AUDITOR GENERAL'S REPORT

Engineering and Construction Services

Phase One: Controls over Substantial Performance and Warranty Inspection Processes Should be Strengthened

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TORONTO

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EXECUTIVE SUMMARY

$500 million spent annually on capital projects

The City's Engineering and Construction Services (ECS) Division delivers approximately $500 million annually in capital projects for the construction of vital infrastructure including bridges, expressways, roads, streetcar ways, watermains, sewers, treatment plants, and water supply. In addition, ECS provides bridge inspection services, and engineering review and acceptance of development applications.

Phase One of this audit, the subject of this report, focused on the certification of substantial performance and construction warranty management for linear unit price capital projects.

Substantial performance is a critical milestone

A construction contract is considered to have achieved substantial performance when the improvement made under the contract is 'ready for use' and is capable of being completed at a relatively minor cost as defined in the *Construction Lien Act* (*Construction Act* as of July 1, 2018). It is a critical milestone in that if a contractor successfully demonstrates substantial performance and meets other tests, the City is obligated to fulfill payment of the statutory holdback.

ECS is responsible for certifying a contract's substantial performance

ECS staff performs a critical role in certifying that a contractor has substantially fulfilled its obligations under the contract.

ECS staff is responsible for conducting timely inspections to confirm that the work completed by the contractor meets the contract specifications and City standards. Similarly, the staff is responsible for performing timely warranty inspections to identify any deficiencies in the contractor's work and ensure that the contractor rectifies these deficiencies.

A project should be finally accepted only after all defects in a contractor's work that are identified prior to the expiry of the warranty period are satisfactorily fixed by the contractor.

Inspection process for substantial performance and warranties can be improved

Overall we found that ECS has established good guidelines for substantial performance and warranty inspections. ECS needs to ensure its prescribed procedures are consistently implemented by project staff to minimize the risk of the City incurring unnecessary costs to repair defects after warranty expiry.

Our audit was performed by reviewing a sample of linear unit price contracts that ECS substantially completed in 2015.

Audit reviewed 10 contract files totaling $34 million in contract costs

We selected 10 contract files to review the steps performed by ECS staff for verifying substantial performance and for monitoring warranty during the 24-month warranty period. The total construction value of the 10 contracts selected for review was approximately $34 million.

We observed that the contract files often lacked documentation to support whether any inspections to verify substantial performance were conducted; and if they were conducted, whether such inspections identified deficiencies that would prevent issuance of substantial performance certification.

Where deficiencies were identified, we also did not find evidence to show that they were rectified by the contractor.

The inspection process included several instances of poor record retention practices followed by staff with respect to the substantial performance and warranty components of the contract. Contract files were inconsistently maintained and were often found to be incomplete.

These observations result in an increased risk that contracts are certified as substantially performed before all criteria are actually met. Our specific findings are summarized below:

Substantial performance inspections not done timely

- In half of the contracts we reviewed, we noted that inspections for substantial performance were not done until after issuing the substantial performance certificate.

Inadequate or no supervisory review of deficiencies

- In half of the contracts reviewed, it was not possible to determine who had prepared or reviewed the deficiency lists. Although not currently a requirement in ECS manuals, it is considered a best practice to have such lists signed and dated by the inspector who prepares the list and the contract administrator who reviews the list.

No regular follow-up with the contractors

- In three contracts that we sampled, we found no evidence that the staff had notified the contractor about the deficiencies.

  Since most of linear unit price contracts are typically completed in the fall, it is important that the contractors are immediately informed of the deficiencies. Not informing the contractor in a timely manner may delay repair work until after the spring of the next year.

Inadequate tracking of deficiencies and follow-up on repair work

- In seven of the sampled contracts, it was unclear what repair works, if any, were performed to rectify the deficiencies identified from substantial performance inspections.

The *Construction Lien Act* requires that in order for a contract to be considered substantially performed, the improvements must be 'ready to use', and the extent of remaining and defective work (expressed as a percentage of total contract value) below a defined financial threshold.

Value of remaining and defective work is not assessed as required by the Construction Lien Act

- In seven of the 10 contracts, staff did not quantify the value of the remaining and defective work before concluding that substantial performance had been achieved.

- In one contract with a value of approximately $2 million, the work performed after substantial performance amounted to $77,000 or four per cent of the total contract value. This was above the threshold permitted by the Construction Lien Act for substantial performance (refer to page 9-10 in the report).

Warranty inspections are not consistently followed Up

ECS warranty management procedures require that a warranty inspection be conducted 3 to 6 months prior to warranty expiry, that is 18 to 21 months from the date of substantial performance.

In nine contracts, we noted that staff had performed their warranty inspection in a timely manner and prior to warranty expiry. In the remaining one contract, the warranty inspection was done 16 days after the warranty expiry.

In seven contracts, the deficiencies identified from the warranty inspections have not been rectified by the contractor. It is unclear what follow-up was performed in these cases.

Bonding company was not notified of the delay by the contractor in completing warranty repair work

As per the ECS construction contract terms, the contractors are required to provide a performance bond that guarantees the performance of all contractual obligations by the contractor. Those obligations include correction of deficiencies brought to the contractor's attention prior to expiry of the warranty.

We noted that in six contracts, the bonding company was not notified of the delay by the contractor in completing warranty repair work even as the warranty had expired and the deficiencies were still outstanding.

It is a good practice to keep bonding companies apprised of developments on a contract, including any delay by the contractor in performing the warranty repair work, to protect the City's interests.

Conclusion

ECS delivers approximately $500 million worth of capital projects annually. Effective implementation of controls and supervisory review of project administration processes is necessary to ensure the contract work meets the contract requirements and City standards.

Implementation of the three recommendations contained in this report will further improve the controls over substantial performance requirements and warranty management for final acceptance.

We express our appreciation for the co-operation and assistance we received from management and staff of the Engineering and Construction Services Division.

BACKGROUND

Engineering and Construction Services overview

The Auditor General's 2017 Audit Work Plan included an audit of construction contracts issued by the Engineering and Construction Services (ECS) Division.

Phase One of this audit, the subject of this report, focused on the certification of substantial performance and construction warranty management for capital projects. A review of the remaining areas of capital project management will be conducted in subsequent phases of this audit, and the audit results will be provided to the Audit Committee in 2019.

Over $500 million in capital projects delivered by ECS annually

ECS delivers approximately $500 million annually in capital projects for construction of vital infrastructure including bridges, expressways, roads, streetcar ways, watermains, sewers, treatment plants, and water supply. In addition, ECS provides bridge inspection services, and engineering review and acceptance of development applications.

The Division's mission is to create safe and sustainable municipal infrastructure that enhances the high quality of life for the people of Toronto, through professionalism in project planning, engineering and project management services.

It provides specialized engineering and construction services to internal clients including Toronto Water, Transportation Services, and Solid Waste Management Services, and external clients such as the development industry, utility companies and other public agencies.

Capital projects are delivered by ECS's three design and construction sections: Major Infrastructure, Linear Underground Infrastructure, and Transportation Infrastructure. Table 1 provides examples of work performed by each section.

Table 1: Examples of Capital Works Projects Delivered by ECS's Design and Construction Sections

Major Infrastructure	Linear Underground Infrastructure	Transportation Infrastructure
Don River & Central Waterfront Utility relocation associated with facilities projects Wastewater treatment plants Water treatment plants, reservoirs and elevated water tanks Solid waste management facilities Pumping stations Planning and feasibility studies related to water treatment	Local and trunk Storm sewer construction – new, replacement and rehabilitation Local and trunk sanitary sewer construction – new, replacement and rehabilitation Local and trunk watermain construction – new, replacement and rehabilitation Watercourse rehabilitation Non-treatment storm water facilities Force mains Inflow and infiltration reduction, Sanitary or CSO Storage tanks, Water distribution studies	Local road resurfacing / reconstruction Major road resurfacing / reconstruction Ramps & expressway on grade Laneway reconstruction Sidewalk reconstruction and new construction Bridge rehabilitation and reconstruction Structural retaining walls Elevated ramps & expressways Required utility cut repairs Streetscape works BIA and City Planning funded projects TTC track reconstruction

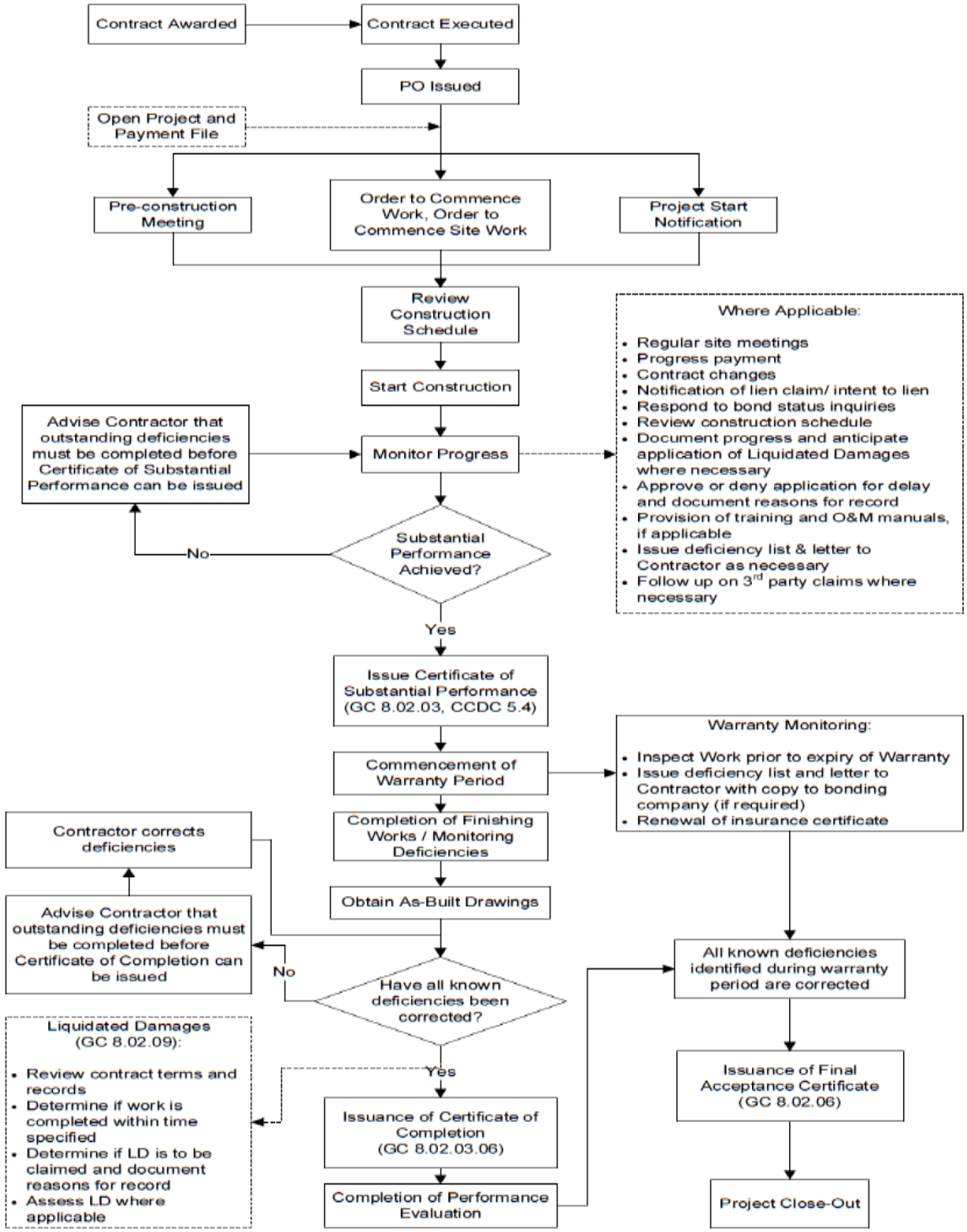
Source: ECS Capital Works Procedure Manual, December 2017, page xviii.

ECS staff is responsible for ensuring that the work performed by Contractors on internally managed projects is completed and constructed to the City's standards and specifications.

Critical stages in contract delivery

Figure 1 describes various contract administration activities performed by ECS staff.

Figure 1: General Construction Contract Administration



Source: ECS Capital Works Procedure Manual, December 2017, page 6-15.

Critical milestones in a construction contract

In the life of a construction contract, there are three critical milestones that signify successful delivery of the contracted services. These milestones are:

1. Certification of Substantial Performance
2. Certification of Completion
3. Certification of Final Acceptance

Achievement of each milestone requires a series of project administration activities that must be performed by the staff. These are very important steps as they affect various rights and obligations of all parties involved, specifically the City and the Contractor.

Substantial performance

Substantial performance in construction is typically defined as the stage when the work or a designated portion is complete to the extent that the owner can occupy or utilize it for its intended use.

According to ECS's Field Service Manual:

"The contractor's responsibilities for substantial performance are defined in the general conditions with reference to the Construction Lien Act. Work on any area, system, facility, or the like, must be to the point where it is able to be fully operational in the mode for which it was designed, unless specifications allow otherwise. The value of deficient and uncompleted work must be accounted for determining if the contract is substantially performed."

In Ontario, the certification requirements for substantial performance are regulated as per the Construction Lien Act, R.S.O. 1990. The main requirements according to the Act include the following:

- Improvements to be made under the contract must be 'ready to use' for the purposes intended, and

- Outstanding work or known deficiencies[1] are less than
    - 3 per cent of the first $500,000 of the contract price,
    - 2 per cent of the next $500,000 of the contract price, and
    - 1 per cent of the balance of the contract price.

It is important to note that substantial performance recognizes that while the work is not yet fully complete, it is sufficiently complete to certify substantial performance and initiate the process that leads to holdback release.

When the City certifies the work is 'substantially performed', it is obligated to release the holdback payment

If the legal criteria for substantial performance are met by the contractor, the City certifies substantial performance and the contractor may publish the certificate as required by the Construction Lien Act. If the lien preservation period after publication expires with no claims for lien on the project, the City has a contractual obligation to pay the holdback, subject to any set-offs it may retain for things like deficient workmanship by the contractor.

Therefore, it is critical that City staff perform proper inspections, and verify the contractor's claim of the work performed prior to issuing a certification of substantial performance.

Inspections are necessary to confirm if work is substantially performed

It is expected that City staff would identify all deficiencies or defects as well as outstanding work prior to certifying substantial performance. Further, it is expected that the value of such deficiencies or outstanding work is properly assessed to ascertain whether the work completed is 'substantial' in nature and that there are no significant outstanding issues that should warrant withholding of substantial performance certification and/or payments.

[1] Effective July 1, 2018, the threshold for outstanding work or known deficiencies has been revised from $500,000 to $1000,000 as per the amended Construction Act R.S.O. 1990, Chapter C.30

Final acceptance and warranty period

Warranty inspections are critical in identifying potential warranty claims and repairs

City contracts carry a standard 24-month warranty. The warranty period begins upon issuance of the certificate of substantial performance. Upon expiry, if all known defects have been corrected to the City's satisfaction, a Final Acceptance Certificate is issued which indicates that the contractor has completed its obligations and all risks and ownership are transferred to the City.

Before expiry, it is important that inspections are carried out and that the contractor is notified of any defects or deficiencies. This ensures the quality of City infrastructure, and protects the City from bearing the cost of defective work after warranty expiry.

Prior to issuing 'final acceptance' of the contract, staff should ensure that deficiencies identified during the warranty phase are satisfactorily rectified by the contractor at no cost to the City.

AUDIT RESULTS

This section of the report contains the findings from our audit work followed by specific recommendations.

A. SUBSTANTIAL PERFORMANCE IS NOT SUFFICIENTLY EVIDENCED

ECS completed 74 contracts with a total value of $290 million in 2015. Our audit was performed by reviewing a sample of unit price linear contracts that ECS substantially completed in 2015 to assess the effectiveness of warranty management.

Additionally, we selected 10 contract files to review the steps performed by ECS staff for verifying substantial performance and for monitoring warranty during the 24-month warranty period. The total value of the 10 contracts selected for review was approximately $34 million.

Substantial performance is not sufficiently evidenced

From our detailed review of the 10 sampled files, we observed that the contract files often lacked documentation to support whether any inspections to verify substantial performance were conducted; and if they were conducted, whether such inspections identified deficiencies that would prevent issuance of substantial performance certification.

Informal inspection process

The inspection process for substantial performance and warranty appeared to be informal at best with poor record retention practices followed by staff. The contract files were inconsistently maintained and were often found to be incomplete. Several key documents were initially found to be missing from the contract files, although staff were able to locate some of the documents upon request.

Some inspections were done after certifying substantial performance

We found that in many cases, the deficiency lists were not signed by the inspector or the contract administrator, although we recognize that ECS' manual does not require the sign-off on the form.

We also noted from our samples that some inspections for substantial performance were done after the issuance of the substantial performance certificate.

Timely inspections are necessary to estimate the value of defective and remaining work so that it can be established whether substantial performance has been achieved. The staff may have potentially issued the certification without properly assessing if all criteria for substantial performance were met.

No evidence that deficiencies identified were rectified

We also did not find evidence to show that the deficiencies identified from inspections were rectified. In many cases, there was insufficient documentation to indicate that deficiencies were being properly tracked and followed-up for resolution.

Our key findings are summarized in Table 2.

Table 2: Substantial Performance and Contract Completion Observations

		Contract									
	Critical Steps	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
	Substantial Performance										
1	Inspection for verifying substantial performance conducted in a timely manner (i.e., inspections were done prior to substantial performance)	✓	✗	✓	✗	✓	✗	✗	✓	✗	✓
2	Deficiency list identifies who prepared and reviewed the document	✗	✗	✓	✗	✓	✗	✓	✗	✗[1]	✓
3	Documentation confirming deficiencies were communicated to the contractor	✗	✓	✓	✓	✓	✓	✓	✗	✗	✓
4	Value of defective and remaining work properly assessed	✗	✓	✓	✗	✗	✗	✓	✗	✗	✗
5	Certificate of substantial performance issued and on file	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓
6	Letter sent to the contractor outlining their obligations for release of the holdback	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓
7	Documentation confirming that deficiencies had been rectified	✗	✓	✗	✗	✗	✗	✓	✗	✗	✓
	Contract Completion										
8	Certificate of Completion Issued	✗	✓	✓	✗	✗	✓	✓	✓	✓	✓
9	Letter sent to the contractor outlining their obligations for completion payment and statutory holdback release	✗	✓	✓	✗	✗	✗	✗	✓	✓	✓

1 - For contract 9, no deficiency list was prepared.

In particular, we noted the following:

Critical step 1

In four contracts, we found that the inspections for substantial performance were done after the issuance of substantial performance certificate. The delay ranged from 4 days to 2 months after the substantial performance date. In addition, for contract 9, the contractor was only notified of deficiencies verbally. We found no evidence of any inspection done by staff (such as deficiency list, photographs or notes, etc.).

Critical step 2

In half of the contracts reviewed, it was not possible to determine who had prepared or reviewed the deficiency lists. Although not currently a requirement in ECS manuals, it is considered a best practice to have such lists signed and dated by the inspector who prepares the list and the contract administrator who reviews the list. In one contract, there was no deficiency list on file.

Appropriate sign-off on the deficiency list helps ensure accountability and timely review.

The ECS procedures require that deficiency lists are maintained by the inspector, and are reviewed by the contract administrator.

Critical step 3

In three contracts, there was no evidence on file to suggest that the contractor was informed of the deficiencies prior to issuing the substantial performance certificate. According to ECS Field Service Manual, the deficiency list should be given to the contractor prior to substantial performance.

Since most of the contracts are typically completed in the fall, it is important that the contractors are immediately informed of the deficiencies. Not informing the contractor in a timely manner may delay repair work until after the spring of the next year.

Critical step 4

In seven contracts, there was no evidence to suggest the value of defective or remaining work was assessed to determine whether the value of the remaining work was within the thresholds permitted for the purpose of substantial performance.

- The ECS Capital Works Procedures recommends that staff use a standard template for calculating the value of defective or remaining work. We found that the standard template was used only in one contract and it was in fact provided by the contractor.

- We performed additional procedures to verify the value of work that was performed after substantial performance.

  In one contract with a value of approximately $2 million, the work performed by the contractor after substantial performance was $77,000 or four per cent of the total contract value. This was above the threshold permitted by the Construction Lien Act. In this case, it would appear that certificate of substantial performance was issued prematurely.

Critical step 5

- In one contract, certificate of substantial performance was not on file. The staff was unable to locate the copy of the certificate (Form 6).

Critical step 6

- In one contract, there was no letter on file indicating that staff had notified the contractor to provide the standard release (SP1), statutory declaration (SP2) and WSIB certification for release of the holdback. However, in all 10 contracts, the above documents were duly received from the contractor.

Critical step 7

- In seven contracts, there was no documentation on file to suggest that the deficiencies identified from substantial performance inspections were corrected.

If substantial performance is certified without proper inspection and documentation, this could result in premature release of the holdback funds. This could place the City at risk if lien claims are preserved by subcontractors after holdback release.

In addition, premature certification of substantial performance could impact the length of warranty because the time limitations associated with warranties typically begin with substantial performance.

B. CERTIFICATION OF CONTRACT COMPLETION DOCUMENTATION NEEDS IMPROVEMENT

Certificate of Completion is issued after the contractor satisfactorily rectifies any deficiencies and completes any remaining work that was identified at the time of issuing substantial performance certification.

We noted that some contract files did not have complete documentation on the follow-up steps performed after substantial performance to the point where the certificate of completion was issued. Specifically, we noted the following:

Critical step 8

In three contracts, the certificate of completion was not on file. The staff were unable to locate a copy of the certificate.

C. WARRANTY INSPECTIONS ARE NOT CONSISTENTLY FOLLOWED UP

Warranty inspections were appropriately performed

ECS warranty management procedures require that a warranty inspection be conducted between 18 and 21 months from the date of substantial performance, that is 3 to 6 months prior to the expiry of warranty. From our detailed review of the 10 sample files, we observed that in nine cases inspections were appropriately performed prior to warranty expiry.

Unclear whether deficiencies identified were rectified

However, it was often unclear whether staff ensured that deficiencies were rectified by the contractor, conducted follow-up on outstanding deficiencies in a timely manner, and/or obtained appropriate insurance extensions where deficiencies remained beyond the warranty expiry date.

Our findings on warranty inspections are summarized in Table 3.

Table 3: Warranty Inspections

		Contract									
	Critical Steps	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	Warranty Inspections conducted in a timely manner	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓
2	Contractors were informed of warranty deficiencies in a timely manner (Note 1)	✓	✗	✗	✓	✓	✓	✗	✗	✓	✓
3	Adequate follow-up performed with the contractor where deficiencies were not corrected within 30 days	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗
4	Deficiencies rectified within the warranty period	✓	✗	✗	✓	✗	✗	✗	✗	✓	✗
5	Bonding company notified of the deficiencies that were outstanding beyond the warranty expiry	✓	✗	✓	✓	✗	✗	✗	✗	✓	✗

Note 1: In four contracts the staff took more than 45 days after the warranty inspection to issue a warranty letter informing the contractor of warranty deficiencies.

In particular, we noted the following:

Critical step 1

- In nine contracts, we noted that the warranty inspections were performed in a timely manner and the contractors were notified of the outstanding deficiencies in each case. However, in one contract, the warranty inspection was performed 16 days after the warranty had expired. Although, the contractor has partially completed the repair work, there continues to be minor outstanding repair items.

  It is important to note that deficiencies identified after the expiry of warranty are not covered by the warranty and the City may be responsible for the cost to fix these deficiencies. Therefore, it is very important that warranty inspections are performed in a timely manner and at least before the warranty expiry.

Critical step 3

- In one contract, there was no evidence of regular follow-up with the contractor to ensure deficiencies were rectified.

Critical step 4

- In seven contracts, there was no evidence on file to indicate whether deficiencies identified during warranty inspections had been corrected. In all of these cases, the original warranty period has now expired.

  In one of the seven contracts, it was determined that the contractor neglected to clean a manhole after the road reconstruction work had been completed, resulting in damages valued at approximately $116,000.

  The issue was identified in October 2015 when Toronto Water responded to a 3-1-1 call about a blocked sewer. The repair work was subsequently completed by Toronto Water.

  It would appear from the documents on file that ECS was informed about this only in March 2016. By then, ECS had released all payments to the contractor, including the final payment in January 2016.

  Although the City was successful in recovering the costs of damages from the contractor, this case illustrates the importance of regular on-site monitoring and inspection of contract work, and better coordination between ECS and divisions.

  In this same contract, there are other outstanding deficiencies possibly from the first phase of the contract which was completed in 2014 and the warranty has since expired. The deficiencies continue to be outstanding as of today.

Critical step 5

- Among the ten sampled contracts, seven had outstanding deficiencies and the warranty had expired. In six of these seven contracts, the bonding company was not informed of the deficiencies that remained outstanding after the warranty expiry.

  It is a good practice to keep bonding companies apprised of developments on a contract, including any delay by the contractor in performing the warranty repair work, to protect the City's interests.

  In two of the six contracts, despite numerous requests by staff, the contractors delayed performing warranty repairs yet the bonding companies were not notified. The repair work is still outstanding.

- We also noted that in four out of the seven contracts above, the contractors had at least five or more months available from the time they were first informed of the deficiencies, to perform warranty repairs before the onset of winter.

- In four contracts, the staff took more than 45 days to inform the contractor of the deficiencies. As stated above, the warranty repair work is still outstanding.

Failure to follow up on deficiencies may result in quality issues and extra costs to the City

Failure to inform and follow-up on deficiencies within the warranty period may potentially result in the City incurring the costs for subsequent repairs and damages.

Furthermore, without proper inspection practices the City may not be able to ensure the quality of construction work, and the assets put into service may not meet service life expectations.

The processes outlined in Tables 2 and 3 in this section, were compiled through reviews of various contract management procedures as well as discussions with ECS management and staff. In our view, the use of standardized forms such as checklists would help ensure critical steps are consistently followed by staff and facilitate ongoing monitoring.

Warranty Information is not Consistently Tracked

ECS uses the Project Tracking Portal (PTP) to track important project milestones e.g. order to commence date, substantial performance date, warranty inspection planned date, actual warranty inspection date, and project completion date etc.

Warranty expiry dates, extensions, and inspections were not adequately tracked

Given that the 74 contracts reviewed were substantially completed in 2015, the standard 24-month warranty would have expired in 2017. However, only 20 out of 74 contracts had warranty expiry dates entered in PTP. In each of the 20 contracts, the warranty was recorded correctly as expiring in 2017. For the remaining 54 contracts, it was unclear from records in PTP whether the warranty had been extended beyond 2017, or whether further warranty inspections were necessary.

Furthermore, 26 out of the 74 contracts had no actual warranty inspection dates entered in PTP. It is therefore not known whether any warranty inspections were conducted for these contracts.

Table 4 summarizes the missing warranty data in PTP as of April 30, 2018.

Table 4: Inspection Data in PTP, as of April 30, 2018

Contracts substantially completed in 2015	No Warranty Expiry Date	No Planned Warranty Inspection Date	No Actual Warranty Inspection Date Entered in PTP
74	54	20	26

Recommendations:

1. **City Council request the Chief Engineer and Executive Director, Engineering and Construction Services, to strengthen processes and monitoring measures to ensure that:**

   a. **Inspections for verifying substantial performance and for identifying deficiencies during the warranty period are conducted in a timely manner**

   b. **Appropriate deficiency lists are prepared and forwarded to the contractor in a timely manner**

   c. **Estimated value of all defective and remaining work is documented**

   d. **Rectification of deficiencies is followed up in a timely manner**

   e. **Documentation of all follow-up work is retained in the contract files**

   f. **Rectification work is inspected, and signed-off as completed by the project leader.**

2. **City Council request the Chief Engineer and Executive Director, Engineering and Construction Services, to update existing procedures within the ECS Capital Works Procedures Manual to ensure that project staff conduct a formal comprehensive assessment of estimated value of defective and remaining work to determine if the criteria for substantial performance prescribed in the Construction Act are met.**

3 .**City Council request the Chief Engineer and Executive Director, Engineering and Construction Services, in consultation with Insurance and Risk Management, to ensure existing procedures for obtaining appropriate insurance and bonding extensions where required, are correct and are being correctly implemented.**

CONCLUSION

Three recommendations to help improve controls over substantial performance and warranty inspection processes

ECS delivers approximately $500 million worth of capital projects annually. Our review of the certification of substantial performance and warranty management noted the need to conduct proper inspections during various stages of a contract including prior to certifying substantial performance and during the warranty period to ensure the contract meets the contract requirements and City standards.

This report contains three recommendations to help further improve the Division's controls over substantial performance and warranty inspection processes. Implementation of these recommendations could result in potential cost savings. The amount of cost savings are not quantifiable at this time.

AUDIT OBJECTIVES, SCOPE AND METHODOLOGY

Why we conducted this audit

The Auditor General's 2017 Audit Work Plan included an audit of construction contracts issued by the Engineering and Construction Services (ECS) Division.

Audit objective and scope

The objective of Phase I was to assess the controls and processes around verifying the substantial completion of contracts as well as warranty administration.

The audit reviewed unit price contracts that achieved substantial performance in 2014 and 2015.

Our audit methodology included the following:

- Review of policies and procedures
- Review of applicable legislation
- Analysis of available documentation for contract files relating to inspections, deficiencies, warranties, substantial performance, and contract completion
- Review of information systems used
- Interviews with divisional management and staff

Compliance with generally accepted government auditing standards

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

APPENDIX 1: Management's Response to the Auditor General's Report Entitled: "Engineering and Construction Services - Phase 1: Controls over Substantial Performance and Warranty Inspection Processes Should be Strengthened"

Recommendation 1: City Council request the Chief Engineer and Executive Director, Engineering and Construction Services, to strengthen processes and monitoring measures to ensure that:

Inspections for verifying substantial performance and for identifying deficiencies during the warranty period are conducted in a timely manner

a. Appropriate deficiency lists are prepared and forwarded to the contractor in a timely manner

b. Estimated value of all defective and remaining work is documented

c. Rectification of deficiencies is followed up in a timely manner

d. Documentation of all follow-up work is retained in the contract files

e. Rectification work is inspected, and signed-off as completed by the project leader.

Management Response: ☒ Agree ☐ Disagree

Comments/Action Plan/Time Frame:

While the 10 contracts that were analyzed may not be wholly representative of all linear unit price contracts delivered during the timeframe investigated, ECS supports the need to ensure that warranty periods are clear, deficiencies are recorded and sent to contractors in a timely way, and correction is monitored and enforced.

ECS is committed to continuous improvement and has an established record of identifying, developing and implementing improvements that enhance the management and record-keeping of municipal infrastructure construction contracts. Thus, it is important to note that the contracts evaluated as part of this audit (dating from 2015) were delivered based on contemporaneous procedures and manuals, which have since been updated. The ECS Field Services Manual was updated in 2016, and the ECS Capital Works Procedures Manual was updated in 2017.

ECS currently relies on the Project Tracking Portal (PTP), a custom built integrated project planning, coordination and delivery web application. It is a one window, easily accessible system to monitor, track, and report on projects, contracts, development applications, and staff time. For the purpose of delivery of capital projects, PTP is used to record project details, financial information, and, milestones.

ECS has updated PTP annually, since it was first developed. Beginning in 2015, programming changes were made to PTP to automatically generate:

- Planned Warranty Inspection milestone date, which is calculated as 18 months after the date of Substantial Performance (this latter is entered by project management staff).
- Planned Warranty Expiration, which is calculated as 24 months after the date of Substantial Performance.

- Dashboard notifications to project management staff, which can viewed by Managers, Directors, and the Chief Engineer, for "Planned Warranty Inspection" where the date is overdue, and so that action can be taken

ECS is already working on strengthening processes and monitoring measures. For 2018, ECS has requested an enhanced PTP warranty report that will explicitly identify warranty actions.

In addition, ECS is migrating contract documentation to a centralized data management platform, which will provide more efficient accessibility and enable more effective oversight of project files.

Furthermore, as part of the ECS Information and Technology Strategic Plan, ECS is in the process of evaluating comprehensive construction project management systems that will provide project managers with true work flow management capabilities (e.g., identification of the critical path for a project, ability to generate charts showing contract timelines, etc.) with the view of identifying and deploying a system that improves productivity and accountability.

In response to the recommendation, ECS will undertake updates to existing procedures to ensure:

(a) timeliness of assessments for verifying Substantial Performance and identifying deficiencies within the warranty period;

(b) timeliness of delivery of deficiency lists to contractors for their action;

(c) the value of deficiencies is assessed and recorded;

(d) deficiencies are rectified in a timely manner;

(e) record and retain documentation confirming deficiencies are rectified; and,

(f) inspection of rectified deficiencies and sign-off on contracts by project management staff.

The procedural updates will be documented in the ECS Capital Works Procedures Manual.

Recommendation 2: City Council request the Chief Engineer and Executive Director, Engineering and Construction Services, to update the existing procedures within the Capital Works Procedures Manual to ensure project staff to conduct a formal comprehensive assessment of estimated value of defective and remaining work to determine if the criteria for substantial performance prescribed in the Construction Act are met.

Management Response: ☒ Agree ☐ Disagree
Comments/Action Plan/Time Frame:

ECS will update existing procedures to ensure project staff assess and document the value of defective and remaining work when determining if the criteria for Substantial Performance, as defined by the *Construction Act*, are met.

Procedural updates will be documented in the ECS Capital Works Procedures Manual.

Recommendation: 3

City Council request the Chief Engineer and Executive Director, Engineering and Construction Services, in consultation with Insurance and Risk Management, to ensure existing procedures for obtaining appropriate insurance and bonding extensions where required, are correct and are being correctly implemented.

Management Response: ☒ Agree ☐ Disagree
Comments/Action Plan/Time Frame:

ECS will clarify existing procedures to ensure project staff know when to obtain insurance and bonding extensions after warranty expiration for those contracts with deficiencies still to be rectified.

Procedural updates will be documented in the ECS Capital Works Procedures Manual.
