



OFFICE OF THE
City Auditor

Transportation Contributed Assets Review

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The Office of the City Auditor conducted
this project in accordance with the
*International Standards for the
Professional Practice of Internal Auditing*

Transportation Contributed Assets Review

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Executive Summary

The Development Planning and Engineering Section of the Transportation Services Department is responsible for approving the transportation components of municipal improvements built by Developers prior to the City taking them over. This work is done in the interest of protecting public assets. The transportation components of the municipal improvements are known as Transportation Contributed Assets (TCA). Once the City accepts a TCA, the City is responsible for the ongoing maintenance of the asset. Over the past five years, the City received approximately \$353 million worth of transportation assets from Developers.

The objective of this audit was to determine whether the City's process to accept TCAs from Developers is effective. It is important that this process is effective due to the magnitude of the contributed assets and the potential risk or cost to the City if the contributed assets are substandard. To be effective, the City needs to ensure it is only accepting transportation assets that have been designed and constructed in accordance with the guidance documents (Servicing Agreement and City Design and Construction Standards).

Overall, we found that the process to accept TCAs can be improved. We made three recommendations to the Sustainable Development Department and two recommendations to the Transportation Services Department to address the following findings:

- The guidance documents would benefit from an overall review and update. Various sections have been revised over time but an overarching review has not been conducted.
- The expectations and accountabilities of the Departments involved with the TCA process needs to be better defined.
- The framework between the City and Developers for accepting TCAs needs to be updated to reflect the number and nature of inspections needed to adequately assess the risk of the City accepting substandard TCAs.
- The City's processes to inspect the assets during construction and to document inspection findings are not consistent.
- The information system currently in use by the Construction Group of the Development Planning and Engineering Section is not adequate to manage information and report data on an aggregate level.

Management has accepted all five recommendations and developed action plans to address them. They are already actively working on addressing some of our recommendations. For example, they are in the process of developing an operating manual and working on developing a new information system to better track pertinent data.

We anticipate that implementing the five recommendations in this report will help ensure the City is receiving transportation assets from Developers that meet the City's expectations for service life. As well they will help to improve the working relationships between the City and the Developers as new growth areas in the city are developed.

Transportation Contributed Assets Review

1. Introduction

Developers are mandated by the *Municipal Government Act – Section 650* and the *Edmonton Zoning Bylaw 12800 – Section 15* to enter into an agreement with the City to construct the transportation components, landscaping, storm and sanitary sewers, water mains, power, and various other items that make up a new development area in the city. This audit focused on the transportation components.

In each of the past 5 years, the City has received an average of approximately \$70.5 million of municipal improvements relating to transportation components from Developers. Once the municipal improvements are transferred to the City of Edmonton (City), the City is responsible for the maintenance of the asset including snow clearing, pothole repairs, patch paving, sidewalk repairs, repaving, and reconstruction.

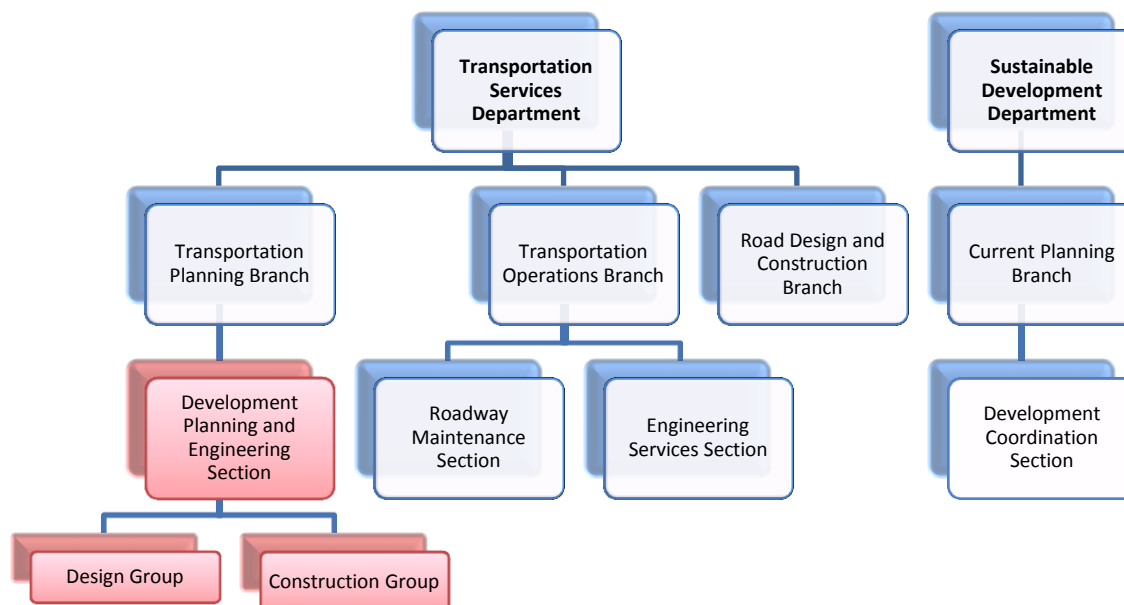
The Transportation Planning Branch requested that the Office of the City Auditor (OCA) conduct a review of the Branch's processes for accepting transportation contributed assets. The OCA included a review of the management of the acquisition of transportation contributed assets from Developers in its *2014 Annual Work Plan*.

2. Objective, Scope, and Methodology

The objective of this review was to determine if the City has an effective process to accept transportation contributed assets. This review does not cover the process used by the City to accept other types of municipal improvements built by Developers (landscaping, storm and sanitary sewers, water mains, etc.).

The Transportation Services and Sustainable Development Departments are both involved in the process for accepting transportation contributed assets. Figure 1 on the following page shows the areas within each Department that are involved in the process.

Figure 1
Areas of the City Involved with Transportation Contributed Assets
 Area of focus for this review shaded in red



In general, the following are the responsibilities of each Branch within the City relating to transportation contributed assets:

- Transportation Planning – Review and recommend for approval the engineering drawings for new private development. Provide inspections and recommendations for acceptance of all of the City’s private roadway developments.
- Transportation Operations – Perform materials research, testing, and pavement structural design and analysis. Provides roadway maintenance such as snow clearing, pothole repairs, and street sweeping.
- Road Design and Construction – Provide detail design and project management services for City road projects including major roads, neighbourhood renewal and rehabilitation.
- Current Planning – Prepare the Servicing Agreements and provide formal approval of engineering drawings and acceptance certificates for the private development industry on behalf of the City.

The scope of our review was focused on the activities of the Development Planning and Engineering Section of the Transportation Services Department as they relate to the recommendations for acceptance of transportation contributed assets.

We completed detailed audit procedures including interviews with management; ride-alongs with the Inspectors; focus group sessions with Developers, Consultants, and Contractors; and a review of relevant documentation. We also surveyed representatives from six other municipalities to determine whether they have processes similar to the City.

3. Background

3.1. What are Transportation Contributed Assets?

The transportation components include: paved roads, sidewalks, curb and gutter, light poles, etc. Upon completion of these assets, the Developer transfers them to the City and they become part of the City’s transportation asset inventory.

From 2009 to 2013, the City received approximately \$353 million of municipal improvements relating to transportation assets from Developers. Table 1 shows the value of each component by year.

Table 1 – Transportation Contributed Assets (2009 – 2013)
(\$ thousands)

Component	2009	2010	2011	2012	2013	Total
Asphalt	\$90,000	\$38,700	\$27,100	\$39,200	\$51,800	\$246,800
Sidewalks	20,600	12,500	10,000	7,900	14,800	65,800
Light Poles	5,200	7,700	6,800	7,900	400	28,000
Auxiliary Structures*	0	300	0	0	7,000	7,300
Other**	400	600	1,800	1,400	600	4,800
Total	\$116,200	\$59,800	\$45,700	\$56,400	\$74,600	\$352,700

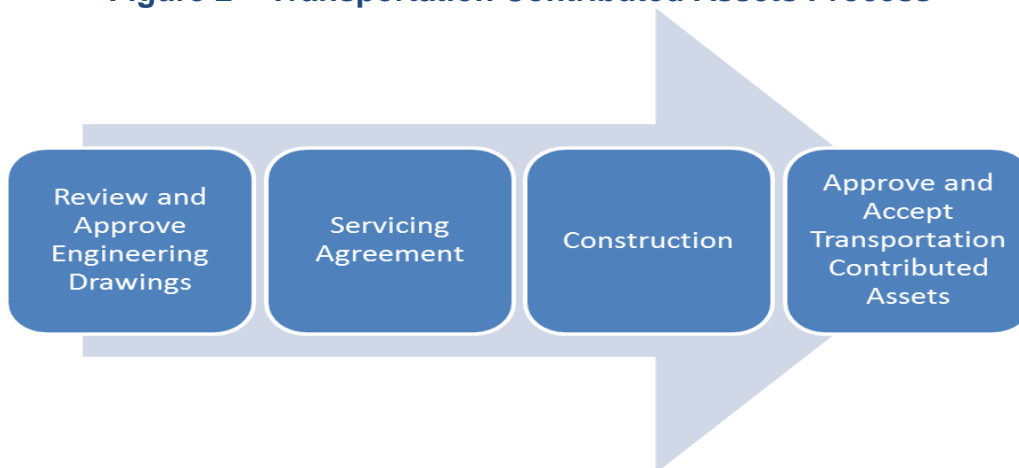
*Auxiliary Structures – includes retaining walls and sound walls.

**Other – includes bus stops and gravel roads.

3.2. Transportation Contributed Assets Process

The process to ensure transportation assets are built in accordance with City standards involves four key steps: (1) review and approve engineering drawings, (2) enter into a Servicing Agreement, (3) construct the transportation assets, and (4) approve and accept the transportation assets. Figure 2 below illustrates the process.

Figure 2 – Transportation Contributed Assets Process



1. Review and Approve Engineering Drawings

The engineering drawings are reviewed and recommended for approval by the Development Planning and Engineering Section of the Transportation Services Department. The Design Group within this Section ensures that the engineering drawings comply with the City's Design and Construction Standards. The recommendation is forwarded to the Development Coordination Section of the Sustainable Development Department where final approval/sign-off takes place.

Once the engineering drawings are, at minimum, in second circulation the Developer submits an application to the Development Coordination Section to develop a Servicing Agreement.

2. Servicing Agreement

The Servicing Agreement is the legal contract between the Developer and the City which outlines the terms and conditions for development of the transportation components in a new area. The Servicing Agreement also requires that Developers use the City's Design and Construction Standards. Those standards are organized into eight volumes by discipline, to ensure a consistent process for the construction of all contributed assets. For the purposes of this review we focused on Volumes 1 and 2 of the Design and Construction Standards:

- *Design and Construction Standards Volume 1 - General (General Provisions)*
The General Provisions outline the responsibilities of the Developers and the City in the construction of municipal improvements. They contain information such as the responsibility for quality assurance and quality control, occupational health and safety requirements, etc.
- *Design and Construction Standards Volume 2 - Roadways Design Standards and Construction Specifications – 2012 Edition (Roadways Specifications)*
The Roadways Specifications contain the design standards for roadways and the construction requirements including the materials to be used for roadway construction. As part of performing the materials research, the Engineering Services Section of the Transportation Services Department suggests improvements to the materials used in the Roadways Specifications.

3. Construction Phase

The Developer is responsible for the overall construction of the transportation assets. The Construction Group is responsible for performing monitoring and inspection activities in order to ensure that the Developer is building the assets in accordance with the approved engineering drawings and the City's Design and Construction Standards.

4. Approve and Accept Transportation Contributed Assets

Once the Developer has completed construction of the transportation assets, they will request that the City issue a Construction Completion Certificate (CCC). Prior to issuing the CCC, an Inspector from the Construction Group will inspect the transportation asset, and review relevant documentation including the test results for adequacy of materials used. The Inspector will also review any other required

documentation to ensure the asset was constructed in accordance with the engineering drawings.

After the approval of the CCC, there is a two-year warranty period for the transportation asset. Upon expiry of the warranty period, the Developer applies to the City for an inspection. If no deficiencies are found, the City approves the Final Acceptance Certificate (FAC).

Once the FAC is approved, the City assumes full responsibility for the maintenance and operation of the particular transportation asset.

4. Observations and Recommendations

The objective of our review was to determine whether the City's transportation contributed asset process is effective. To be effective, the City needs to ensure that it is only accepting roads that have been designed and constructed in accordance with the conditions of the Servicing Agreement and the City's Design and Construction Standards. We reviewed whether:

- Guidance documents used in the construction of transportation contributed assets are up-to-date and applicable;
- Roles and responsibilities for all parties involved in the process are clearly defined;
- The drawing design review and inspection processes are performed consistently; and
- Management is using data to manage the process at an aggregate level.

We found that the process to accept transportation contributed assets can be improved. The current guidance documents are not being updated on a regular basis. This has resulted in some roles and responsibilities not being clear and inspection procedures not being completed in a consistent manner. Additionally, data management can be improved in order to assess overall operational performance at an aggregate level.

4.1. Guidance Documents

As discussed above, the City uses the Servicing Agreement and the Design and Construction Standards to promote consistency and quality of construction throughout the City.

The Development Coordination Section of the Sustainable Development Department is the owner of the Servicing Agreement and the Design and Construction Standards. They rely on input from other areas of the City who are involved in the process including the Transportation Services Department to keep them current. We noted that the Development Coordination Section does not have a formal process to gather input from stakeholders, update the guidance documents, and communicate changes with stakeholders on a regular basis.

We found the following issues with the current guidance documents:

4.1.1. Servicing Agreements

Compliance with Servicing Agreement

We compared the City's process to accept Transportation Contributed Assets with the terms and conditions stated in the Servicing Agreement template. Our testing revealed instances where the process was not followed. For example, the Servicing Agreement specifies that the Inspector should provide a written deficiency list to the Developers. We found that this does not always happen. Therefore, there is a risk that the City is not able to ensure that all the deficiencies have been corrected. Additionally, the Servicing Agreement states that Developers are required to correct major deficiencies prior to the issuance of the Construction Completion Certificate; however, this did not always occur. In these instances, the Construction Completion Certificate is issued even though major deficiencies exist for the transportation asset.

Review of warranty period

In our discussion with management, we found that the City has not conducted a review of the appropriateness of the length of the warranty period. The City currently requires a two-year warranty for roadwork prior to accepting the road. We conducted a survey with six other municipalities including Calgary, Kelowna, Leduc County, Red Deer, Regina, and St. Albert to determine the length of their warranty periods. We found that the City's period of two-years is consistent with three of the six municipalities we surveyed. The other three municipalities had either a one-year or three-year warranty period.

The City needs to review the appropriateness of the terms and conditions of the Servicing Agreement template to ensure that the terms and conditions are still practical for the transportation contributed assets process and is adequate to protect the City's interests.

4.1.2. Design and Construction Standards

Volume 1 – General Provisions

The current version of the General Provisions as posted on the City's website is dated 2004. The individual sections within the General Provisions are dated between 1999 and 2011. This suggests that there has been an inconsistent review of the General Provisions as an entire set. Without a comprehensive review of the entire General Provisions, there is a risk that some processes and references to City Departments may no longer be applicable due to the City's organizational changes since 1999.

Volume 2 – Roadways Specifications

The current version of the Roadways Specifications posted on the City's website is dated 2012. However, the individual sections within the Roadways Specifications are dated between 2009 and 2012.

The need for updating the Roadways Specifications document generally occurs as a result of material enhancements for building transportation assets and/or process improvements for constructing transportation assets. Based on our discussions with

management from the Development Planning and Engineering Section and the Engineering Services Section, a number of procedural and material specification changes have been proposed over the past few years. However, the Development Coordination Section is still in the process of updating the Roadways Specifications. Thus, there is a risk that new requirements are not being used.

The Development Coordination Section indicated that they have not made these changes as the process of communicating and reviewing changes with the Urban Development Institute Edmonton Region had not taken place. Although not a requirement, they believe it is good practice to ensure that the Urban Development Institute Edmonton Region is made aware of the changes prior to formalizing the Design and Construction Standards. Additionally, the timing of the changes is also a factor in determining when to update the Roadways Specifications. For example, engineering drawings submitted based on the online version of the Roadways Specifications are accepted in order to not require revision.

Without a timely update to the Roadways Specifications, Inspectors may be communicating material and/or process changes informally that are not in the current Roadways Specifications. There is also a possibility that roads built by the Roads Design and Construction Branch may be using a different set of material specifications than roads built by Developers since they follow the latest version recommended by the Engineering Services Section while Developers follow the version of the Roadways Specifications that is posted online. Therefore, in these instances, it could result in roads being built to different quality standards if different specifications are being used.

We identified two specific examples that demonstrate the need for ongoing updates and periodic reviews of the Roadways Specifications as an entire set. This includes construction where unique soil conditions exist and defect assessments.

Constructing in unique soil conditions

As the City continues to expand outwards, Developers are encountering subsurface soil conditions that are different from the developments in the rest of the City. In one neighbourhood, Developers encountered unique soil conditions that required the use of significantly more cement than normal to achieve the stabilization required by the Roadways Specifications. The use of cement to stabilize the soil is in accordance with the Roadways Specifications. Therefore, the City approved and issued a Construction Completion Certificate for these sections of road.

The Engineering Services Section was later called in to perform testing on the structural performance of some of these roads and determined that the roads were not performing as well as those in an adjacent neighbourhood. Analysis by the Engineering Services Section recommended that the appropriateness of soil conditions should be reviewed for constructability. As well, the maximum amount of cement used for stabilization should have been one-third of what was actually used. To date, however, the Roadways Specifications have not been updated to reflect these recommendations.

There is a risk that if the Roadways Specifications are not updated to reflect such experiences, Inspectors may not have the authority to enforce their updated understanding in future instances. Consequently, this would increase the City's risk of accepting poorly-constructed transportation assets.

Defect assessments

Developers pay the City a certain percent of the costs associated with the work when a constructed asset does not meet the specified density, thickness, etc., but is within a tolerable range specified by the City. Instead of repairing or replacing the work, the Developer can choose to pay a defect assessment. When the results of the testing are outside of the tolerable range, the City requires that particular section to be removed and replaced. The parameters for the tolerable ranges for certain specifications, such as the density of asphalt and the oil content of the asphalt mix have recently been reviewed by the City. However, management indicated that not all specifications have been recently reviewed.

The Developer calculates the defect assessment based on the criteria set out in the Roadways Specifications and submits the payment to the City. Inspectors review the test results and ensure the Developer calculated and paid the appropriate amount.

Table 2 shows the number and value of defect assessments paid by Developers from 2009 to 2013 compared to the total value of the transportation contributed assets in each year.

Table 2 – Private Development Defect Assessments (2009 to 2013)

	2009	2010	2011	2012	2013	TOTAL
Total Number of Defect Assessments	83	74	50	71	27	305
Number of Assessments < \$5,000	74	69	47	58	19	267
Total Amount of Defect Assessments (\$ 000's)	\$167	\$136	\$87	\$204	\$114	\$708
Total Transportation Contributed Assets (\$ 000's)	\$116,200	\$59,800	\$45,700	\$56,400	\$74,600	\$352,700

The City has collected an average of approximately \$142,000 per year from Developers at an average of approximately \$2,300 per defect assessment. We saw nine defect assessments that were lower than \$100.

The City has not reviewed the reasonability of the calculation of the defect assessments. This means that the amounts assessed may or may not be sufficient to compensate for the defects. Therefore, there is a risk that the defect assessments are not an effective deterrent for the City to obtain quality built roads.

Recommendation 1 - Updating the Guidance Documents

We recommend that the Director of the Development Coordination Section coordinate with stakeholders, including the Transportation Services Department, to develop a process to ensure that the guidance documents relating to transportation contributed assets are periodically reviewed and updated. Additionally, any changes are subsequently communicated to relevant stakeholders.

Management Response and Action Plan**Accepted****Action Plan:**

Development Coordination initiate and lead a review of the standard Servicing Agreement with input from all affected stakeholders, including Transportation, to:

- Identify clauses in the standard Servicing Agreement pertaining to design and construction that are missing or do not reflect current practice.
- Develop revised or new clauses to reflect current practice for review by all stakeholders.
- Completion of a standard Servicing Agreement by the fourth quarter of 2015 that captures today's design and construction processes and procedures to be implemented for the 2016 design and construction season.

Development Coordination initiate and lead a comprehensive review of the City's Design and Construction Standards with input from all affected stakeholders to:

- Identify where the Design and Construction Standards need revisions to reflect current practice by the end of the third quarter of 2015.
- Identify inconsistencies in where the Design and Construction Standards differ between private development projects and City constructed projects by the end of the third quarter of 2015.
- Revise all affected documents that form the Design and Construction Standards by the end of the fourth quarter of 2015.
- Develop and formalize a schedule for regular review of the Design and Construction Standards by the end of the fourth quarter of 2015.
- Develop and formalize a procedure to propose and implement changes to the Design and Construction Standards between scheduled review dates by the end of the fourth quarter of 2015.
- Publish the Design and Construction Standards by the end of the first quarter of 2016.

Planned Implementation Date:

Quarter 1, 2016 – Completion of updated guidance documents.

Responsible Party:

Director – Development Coordination Section of the Sustainable Development Department in conjunction with affected stakeholders.

4.2. Roles and Responsibilities

A clear understanding of roles and responsibilities, as well as related accountabilities, is needed both internally amongst City Departments in administering the Servicing Agreements and externally with Developers.

4.2.1. Roles and responsibilities - internal

Currently, a centralized process is in place where the Development Coordination Section of the Sustainable Development Department is responsible for managing and coordinating the execution of the Servicing Agreements. The Development Planning and Engineering Section of the Transportation Services Department is responsible for ensuring that the transportation components are designed and constructed in accordance with the City's Design and Construction Standards.

Large organizations such as the City use jointly-developed internal agreements, such as Service Level Agreements between business areas, to clarify the expectations and accountabilities of joint processes and operations. We did not find such an agreement between the Sustainable Development and Transportation Services Department. Without such an agreement, there is a risk that the expectations and accountabilities in administering the Servicing Agreement may not be achieved.

Through our review of the department, branch, and business unit mandates, we determined that the roles and responsibilities of both Development Coordination and Development Planning and Engineering are generally clear. However, in our interviews with management from both areas, we determined that additional clarity of expectations and accountabilities is needed to ensure operational initiatives are coordinated between the areas. This was particularly the case for the expectations of timelines for design reviews and clarifications of the accountabilities related to monitoring key terms and conditions in the Servicing Agreements.

Recommendation 2 - Internal Roles and Responsibilities

We recommend that the Director of the Development Coordination Section develop Service Level Agreements with the Branches within the Transportation Services Department involved in the transportation contributed assets process. The expectations and accountabilities of key activities required to administer Servicing Agreements should also be defined.

Management Response and Action Plan

Accepted

Action Plan:

Development Coordination initiate and lead discussions with affected stakeholders, including Transportation Services, to develop and implement Service Level Agreements by the third quarter of 2015 that outline:

- Expectations and accountabilities of Development Coordination for the engineering drawing review process and the CCC and FAC process.

- Expectations and accountabilities of reviewing departments and agencies, including Transportation Services, for the engineering drawing review process and the CCC and FAC process.
- Expected timelines for completion of engineering drawing reviews. Expected timelines for processes relating to CCC and FAC applications.

Communication of expectations and accountabilities outlined in the Service Level Agreements to all affected staff, including those in Transportation Services, by the fourth quarter of 2015.

Planned Implementation Date:

Quarter 1, 2016

Responsible Party:

Director – Development Coordination Section of the Sustainable Development Department in conjunction with affected stakeholders.

4.2.2. Roles and responsibilities - external

We found that the roles and responsibilities in the guidance documents were generally clear. However, when we compared the defined roles and responsibilities to actual day-to-day practice, we identified inconsistencies. Specifically, the guidance documents identify the City's role as monitoring the municipal improvement during the construction phase. The Developer is responsible for quality control and quality assurance. This is reflected in the citation¹ below.

The Developer shall ensure that the Consultant provides all equipment, tools, and labour necessary for all inspection, quality control, and administrative duties required during construction. Inspection by the City is for monitoring only and is not sufficiently comprehensive to address the requirements for quality control, activity coordination or safety. The City's inspection shall not relieve the Developer of full responsibility for all aspects of the work.

However, our review determined that the Inspectors have taken a more active role than the guidance documents intended.

We found that in the guidance documents the term "inspection" was used interchangeably with the terms "monitor" and "supervise" without defining the corresponding level of authority implied. Thus, there is a risk that the Inspector and the Developer may have a different perception of the authority and decision-making power of the Inspector while on the construction site.

¹ City of Edmonton Design and Construction Standards, Volume 1: General, section: General Provisions for Developers, 1.5.3.

With the assistance of management, we reviewed the Design and Construction Standards and identified at least 20 different inspections that Inspectors are performing that are the stated responsibility of the Developer. Management noted the following key reasons for the additional inspections performed by the Inspectors:

1. *Consultants are not always at the construction site* – Even though required by the General Provisions,² Developers are not always on site to oversee the construction. In our focus group meetings with the Developers, they acknowledge that they are not always on site due to their management of multiple projects; however, they indicated that they are easily reachable when the need arises.
2. *Inspector's experience* – Some of the Inspectors have had previous experience with the City's Roads Design and Construction (RDC) Branch, which is responsible for City-built roads. RDC Inspectors have a more active role in the monitoring process as they manage the contract directly. These Inspectors appear to have implemented some of the monitoring and inspection procedures from their previous RDC experience into the transportation contributed assets process.

Our interviews with management also revealed that there is a perceived benefit by Inspectors that the performance of additional inspections better supports the City's ability to safeguard and mitigate its risk of receiving poorly constructed assets. However, the private development of municipal improvement framework places the responsibility for quality assurance and quality control on the Developer, not the Inspector.

Consequently, as a result of performing these additional inspections, there is a risk that the City is not using its inspection resources optimally. By completing inspections that are the responsibility of the Developer, the burden of construction inspection and monitoring has shifted from the Developer to the City. Therefore, the City needs to review the framework for Developer-built roads and assess the risks and benefits with regards to the amount of responsibility, trust, and reliance it places on the Developer.

Recommendation 3 – Roles and Responsibilities Framework

We recommend that the Director of the Development Coordination Section work with the Development Planning and Engineering Section to review the framework for accepting transportation contributed assets. This review should include developing a methodology that would enable the City to determine the amount and nature of inspections needed in order to accept transportation contributed assets that have been constructed in accordance to the Design and Construction Standards.

Once determined, management should document the purpose, nature, and responsibility of the inspections in the Standards and communicate to relevant stakeholders.

² City of Edmonton Design and Construction Standards, Volume 1: General, section: General Provisions for Developers, 1.5.2.

Management Response and Action Plan

Accepted

Action Plan:

Create a document which outlines the nature of inspections required in order to accept transportation assets that have been constructed in accordance to the Design and Construction Standards.

Development Coordination initiate and lead discussions with all affected stakeholders, including Transportation, to complete the following:

- Identify and categorize risks associated with the current process for accepting contributed assets of all types by the end of the third quarter of 2015.
- Determine measures to mitigate identified risk by the end of the fourth quarter of 2015.
- Outline clear expectations for the development industry and Inspectors during construction activities as well as more detailed roles and responsibilities for each party by the end of the third quarter of 2015.
- Develop and establish an agreed upon framework for inspection activities that can be followed by all inspection staff and development industry by the end of the fourth quarter 2015.

Planned Implementation Date:

Quarter 4, 2015 – Complete the framework

Responsible Party:

Director - Development Planning and Engineering Section
 Director - Development Coordination Section of the Sustainable Development Department in conjunction with affected stakeholders.

4.3. Design Review and Construction Monitoring Processes

As discussed earlier, the Design Group reviews the engineering drawings for the transportation contributed assets. Staff from the Construction Group perform the monitoring activities during the construction phase and approve the asset when construction is complete.

We found that the engineering drawing review process is adequate. For the construction and approval process, improvements are needed. We found that the practice of completing inspections and approving Construction Completion Certificates were not consistent, nor was the manner in which inspections were documented.

4.3.1. Design review process and timelines

The Developer's engineering drawings contain the design details of the transportation contributed assets that will be constructed and ultimately transferred to the City. Therefore, the drawings need to adhere to the City's Design and Construction

Standards. The timeliness of approvals for engineering drawings is important to ensure that construction of municipal improvements can occur in a timely manner.

We found that the City has a good process to review the engineering drawings. We selected 10 engineering drawings and found that they were all properly approved by a qualified City Engineer, which indicates that the designs conformed to the City's Design and Construction Standards.

We also determined that the timeliness of the design reviews is improving.

- In 2014, the average number of business days to review drawings was 15.0 (2013 – 16.5 business days). The Design Group has achieved their target of 15.0 business days and reduced the average number of business days it takes to review a design drawing.
- Based on the data that is tracked by management, there has been a declining trend in the amount of re-submissions³ for subdivision drawings from an average of 1.8 re-submissions in 2011 to 1.4 re-submissions in 2014. This also demonstrates improvement in the quality of the engineering drawing submissions by Developers.

4.3.2. Construction monitoring and approval process

Monitoring and approval activities are performed by 9 full-time Inspectors and 4 temporary Inspectors (summer-staff). These Inspectors are responsible for the daily inspections and inspections and approvals for both the Construction Completion Certificate (CCC) and Final Acceptance Certificate. The intent of their work is to help protect the interests of the City during the construction of public assets. The 13 Inspectors are split amongst the 4 quadrants of the City. In 2014, there were approximately 51 subdivisions per quadrant in various phases of construction.

To assess the performance, adequacy, and effectiveness of the monitoring and approval process, we sampled 8 projects to assess daily inspections. We also sampled 10 projects to assess CCC inspections. We found the following:

1. Daily inspection practices are not consistent

We found that there is a general process to inspect the construction sites. This includes being on location at certain “critical points.”⁴ However, the manner in which the inspection process is completed by the Inspectors and across the quadrants is inconsistent. For the eight projects with a CCC approved in 2014, we found the following:

- Inspectors do not keep consistent daily notes of the work they have completed or enter the information into the weekly reports.
- Inspectors are not always carrying out inspections at the critical points of the construction process. We found documentation that Inspectors were present at all five critical points during construction in only four out of eight samples.

³ Re-submission – Once an original design is reviewed, changes may be required necessitating a “re-submission” by the Developer. A reduction in this figure provides an indication of the quality of designs submitted by Developers and the quality of review performed by the City.

⁴ Critical Points – There were five critical points identified by the Inspectors in the construction process, these included the trench backfill, subgrade, proof rolling, gravel, and first asphalt lift.

Based on the inconsistencies identified, we determined that the City does not have a formal process to ensure that inspections are conducted and documented appropriately.

2. *CCC inspection practices are not consistent*

Once a Developer completes construction, Inspectors are required to perform a CCC inspection to ensure the Developer has built the project in accordance with the Design and Construction Standards. We selected ten projects with a CCC approved in 2014 and found that Inspectors did not document or communicate the results of their CCC inspections in a consistent manner. In particular:

- Some Inspectors performed a pre-CCC inspection, prior to the formal CCC inspection.
- Developers did not always formally request their CCC inspection in writing, as required by the Servicing Agreement. They used other methods to request the inspection such as phone calls or direct communication.
- Some Inspectors used a checklist to record CCC inspections.
- Inspectors do not always provide the Developers with a written list of deficiencies from the CCC inspection, even though it is a stated requirement in the Servicing Agreement.

Although we found inconsistencies in the CCC inspection process, we were able to confirm that Inspectors did complete a final CCC inspection for each project we sampled. As well, the Inspector's Supervisor signed off on the CCC prior to it being issued.

However, we believe that the above inconsistencies lead to the following risks:

- Without a documented CCC inspection request, there is a risk that the Inspector may fail to recall when an inspection request was made. Recalling the request date is important since key timelines defined in the Servicing Agreement (e.g., the City has 30 days to complete a CCC inspection after receiving a request from the Developer) are based on the initial request date.
- Without a written deficiencies list, the Inspector will rely on their memory or the Developer to ensure that all deficiencies have been fixed prior to issuing the CCC. Consequently, this may negatively impact the quality of transportation contributed assets the City receives if identified deficiencies are not fixed.

Furthermore, our focus group meetings with the Developers also revealed their concerns with the inconsistencies in the way Inspectors perform their duties.

3. *Inconsistent review of CCC test result packages*

We conducted detailed testing on three projects with an approved CCC to determine whether the Inspector adequately reviewed the test results submitted as part of the CCC test result package. The CCC test result package includes the test results conducted by the private laboratory working on behalf of the Developer to ensure the road was constructed according to City standards. In particular, we reviewed the asphalt density and bitumen content test results.

For one project tested, we found that the bitumen content was outside of the tolerable range included in the Roadways Specifications applicable at the time the road was built.⁵ Therefore, the road should have been removed and replaced prior to issuing the CCC. This was not identified in the review completed by the Developer's Consultant nor the Inspector, yet the City issued the CCC.

Management indicated that at the time this particular road was being built, neither the City nor the Developer considered this element of the Roadways Specifications as a requirement. Therefore, it may not have been reviewed by the Inspector even though it was part of the Roadways Specifications. Additionally, we believe other contributing factors which led to the issuance of the CCC included:

- The failure to use a standard checklist when reviewing the test packages. Using a checklist would help ensure that every item in the Roadways Specifications has been tested and reviewed.
- The test results sheet currently in place only discloses the results of the testing and does not indicate what the requirements are. Therefore, the information needed to determine whether the test results resulted in a pass or a fail is not readily available.

4. *Misapplying warranty period*

According to the Servicing Agreements applicable at the time of testing, the warranty period of paved roads is 2 years. Once construction is completed, the Developer is to provide a written request to the Inspector to perform a CCC inspection. The Inspector will then have 30 days to complete the inspection. The Inspector can then approve and issue a CCC in the following ways:

- In the event that the Inspector does not identify any deficiencies, the Inspector can back date the warranty start date to the construction completion date.
- In the event that there are major deficiencies, the warranty start date commences the day when the major deficiencies are fixed.
- In the event that there are minor deficiencies, if the Developer fixed the minor deficiencies within the repair period specified in the Servicing Agreement, the warranty start date is the CCC issuance date. If the minor deficiencies are not fixed within the specified repair period, the warranty period starts on the actual date the minor deficiencies were fixed.

We reviewed 10 projects and found that only 3 had the correct warranty start dates. We were unable to determine if the Inspector applied the correct warranty period for 3 projects due to a lack of inspection documentation such as construction completion dates and deficiency lists. For the remaining 4 projects, we found the following issues with their warranty periods:

- The warranty period for three projects started prior to all deficiencies being repaired.

⁵ 2009 Specifications - In 2012, the Specifications were updated resulting in the tolerable range for bitumen content increasing. However, the above projects were based on 2009 Specifications.

- The warranty period for one project started prior to the construction completion date.

Consequently, in these cases the City may not get an appropriate warranty period for the transportation contributed assets.

Without a consistent process in place and adequate documentation, there is a risk that management is unable to review the work of the Inspectors for adequacy and accuracy. Additionally, without a checklist, there is no control mechanism to ensure that all of the requirements from the Roadways Specifications are being met when completing a CCC review of the test results. Collectively, these deficiencies in the transportation contributed assets process limit the ability of the City to ensure that it is accepting assets that have been built in accordance with the guidance documents.

Recommendation 4 - Operating Manual

We recommend that Director of the Development Planning and Engineering Section develop an operating manual that will support the consistency of the monitoring and approval process. This manual should include:

- Procedural guidelines
- Documentation requirements
- Reporting requirements
- Checklists

Management Response and Action Plan

Accepted

Action Plan:

Development Planning and Engineering is currently developing an operating manual for Inspectors identifying procedural guidelines, documentation requirements, reporting requirements and checklists to allow for more consistent monitoring and approval. Once completed, Development Coordination will also consider expanding Transportation's operating manual to include all other departments and agencies into an overall document.

Planned Implementation Date:

Quarter 2, 2015 - Draft document to be trialed.
 Quarter 1, 2016– Review and improvement.
 Quarter 2, 2016 – Finalize working document.

Responsible Party:

Director - Development Planning and Engineering Section

4.4. Management Data

Having complete data records ensures that management can review their operations at a high level, including managing current projects and supervising staff. Tracking key data also allows for the development of performance measures in order to assess the effectiveness and efficiency of overall operations.

We reviewed the various types of data and reports used by management in both the Design Group and the Construction Group. We found that the Design Group uses an information system which allows for tracking of key information such as application date, review date, and approval date for engineering drawings. This tracking of key information facilitates the compilation of monthly and annual reports which allow the area to assess efficiency and effectiveness of its operations at an aggregate level.

Conversely, we found that the Construction Group is using a legacy system that has not been designed to record and track key information. Thus, at an aggregate level, the Construction Group cannot assess certain types of compliance with terms and conditions in the Servicing Agreements. For example:

- They cannot determine the percentage of inspections completed within 30 days of a CCC inspection request.
- They cannot determine the percentage of projects that have corrected major deficiencies within six months of receiving a written CCC deficiency list from an Inspector.

We were able to find this information at an individual project level by reviewing the individual project file. However, without an information system in place to report on an aggregate level, management may not be able to prioritize projects, resources, and more critically, meet deadlines. In our interviews with stakeholders, a common theme in their concerns was the fact the City was not fulfilling timelines set out in the Servicing Agreement.

We also found instances where data entered into the current information system used by the Construction Group is not entered completely and accurately. Specifically, we found:

- That information (i.e., dates) from three out of five project files we reviewed did not match the information entered into the information system.
- For projects where a CCC was approved, there was no CCC application date recorded in the system.

Thus, there is a risk that management may not have useful information at an aggregate level to make operational decisions, report on performance measures, and assess operational efficiency and effectiveness. Additionally, if the current information in the system cannot be relied upon, then the information is not useful.

Recommendation 5 - Data Reporting and Tracking

We recommend that the Director of the Development Planning and Engineering Section ensure that appropriate information systems are in place to monitor key information on an aggregate level, in order to manage the operation and report on performance measures.

Management Response and Action Plan**Accepted****Action Plan:**

Development Planning and Engineering is currently developing a database to replace the existing program which tracks pertinent information of key deliverables outlined in the City's Design and Construction Standards and Servicing Agreements. The updated database will be used throughout the 2015 construction season, which will allow Administration to provide project reporting on an aggregate level and key metrics of the inspection process. In addition, Development Coordination will complete the transition of the inspection process (Construction Completion Certificate and Final Acceptance Certificate) to an electronic system to automate, where possible, the tracking of all applications, dates, and warranty periods to minimize the manual data entry needed.

Planned Implementation Date:

Quarter 3, 2015

Responsible Party:

Director - Development Planning and Engineering Section

5. Conclusion

The objective of this review was to determine whether the City has an effective process to accept transportation contributed assets. To be effective, the City needs to ensure it is only accepting transportation assets that have been designed and constructed in accordance with the guidance documents. We found that there are opportunities to improve the process. We made five recommendations to strengthen the process.

We made three recommendations to the Development Coordination Section of the Sustainable Development Department that relates to the City's guiding documents for transportation contributed assets. The first recommendation was to review these documents to ensure they are up-to-date and reviewed periodically. Secondly, internal Service Level Agreements between the Development Coordination Section and the Development Planning and Engineering Section are needed. This would ensure that expectations and accountabilities are clear when performing and fulfilling operational activities for the transportation contributed assets process. Finally, we recommended that they review the overall framework for receiving transportation assets. This framework should address the appropriateness and purpose of conducting inspections

and assess the risks and benefits with regards to the amount of responsibility, trust, and reliance it places on the Developer.

We made two recommendations to the Development Planning and Engineering Section of the Transportation Planning Branch to improve its process in accepting transportation assets. The first recommendation related to the development of an operations manual to guide staff in conducting inspections and documenting their work, which should improve the consistency of the inspection process. We also recommend that management within the Section improve their tracking of key information on an aggregate level, to more effectively manage its business. This would also allow it to develop and report on performance measures to improve effectiveness.

We thank the management and staff of both the Sustainable Development and Transportation Services Departments who helped us during this review for their support, cooperation, and assistance. Additionally, we also thank the external stakeholders such as the Urban Development Institute Edmonton Region, Developers, Consultants and representatives from other Cities who offered their insights to the transportation contributed assets process.