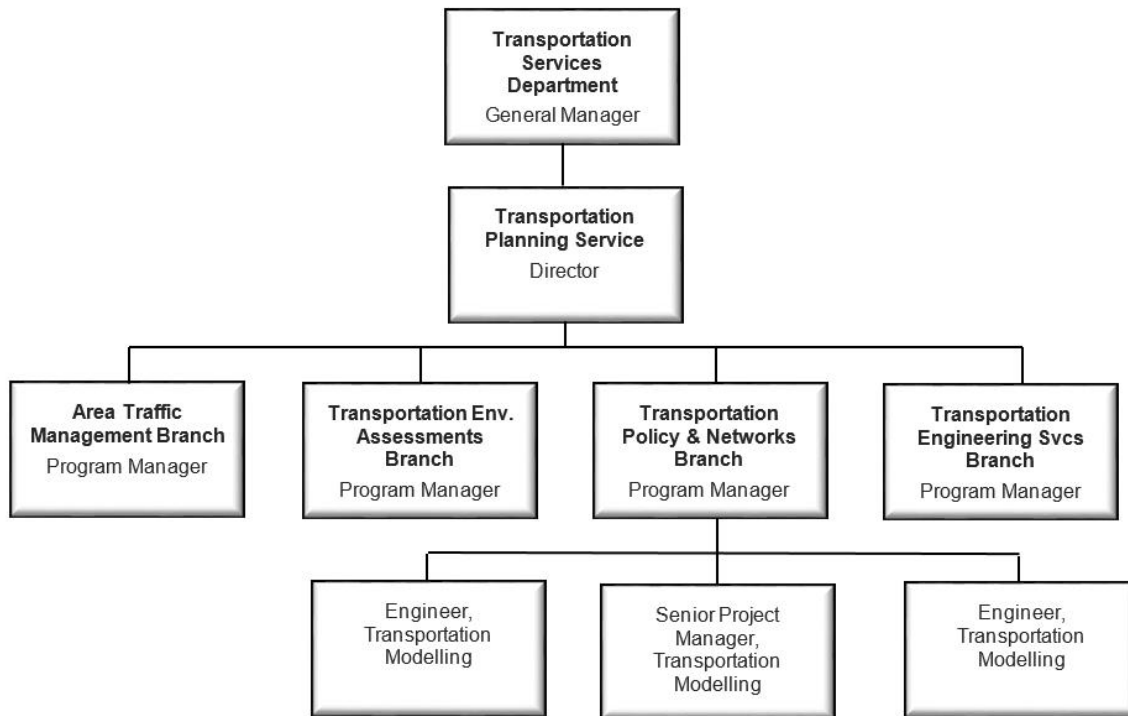

Figure 3: Transportation Modelling Staff within the Transportation Policy and Networks Branch

The City of Ottawa is a member of the TRANS Committee, a multi-jurisdictional committee responsible for transportation data collection and modelling in the National Capital Region (NCR). The TRANS Committee is composed of six agencies: the

National Capital Commission (NCC), the Ministère des Transports du Québec (MTQ), the Ministry of Transportation of Ontario (MTO), the Ville de Gatineau, the Société de transport de l'Outaouais (STO) and the City of Ottawa. Long-term forecasts are produced using the TRANS model, developed by consultants using data from the NCR Origin-Destination (OD) travel survey. The OD survey is conducted every five to ten years by the TRANS Committee. The last travel survey was conducted in 2011 and another is planned for 2020. Five per cent of households in the NCR are surveyed through computer-aided telephone interviews about all trips made by each household member during the preceding 24 hours, excluding commercial trips. Survey questions relate to:

- Household characteristics e.g. household income, household size, number of vehicles;
- Person characteristics e.g. age, gender, occupation status; and
- Trip characteristics e.g. origin and destination, departure and arrival time, mode of transportation, purpose.

The TRANS model has been implemented using EMME, a specialized travel demand modelling system. It predicts ridership growth as a function of land use (population, employment) and transportation infrastructure. The current model has a horizon year of 2031. It should be noted that year over year ridership variability between 2011 and 2031 is not modelled, though forecasts for interim years can be approximated. Long-term ridership forecasts are used for long range planning (e.g. Official Plan, TMP), affordability modelling, business case development (e.g. Stage 1 and 2 LRT), calculation of transit development charges and project planning and design.

Long Range Financial Plan (LRFP) Transit

The LRFP Transit reflects the City's long-term operating and capital requirements and is updated once per term of Council. A separate LRFP was developed for Transit as its sources of funding are dedicated to that purpose and cannot be used to fund other services. The LRFP Transit is produced by the Financial Strategy, Planning and Budgeting Branch within Corporate Finance (Figure 4). The most recent LRFP Transit was submitted to Council in February 2017 and covered a 32-year period to 2048, which covers the full contract period of the Confederation Line and Stage 2 LRT. An update was presented to Council in February 2019 to reflect changes related to Stage 2 LRT.

The LRFP Transit is developed using an Excel-based financial model originally developed by PricewaterhouseCoopers (PwC) in 2010-2011. Referred to as the "affordability model", it tests the LRFP Transit against the following affordability parameters:

- Transit fares will increase at the same rate as transit's operating costs;
- Transit taxes will increase at the same rate as transit's operating and capital costs;
- Annual debt servicing will not exceed provincial and city limits;
- Debt used to purchase an asset will be fully retired before the end of the asset's useful life;
- The City can operate and maintain the transit system and expand the service to meet future needs; and
- The future transit expansion as defined in the Transportation Master Plan will be completed to service growth needs.
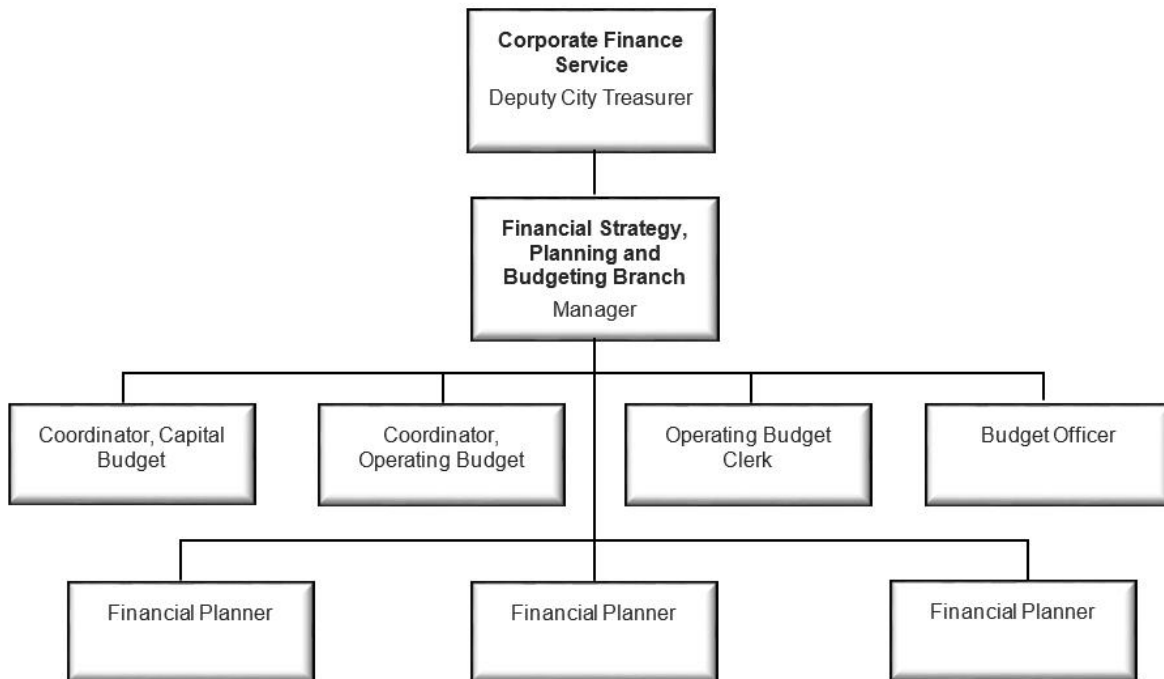
Figure 4: Financial Strategy, Planning and Budgeting Branch

The City currently outsources the services to update the affordability model to a third party. The third party's founder was the key resource involved in the development of the initial model.

The LRFP Transit is used by Corporate Finance, Infrastructure Services and Transportation Services staff for many purposes, including capital planning, maintenance, financial planning and budgeting. For example, the LRFP Transit estimates fare and transit tax increases to 2048, however actual fare and tax increases are determined through the annual budget process. The LRFP Transit also provides estimated cashflow and debt requirements for the City's Treasury Branch and was used to determine the affordability and funding strategy for Stage 2 LRT.

Stormwater

Stormwater services manage the safe transportation of rain and meltwater runoff throughout the City to protect roads, properties and local waterways from flooding and erosion and help with groundwater protection. In May 2015, the Environment Committee and Council directed staff to bring forward a proposal for a new water, wastewater and stormwater rate structure for Council's consideration. At this time, the City's water rate structure was based solely on how much water was used by ratepayers. Drinking water used was metered and charged for and then a sewer surcharge was added. The funds from the sewer surcharge were used to recover the costs for both wastewater and stormwater services delivered by the City.

The Water, Wastewater and Stormwater Rate Review was initiated in 2015, led by Finance staff. The engineering firm AECOM assessed the rate structure options for stormwater specifically. In October 2016, staff proposed a new rate structure with separate fees for water, wastewater and stormwater services, which was approved by Council. The new stormwater fee established three classes of residential properties and eight tiers of Industrial, Commercial and Institutional (ICI) properties. Residential properties are charged a flat fee based on property type and these fees are discounted based on service area (urban or rural) and service type (connected or unconnected to City systems). ICI properties are charged a flat tiered fee based on their municipal property assessment, discounted based on service area (urban or rural) and service type (connected or unconnected to City systems).

Annual operating and capital requirements for the stormwater program are identified in the Long Range Financial Plan (LRFP) for Water, Wastewater and Stormwater Supported Programs, developed by Corporate Finance (Figure 4) in collaboration with

Planning, Infrastructure Services and Public Works and Environmental Services within each term of Council. The LRFP for Water, Wastewater and Stormwater Supported Programs establishes the revenue increases required over the next ten years to meet operating needs, maintain assets in a state of good repair and address growth needs. Stormwater rates are calculated each year using an Excel spreadsheet, based on stormwater costs to be recovered, property assessment values from MPAC and changes in the number of properties by type, service area and service type. It's important that stormwater operating and capital costs are accurately estimated in order to ensure ratepayers are charged appropriately and services can continue to be provided in a sustainable manner.

Audit objectives and criteria

The overall objective of this audit was to provide an independent and objective assessment of the effectiveness of the City's estimation processes and the City's governance oversight structure and functions with respect to select estimates.

Audit objective #1

Assess the effectiveness of the City's governance oversight structure and functions with respect to select estimates.

Criteria:

- Roles and responsibilities are clearly articulated
- Individuals collectively possess sufficient knowledge, experience and resources to exercise a meaningful oversight and challenge function
- Assessments are undertaken to ensure continuous improvements are made to the model
- Procedures are undertaken to ensure the continuity of specialized estimate and modelling expertise

Audit objective #2

Assess the effectiveness of the City's estimation processes used to evaluate complex and uncertain future conditions.

Criteria:

- A process exists to ensure that data inputs are accurate, complete, and timely
- A process exists to analyze and use model outputs in a timely manner

- Assumptions are documented and approved prior to being included in the model and are routinely reviewed to ensure relevance
- Individuals involved in modeling possess and/or have access to sufficient knowledge and experience to derive the estimates
- Reviews are conducted to analyze, compare, and explain variances resulting from model estimates in comparison to predetermined expectations, baseline data, and/or historical trends
- The model and/or some of its components are updated on a regular basis to ensure they reflect the current environment
- Modeling tools and data are protected against unauthorized access, changes, use, and loss

Scope

The scope of the audit included an examination of estimate governance and current estimation processes related to:

- Short-Term Transit Ridership[4]
- Long-Term Transit Ridership
- Long Range Financial Plan (LRFP) Transit
- Stormwater Rates

Audit approach and methodology

The audit was designed and conducted in accordance with the requirements of the City's Audit Standards to ensure that sufficient and appropriate audit procedures were conducted, and evidence gathered to provide reasonable assurance of the accuracy of audit findings and conclusions, as they existed at the time of the audit.

The audit methodology included the following activities:

- Interviews with key staff from Corporate Finance, Transit Customer Systems and Planning and Transportation Planning involved in the development of estimates in scope;
- Review of relevant documentation and information (e.g., guidelines, procedures, management reports, model documentation, model data, organizational charts, third-party reviews, etc.); and

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[4] ParaTranspo ridership was excluded from the scope of the audit.

- Review of practices of other municipalities.

The audit plan was finalized in April 2019, and the audit fieldwork was substantially completed by June 30, 2019.

Audit observations and recommendations

Audit objective #1

We expected estimate owners to implement governance and organizational structures commensurate with the estimate's complexity and materiality. This includes clear articulation of roles and responsibilities and the appointment of individuals or the establishment of committees to oversee and challenge the estimate. We anticipated that estimate owners would make continuous improvements to estimate methodology and where applicable, models involved in the production of estimates. We also expected estimate owners to take measures to ensure the continuity of specialized expertise needed to produce estimates. This includes documentation of estimate and model logic as well as retention of the specialized expertise of City staff and third-party resources, where applicable.

Short-term ridership

Governance

We found that roles and responsibilities of staff involved in the short-term ridership forecast are clearly defined within job descriptions. OC Transpo's Departmental Leadership Team (DLT), composed of the General Manager, Transportation Services and their direct reports, oversees issues related to ridership through a quarterly briefing. Briefing material compares monthly revenue and ridership to the same month the previous year and highlights variances between actual revenue and ridership and budgeted revenue and ridership. Quarterly and year to date results are also provided. Total employed labour force for the National Capital region is also reported as this is the most closely correlated variable to transit ridership in Ottawa. As the DLT includes OC Transpo's most senior staff, this ensures the knowledge and experience necessary to exercise meaningful oversight.

Transit Commission also has a delegated responsibility to receive operational performance reporting related to the transit system. The availability of data supporting its oversight role with respect to ridership is currently limited as operational and performance reporting related to the transit system has been suspended since 2015. In response to a February 2018 Transit Commission inquiry, management indicated that

operations have not been comparable to previous years due to the effects of construction of O-Train Line 1 (Confederation Line). Management committed to produce a new performance scorecard following the opening of the Confederation Line. Until reporting resumes, the ability of Transit Commission members to exercise meaningful oversight of the transit system may be limited.

Recommendation #1

The City should include metrics related to short-term ridership (e.g. total ridership, ridership by fare type, comparisons of revenue and ridership to budgets and/or prior year actuals) in the scorecard to be produced.

Management response:

Management agrees with the recommendation.

Staff will recommend to the Transit Commission that ridership be one of the metrics included in the future performance measurement program, to be presented to the Commission in 2020.

Continuous improvement

We found that current revenue and ridership forecasting methods have been in use since at least 2012. Based on a review of ridership and revenue data, the variance between actual and forecasted ridership for 2014 to 2018 has generally been less than 2%. The variance between actual and forecasted revenue for the same period has generally been between 3 to 5%.

Service Strategy staff use a regression model to explain factors influencing changes in ridership and ridership trends. In 2015, a review of this model and the long-term ridership model was undertaken by Resource Systems Group (RSG). The focus of RSG's review of the short-term model was to understand the difference between actual ridership and modelled ridership that appeared in April 2012 and propose an approach to close this gap. In April 2012, differences between actual ridership and modelled ridership were noted and continued to grow until June 2012. Subsequent month-to-month variation was considerably higher than before 2012; the model consistently predicted more trips than actually carried by OC Transpo.

A summary of RSG's findings and recommendations were presented to Transit Commission and Council in 2016. Although the report to the Commission and Council indicates that OC Transpo adopted the recommendations made by RSG, we found that three of the eight recommendations were not addressed. The outstanding

recommendations relate to the performance of a fare survey and an update of the regression model.

Based on discussions with staff, a fare survey was not conducted in recent years due to the number of changes the transit system was undergoing. Their intention was to wait until the LRT was operational to conduct a fare survey, as survey results can be influenced by the period in which they are conducted. In addition, staff indicated that they are awaiting the results of CUTA's Ridership Methodology Project, which was launched in 2017 and remains in progress. Calculations of current ridership and forecasts of future ridership may be inaccurate as most of the trip rates used in these calculations are based on the last fare survey, conducted in the 1990s. Periodic travel surveys also inform trip rates; the most recent one was performed in 2011. Inaccuracies in current and forecasted ridership may negatively impact decision-making related to service hours, the achievement of fare revenue forecasts and Council's revenue/cost ratio target for transit fares.

Recommendation #2

The City should:

a. Conduct a fare survey or similar exercise in order to update trip rates by fare product used to calculate and forecast short-term ridership;

b. Review and update the short-term ridership model, taking into consideration the findings of CUTA's Ridership Methodology Project and recommendations from RSG's 2015 review; and

c. Document the new model logic based on review and update of the short-term ridership model undertaken under item "b".

Management response:

2.a

Management agrees with the recommendation.

Staff will review the most appropriate means of updating trip rates, whether by survey or by other data-based analyses and will update trip rates by the end of 2020.

2.b

Management agrees with the recommendation.

Staff will update the short-term ridership model once CUTA publishes their ridership methodology project recommendations.

2.c

Management agrees with the recommendation.

All updates to the short-term ridership model will be formally documented within six months of CUTA publishing their ridership methodology project recommendations.

While formal benchmarking exercises are not undertaken by staff, the City of Ottawa is a member of six transit benchmarking groups: the Ontario Public Transit Association (OPTA), the Canadian Urban Transit Association (CUTA), the American Public Transportation Association (APTA), the Union Internationale des Transports Publics (UITP), the Nova Group of Metros and the Benchmarking Group of North American Light Rail Systems (GOAL). These groups share ridership figures for transit agencies in Canada, the United States and around the world with their members. This allows those responsible for short-term ridership forecasting to stay up to date with respect to ridership trends in other municipalities and access industry research.

Retention of specialized knowledge and expertise

The short-term ridership forecast is produced by OC Transpo staff, all of whom have completed training related to transit and have worked on this file for several years. Given this, the production of the forecast is likely to continue in the absence of one or more of these staff. However, existing practices and processes are not well documented, due to a lack of resources dedicated to this. As a result, practices and processes may not be applied consistently over time and rationale for past decisions may be unclear.

Recommendation #3

The City should ensure that key decisions and processes related to the short-term ridership forecast are formally documented and maintained to ensure its long-term consistency and continuity.

Management response:

Management agrees with the recommendation.

Decisions and processes related to short-term ridership forecasting will be enhanced, documented and maintained beginning in 2020.

Long-term ridership

Governance

We found that roles and responsibilities of staff involved in long-term ridership forecasting are clearly defined within job descriptions. The Senior Project Manager and Engineers, Transportation Modelling are responsible for the development, maintenance and application of the model used to produce long-term ridership forecasts. We also found that the TRANS Committee provides oversight of the TRANS regional transportation model used to produce long-term ridership forecasts. Agency representatives participating in the TRANS Committee and sub-committees are typically employed within transportation planning functions, or similar. This ensures the knowledge and experience necessary to exercise meaningful oversight of the TRANS model.

Continuous improvement

We noted that a peer review of the TRANS model was undertaken by a third party in 2014 as part of a model update project. No specific recommendations were made as part of this review. Another peer review is expected to be undertaken during the next model update. A review of the modelling process used to prepare business case forecasts for Stage 2 LRT was undertaken by Resource Systems Group (RSG) in 2015. Eight recommendations were made, of which six were actioned. Based on discussions with staff, one of the outstanding recommendations will be addressed through an upcoming project.

Projects are identified, prioritized and budgeted for within the TRANS five-year work plan to ensure continuous improvements are made to the model. Projects currently underway include the development of a commercial vehicle model for the National Capital Region and the development of a simplified greenhouse gas estimator.

Retention of specialized knowledge and expertise

Much of the TRANS model development work is performed by third parties due to the scarcity of model development resources. As such, it is important that knowledge transfer occurs between third parties and City staff. Based on discussions with Transportation Modelling staff, contracts for model development require the vendor to deliver a workshop to in-house staff. Past workshops in 2014 and 2018 were mostly technical in nature, intended for staff conducting hands-on modelling work, and two to

three days in length. We noted that vendors also produce technical reports which provide detailed information about the work they have undertaken.

City staff are responsible for maintenance of the model and in some cases, its application. Staff are highly educated and highly specialized, holding advanced degrees and titles in civil engineering and have been working in this area for many years. Despite this, given the size of the team, any employee movement would result in a significant loss of experience and knowledge with respect to the model. Staff are well aware of this risk; it was identified in the Transportation Services Department's risk register in 2018 and remains open in the 2019 risk register last updated in April. One measure staff indicated they are using to mitigate this risk is documentation of existing practices and projects. Staff also noted that they are considering hiring a data scientist which would increase the level of redundancy within the team to some extent. However, additional measures may be necessary to reduce the risk to an acceptable level.

Long Range Financial Plan (LRFP) Transit

Governance

We found that the roles and responsibilities of staff involved in the LRFP Transit are defined within job descriptions while the roles and responsibilities of the third party are defined within a 2017 proposal to the City. As part of the advisory services related to the procurement of the Stage 2 Light Rail Transit (LRT) project, the consultant was responsible for updating the affordability model created in 2017 to reflect the actual bid costs for the Confederation and Trillium lines and performing any other required changes. The Financial Planner provides relevant inputs from City departments to the consultant. As part of their duties related to the development, review and update of the City's LRFP Transit, the Financial Planner is required to develop an understanding of the affordability model created by the consultant and is responsible for overseeing their work.

Based on discussions with the Financial Strategy, Planning and Budget Branch, a "core" working group was responsible for the affordability modelling supporting the 2019 LRFP Transit update. This working group was composed of:

- Financial Planner, Transit;
- Manager, Financial Strategy, Planning and Budgeting;
- Manager, Program Management and Technical Services for Stage 2 LRT;
- representative(s) from Deloitte, the financial advisor for Stage 2 LRT; and
- representative(s) from the third party.

The Financial Strategy, Planning and Budgeting Branch also indicated that there was an "extended" working group which included representatives from Planning, Infrastructure and Economic Development (PIED), Transportation Operations, Transportation Planning, the Stage 1 Rail Implementation Office Financial Services Unit and the Stage 2 Rail Implementation Office. Further, we were informed that this group was provided with regular updates and responsible for confirming assumptions and validating results. As documentation related to the core and extended working groups was not available, we were unable to confirm the degree of review and oversight they perform.

The Deputy City Treasurer is accountable for the LRFP Transit. According to Financial Strategy, Planning and Budgeting staff, she confirms assumptions and provides regular updates to the City Treasurer. We were informed that meetings between the Deputy City Treasurer and City Treasurer are largely ad hoc and verbal. Financial Strategy, Planning and Budgeting staff indicated that interim results were validated by the General Manager, Transportation Services and impacted Directors before final presentations of the LRFP Transit to the City Manager, City Treasurer and GM of Transportation Services. Due to the limited documentation available to us, we were unable to confirm the occurrence of the interim and final presentations and the results of these.

The Finance and Economic Development Committee (FEDCO) is responsible for reviewing and making recommendations to Council on all matters associated with the LRFP Transit. The Committee receives annual disposition and quarterly status reporting which compares budgets to actuals and highlights variances.

The involvement of relevant staff, external subject matter experts and FEDCO ensures the collective knowledge and experience necessary to provide meaningful oversight of the LRFP Transit.

Continuous improvement

The affordability parameters used in the affordability model were developed by PricewaterhouseCoopers (PwC) in 2010-2011. We found that there are no formal plans to review the affordability parameters, although Financial Strategy, Planning and Budgeting Branch staff indicated that they are informally reviewed for relevance before the affordability model is run and the LRFP Transit is updated. This appears reasonable as the affordability parameters are principle based and therefore unlikely to change materially over time. More emphasis is placed on updating model inputs and assumptions, discussed under Audit objective #2.

We found that benchmarking of the affordability model is not undertaken. The Financial Strategy, Planning and Budgeting Branch and a representative from the third party indicated that it is not appropriate to benchmark this type of model against the models of other municipalities as it is specific to the City's current transit system and planned transit projects. This is consistent with our understanding of the model.

Retention of specialized knowledge and expertise

Based on discussions with the Deputy City Treasurer, the City outsourced the development and update of the affordability model due to a lack of internal capacity and expertise. In an effort to reduce the outsourcing risk, a new Financial Planner position was created to develop an understanding of the affordability model and oversee the consultant's work during the 2017 and 2019 LRFP Transit updates and to maintain the model going forward. Based on our review of the contract between the City and the third party, the City owns the related intellectual property and therefore has the ability to hire another third party to assume the duties of the third party currently under contract, if needed. As such, an understanding of the affordability model is being developed in-house and specialized knowledge and expertise can be obtained from the third party under contract or another third party.

Stormwater

Governance

We found that roles and responsibilities of the Financial Strategy, Planning and Budgeting staff responsible for preparing stormwater estimates and determining stormwater fees are defined within job descriptions. Stormwater costs are estimated by departmental managers and discussed through interviews with the Account Manager for the Public Works and Environmental Services Financial Services Unit (FSU). The stormwater costs to be recovered are allocated to residential and Industrial, Commercial and Institutional (ICI) properties based on the approved rate structure by the Financial Planner as part of the annual budget process.

Based on discussions with Financial Strategy, Planning and Budgeting staff, the Manager, Financial Strategy, Planning and Budgeting and the Deputy City Treasurer review the stormwater cost estimates and the allocation of stormwater costs, although documentation of their review was not available. The Finance and Economic Development Committee (FEDCO) is responsible for reviewing and making recommendations to Council on all matters associated with the LRFP for Water, Wastewater and Stormwater Supported Programs. The Committee receives annual

disposition and quarterly status reporting which compares budgets to actuals and highlights variances. The involvement of relevant staff and oversight by FEDCO ensures the collective knowledge and experience necessary to provide meaningful oversight of stormwater estimates.

Continuous improvement

We found that continuous improvement assessments have not yet been undertaken to identify potential improvements in the methodology applied. Financial Strategy, Planning and Budgeting staff indicated that while the new rate structure for stormwater was approved in 2016, it was not fully implemented until the new water billing system was launched in 2019. In addition, for residential and ICI properties not connected to the City's infrastructure, there is a four-year phase-in of the stormwater fee which concludes in 2020. Based on these considerations, management indicated that it will review the process used to identify stormwater costs in 2021. The new rate structure will also be reviewed in the next LRFP for Water, Wastewater and Stormwater Supported Programs.

Recommendation #4

In addition to Council's direction on October 26, 2016 to review the new stormwater rate structure in future long-range financial plans, the City should review the processes used to identify stormwater costs.

Management response:

Management agrees with the recommendation.

Staff have been directed by Council to review the rate structure and update the LRFP Water, Wastewater and Stormwater during this term of Council. The process used to identify stormwater costs will be included in this review.

The Review findings and subsequent recommendations will be presented to the Finance and Economic Development Committee and Council, as part of the next LRFP planned to be completed by Q3 2021.

Retention of specialized knowledge and expertise

We found that the identification of stormwater costs and the allocation of these costs to residential and ICI properties are completed by City staff, many of whom are Chartered Public Accountants (CPAs) and were involved in the 2015 Water, Wastewater and Stormwater Rate Review. The process used to identify and allocate stormwater costs is not complex and is documented in Excel spreadsheets.

Audit objective #2

We expected estimate owners to implement processes to ensure estimate consistency, continuity, quality and timeliness. This includes the management of data inputs and assumptions as well as review, analysis and use of estimates in a timely manner. It also includes access to the necessary expertise to produce estimates, updates to estimation and modelling methods to respond to changes in the environment and protection of data and models from unauthorized access, changes and loss.

Short-term ridership

Data inputs

As ridership is estimated based on fare revenue, factors that impact the completeness of fare revenue such as fare evasion may also impact ridership estimates. Fare inspections take place on trains, articulated buses and double-decker buses as they allow for multiple-door boarding. In 2018, the fare evasion rate observed during fare inspections ranged from 4.30% to 16.98% for bus routes and 1.49% to 12.49% for the O-Train, based on reports provided by OC Transpo. Management indicated that fare inspections are often conducted at targeted times and locations where higher rates of evasion are suspected. As a result, fare evasion rates observed during inspections are not necessarily representative and are not used to calculate a system-wide evasion rate. Given this, fare evasion is not taken into consideration within current ridership calculations and forecasts. Service Strategy staff provided several examples of Canadian transit agencies that do not include fare evasion in their ridership figures. This may be because transit agencies are asked to exclude fare evasion from reporting of ridership to CUTA.

Calculations and forecasts of ridership may be inaccurate as fare evasion is not included. Depending on the degree of fare evasion occurring, this may negatively impact decision-making related to service hours and the achievement of fare revenue forecasts.

Recommendation #5

The City should determine how a system-wide fare evasion rate should be derived, taking into consideration the practices of other transit agencies.

Management response:

Management agrees with the recommendation.

Staff will review the practices of other transit agencies, through Canadian and international contacts, industry associations and benchmarking groups, to determine the most appropriate ways to estimate and report system-wide non-payment of fares on multimodal systems with a mix of fare gates and front and rear boarding if possible, by the end of 2021.

Assumptions

We found that the underlying calculations and rationale for fixed values related to the number of STO passengers transferring to OC Transpo are not documented. Based on discussions with Service Strategy staff, the same value has been in use since 1999 for these passengers. Prior to the introduction of no-charge days for seniors, surveys were conducted to estimate fare and ridership levels. These static estimates have been carried forward since 2011.

Recommendation #6

With respect to fixed values used in short-term ridership calculations and forecasts, the City should:

a. perform a review of assumption calculation / rationale, which may include conducting a current survey;

b. document assumption calculation / rationale and its approval; and

c. establish a review frequency for assumptions based on their degree of materiality.

Management response:

6.a

Management agrees with the recommendation.

Staff will perform a review of the few fixed values used in current ridership calculations and will assess if there are existing data sources that will help improve their accuracy. If existing data sources are found to improve accuracy, they will replace the fixed value. If insufficient data exists, staff will determine appropriate means of obtaining more accurate data and will replace the existing fixed value with the updated value. Staff will complete this review and include any updated values by the end of 2020.

6.b

Management agrees with the recommendation.

Staff will ensure fixed value ridership calculations are documented, as they are reviewed in 2020, and moving forward.

6.c

Management agrees with the recommendation.

For any ridership calculations that continue to depend on fixed values, staff will review the fixed value on an annual basis and update it if necessary.

Variance analysis

We found that Service Strategy staff review Presto data on a monthly basis and automated passenger counter (APC) data on a quarterly basis to supplement ridership estimated based on fare revenue data.

APCs are infrared sensors that count the number of people boarding and disembarking from a transit vehicle. Management has indicated that APCs are currently installed on just over 20% of OC Transpo buses and all OC Transpo trains, though we were unable to verify that this figure is accurate. Given that APCs are installed on only a fraction of vehicles, the data collected must be extrapolated to the population of transit vehicles, potentially resulting in sampling error. Management expects the percentage of OC Transpo vehicles equipped with APCs to increase due to bus reductions related to the opening of the Confederation Line and the delivery of new replacement buses, which will be equipped with APCs.

Both Presto and APC data present ridership in terms of unlinked trips (a passenger may be counted multiple times from origin to destination) while ridership estimated based on fare revenue data is presented in terms of linked trips (a passenger is only counted once from origin to destination). As such, in order to make comparisons between Presto or APC data and ridership estimated based on fare revenue data, the unlinked trips counted through Presto and APC data must be converted to linked trips, based on an estimate of the number of transfers the average passenger makes, limiting the precision of the comparison. In addition, the completeness of Presto data, that is, whether all passengers using Presto are tapping their cards as required, is not known.

While the comparison of ridership estimated based on fare revenue data to other data representing ridership is a good practice, current limitations of Presto and APC data

impact the value of this analysis. As a result, anomalies or inaccuracies may not be identified.

Recommendation #7

As it relates to short-term ridership, the City should examine how other data representing ridership can be improved, for example greater use of APCs, leveraging fare gate data, communications related to the importance of smartcard taps etc.

Management response:

Management agrees with the recommendation and implementation is in progress.

APC equipment has been included on all buses and trains procured in recent years and will be included on all future bus and train purchases. All current trains have APC equipment. When non-APC buses reach their end of useful life, they will be replaced with APC-equipped buses. Staff have begun using fare gate data for O-Train Line 1 and Line 2 ridership analyses.

Long-term ridership

Data inputs

We found that travel survey data is collected through the Origin-Destination (OD) travel survey, conducted every five to ten years by the TRANS Committee. The last OD survey was conducted in 2011. The intention was to conduct another survey in 2016 however its conduct was delayed in anticipation of the launch of the LRT and the expectation that this would significantly impact travel patterns. It costs approximately $1.5M to conduct an OD survey and takes two to three months to complete. An additional six to nine months is needed to clean, format and validate the data. The next survey is expected to be conducted in 2020.

The data collected is validated at a regional level, using traffic and transit counts. Traffic and transit counts are also a key source of data for validating the transportation model. However, as there are currently no permanent traffic counting stations in Ottawa, traffic counts are performed during a single day on an annual basis. As a result, seasonal variations in demand and travel trends cannot be assessed by staff. In contrast, the City of Calgary has 38 traffic counting stations, the City of Surrey has 16 traffic counting stations and York Region has seven traffic counting stations.

Recommendation #8

In order to further improve long-term ridership forecasts, the City should develop a business case to obtain the funding and resources necessary to implement permanent traffic counting stations in Ottawa, in consultation with Transportation Planning, MTO and the TRANS Committee.

Management response:

Management agrees with the recommendation.

Traffic Services will develop a business case in consultation with Transportation Planning by the end of Q2 2020 that will serve to identify resource requirements related to continuous count stations (CCS). This information will be brought forward to Committee and Council for review and funding approval consideration as part of the 2021 Budget.

Another major input to the TRANS model is the National Capital Region's transportation network. The road network within the model includes all arterial and major collector roads, their capacity, number of lanes and free flow speed. The transit network within the model includes all OC Transpo and STO routes as they existed in the fall of 2011, the vehicle type used, headway[5], stop patterns, fare and speed for the route. Based on discussions with Transportation Modelling staff, network validation is conducted manually on an ad-hoc basis, in response to specific needs. However, a network development project is being initiated in 2019. This project will include a comprehensive review and update of road, transit and cycling networks in the model.

Analysis and use of model outputs

Based on discussions with Transportation Modelling staff, a third party has been contracted to develop automated tools to summarize model results in order to ensure greater consistency, minimize errors and reduce the time required to prepare model outputs. All model outputs are reviewed by Transportation Modelling staff for reasonability. In depth analysis is generally performed by individuals using the outputs.

We found that sensitivity and scenario testing is often included in model development contracts and carried out by consultants under supervision of the TRANS Modelling Sub-Committee, though it is occasionally undertaken in-house by members of TRANS.

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[5] Time between vehicles in a transit system.

When model results need to be adjusted for specific purposes, adjustments are generally reviewed by the Senior Project Manager and discussed with the Program Manager, Transportation Policy and Networks for concurrence. In some cases, these adjustments are discussed with senior management representatives such as the GM, Transportation Services or the City Manager.

Assumptions

Many of the TRANS model's assumptions are related to its input data. Based on discussions with Transportation Modelling staff, data related to future land use is prepared and validated by the City's Research and Forecasting Branch. Data related to the transit network is validated by OC Transpo's Service Strategy staff. Where feasible, input data is updated on an as-needed basis to produce more accurate forecasts. Some assumptions, for example that transportation attitudes in the future remain similar to today's are inherent to the model's current design and structure and are not expected to change in the short-term.

Protection from unauthorized access, changes and loss

We found that within the City of Ottawa, all networked employees have access to the Transportation Systems sub-directory. However, based on discussions with Transportation Modelling staff, the modelling software, EMME, requires a software protection dongle (key) to open modelling files, which reduces the risk of unauthorized access or changes to these files. We also identified some personally identifiable information (PII) stored in this sub-directory. As a result, networked employees with the path to the sub-directory could access the PII.

Recommendation #9

The City should limit access to long-term ridership files within the Transportation Systems sub-directory to employees with a "need to know".

Management response:

Management agrees with the recommendation and it has been implemented.

Transportation Planning staff have limited access to employees with a "need to know" to the long-term ridership files within the Transportation Systems sub-directory. Moving forward, access to the files will only be granted to staff in a position with a "need to know", as determined by the Program Manager of Transportation Policy & Networks.

Transportation Modelling staff work primarily off their local hard drives, which have been upgraded with additional storage, as the TRANS model cannot be run from network

drives. Staff back up their work to an external hard drive once or twice a year, generally at the conclusion of a project. They indicated that making backups to the external hard drive is time consuming given the number and the size of the files involved. As a result, work in progress during a project may be lost due to local hard drive failure.

Recommendation #10

The City should perform more frequent backups of long-term ridership modelling files to minimize the risk of loss.

Management response:

Management agrees with the recommendation.

Transportation Planning staff are working to implement daily automatic back-ups of the long-term ridership files by the end of Q1 2020. ITS staff are assisting to provide technical support, including identifying system requirements (e.g. hard disk space) and costs to implement.

Long Range Financial Plan (LRFP) Transit

Data inputs

We found that there is a process to ensure that inputs to the affordability model are accurate, complete and timely, although the performance of this process by Financial Strategy, Planning and Budgeting staff is not documented.

Inputs to the affordability model include:

- Capital and operating estimates for Stage 2 LRT, provided by the Stage 2 Rail Implementation Office and Capital Transit Partners (CTP);
- Compensation impacts, debt servicing projections and fuel impacts, provided by City staff;
- Comprehensive asset management (CAM) reports, which provide information related to the current state of assets;
- Development charge (DC) background study, conducted by a third party, which provides information related to growth-related capital and expected DC revenues;
- Federal and provincial gas tax agreements, provided by the Association of Municipalities of Ontario (AMO);
- Ridership estimates, provided by Transportation Planning and a third party;
- Transit operating costs; and
- The Transportation Master Plan (TMP), which identifies transit projects to 2031.

Financial Strategy, Planning and Budgeting staff indicated that inputs are validated through comparisons to source documents, such as approved budgets, forecasts and reports. Quarterly budget reporting and monitoring and performance reports which highlight variances may identify changes to inputs which require updates to the model. Based on discussions with Financial Strategy, Planning and Budgeting staff, the model is updated as required in between formal updates to the model and the LRFP Transit once per term of Council. If there are significant changes to inputs or assumptions within Council's term, an update is provided within the same term.

We discussed the following inputs and assumptions with Financial Strategy, Planning and Budgeting staff and reviewed supporting documentation:

- Change to the provincial gas tax;
- Contingency for impacts resulting from delays to Stage 1 LRT;
- Contingency for Stage 2 LRT;
- Increased growth rate; and
- Interest rate ceiling.

We found that the February 2019 LRFP Transit update to Council included the doubling of the gas tax as the provincial government had not yet announced any changes to this program; these were announced in April 2019. Staff are assessing the implications of this change on the LRFP Transit and the options available to address this change. We noted that the affordability model includes contingencies to cover the impacts resulting from delays to Stage 1 LRT as well as for Stage 2 LRT. Based on our discussions with Financial Strategy, Planning and Budgeting staff, the model also includes contingencies for non-LRT related capital projects. We also confirmed the rationale for the increased growth rate and the interest rate ceiling included in the 2019 LRFP Transit update.

Analysis and use of model outputs

We found that representatives from the third party reconcile the affordability model outputs to two other separately constructed models: one in Excel and one using "R", a programming language. We observed that all three models reconcile appropriately. Once this reconciliation is completed, the Financial Planner within Financial Strategy, Planning and Budgeting performs their review. This review includes comparing the current version to a previous version of the model, comparing model inputs to source documents and recalculating model outputs. The Financial Planner ensures that variances are explained or discussed with the third party and rectified as necessary. While we found this process reasonable, documentation of its performance was not

available. As a result, greater reliance may be placed on the third party's work and errors may go undetected. The Manager, Financial Strategy, Planning and Budgeting is aware of this deficiency and indicated that they intend to make improvements in this area.

Recommendation #11

The City should ensure the review and validation of affordability model outputs which support the LRFP Transit are appropriately documented and retained.

Management response:

Management agrees with the recommendation and it has been implemented.

All change requests and updates to the model are documented and verified by the Financial Planners in an affordability model version tracking document.

We noted that the affordability model is designed to allow staff to perform sensitivity testing. A number of inputs can be modified in order to determine at which points the plan may no longer be affordable. Some of these limitations were disclosed in the 2019 LRFP Transit update to Council. However, documentation of the full suite of sensitivity tests conducted by Financial Strategy, Planning and Budgeting staff was not available for our review. Furthermore, the results of key sensitivity tests are not described in reporting to Council. Financial Strategy, Planning and Budgeting staff indicated that this is left to Councillors to address during the question and answer period. However, Councillors may not be fully aware of the potential impacts should inputs change.

Recommendation #12

As it relates to the LRFP Transit, the City should:

a. document and retain affordability model sensitivity testing results; and

b. communicate relevant affordability model sensitivity testing results to Committee and Council.

Management response:

Management agrees with the recommendation and it has been partially implemented.

Key sensitivity testing results are captured within the affordability model. The results of the model sensitivity testing will be documented and included in the next Transit LRFP planned for Q2 2022.

Assumptions

We noted that assumptions are documented in the affordability model and implicitly approved through the submission of the LRFP Transit to Committee and Council. Based on discussions with Financial Strategy, Planning and Budgeting staff, assumptions are reviewed and validated by the "core" working group and the Deputy City Treasurer. Documentation supporting this review and validation were not available. Furthermore, outside of LRFP Transit submissions made by the City Treasurer to Council, documentation of the City Treasurer's approval was not available. At a minimum, assumptions are reviewed when the LRFP Transit is updated once per term of Council, although they may also be informally reviewed during interim updates.

Stormwater

Data inputs

We found that a process exists to identify the stormwater costs to be recovered however sufficient documentation is not retained to support management's estimated allocation of indirect costs used for stormwater costing. The City is required to report financial information to the province annually through a Financial Information Return (FIR). In order to complete the FIR, departmental managers must allocate their costs among nine programs, two of which are urban storm sewer and rural storm sewer. As such, management decided to leverage the FIR exercise to identify stormwater costs to be recovered through the stormwater rate. However, as the City does not track costs based on the FIR structure, each departmental manager must estimate the cost per program based on full-time equivalents (FTE), work orders or other factors. Given this, we sampled urban and rural storm sewer costs totaling nearly $41M. We found that documentation was available to support the costs selected.

Departmental managers' allocations among the FIR programs are discussed during interviews with the Account Manager for the Public Works and Environmental Services Financial Services Unit in order to identify stormwater costs to be recovered. However, the allocations are not justified or supported with documentation. As a result, the stormwater costs to be recovered may be misstated if not accurately estimated. The stormwater rate may be too high, resulting in a surplus, or too low, resulting in inadequate funds for the maintenance of stormwater infrastructure and provision of stormwater services.

Recommendation #13

During the identification of stormwater costs, the City should ensure the rationale supporting the departments' allocations are corroborated and documented.

Management response:

Management agrees with the recommendation.

Staff have been directed by Council to review the rate structure and update the LRFP Water, Wastewater and Stormwater. The process used to identify stormwater costs will be included in this review and the allocation of these costs will be validated by the supporting departments. All cost and assumptions will be documented and retained within the stormwater model. The next LRFP is planned for Q3 2021.