

Chapter 3

Section 3.09

Metrolinx—Public Transit Construction Contract Awarding and Oversight

1.0 Summary

Metrolinx is an agency of the Ministry of Transportation responsible for operating a network of train and bus routes across more than 11,000 square kilometres (km) in the Greater Toronto and Hamilton Area. Currently valued at \$11 billion, Metrolinx uses about 680 km of railway track on seven train lines, 66 train stations and 15 bus terminals. In total, about 69 million passenger boardings occur annually on Metrolinx vehicles.

Metrolinx was established in 2006 as a planning agency, and then merged in 2009 with GO Transit (GO), which had been operating the regional transit system since 1967. With this merger, Metrolinx became responsible for operating, maintaining and expanding GO's network of trains and buses. Expanding public transit capacity is a high priority for Metrolinx: under the government's 25-year "Big Move" plan, announced in 2008, about \$27 billion is earmarked for new public transit infrastructure over the next 10 years.

In the past five years, Metrolinx has completed about 520 construction projects costing a total of about \$4.1 billion. The average cost of these projects was about \$8 million. These projects included building new parking lots, expanding GO railway

tracks, building tunnels and bridges for trains, and upgrading existing GO stations.

Metrolinx's construction projects proceed differently depending on the contractor Metrolinx works with. Of the \$4.1 billion Metrolinx spent over the past five years, about \$3.4 billion (82%) was on projects where Metrolinx contracted out all of the work. That is, external firms designed the project, constructed it and oversaw it. For almost all of these projects, Metrolinx contracted with a separate company to design the project and a different company to construct it (this is the traditional model for delivery of construction projects).

The other \$725 million (18%) of construction dollars Metrolinx spent in the past five years was paid to Canada's two major railway companies—the Canadian National Railway (CN) and the Canadian Pacific Railway (CP). When GO was first established, it used existing CN and CP track. As demand for GO train service increased, GO bought as much CN and CP track and surrounding land that it could. When CN and CP would not sell land to GO, GO paid them to construct more track lines on their land and paid them, as per the terms of their agreement, to use the lines. This continued after Metrolinx assumed responsibility for GO. Thus, Metrolinx has had to hire either CN or CP as the sole contractor for these projects on CN and CP land.

Our audit found that Metrolinx does not have adequate processes in place to consistently ensure value for money in its delivery of construction projects. Because of deficiencies noted in its oversight processes around construction contracts, and because of deficiencies we confirmed in a sample of contracts, there is a risk that it is spending more than what is required, and there remains a significant risk that this will continue to happen.

Metrolinx continues to award contracts to poorly performing contractors that submit the lowest bids—it does not track contractors' past performance and does not consider contractors' ability to deliver completed projects on time, which has resulted in Metrolinx incurring additional costs. Metrolinx has had many years to implement a contractor performance-management system but still has not done so.

For contracts with CN and CP, Metrolinx does not do work to know that it is getting what it pays for: it does not verify charged costs; it does not ensure that charged costs are reasonable; when it requests that the parts on a project be new, and pays the cost of new parts (as opposed to less expensive recycled ones), it does not require that parts be checked to ensure that they are new. It has also been paying excessively high mark-up rates charged by CN for building new rails for Metrolinx (CN's mark-up rates are specified on its invoices, while CP's are not as clear).

Our specific observations are as follows:

Metrolinx Rarely Holds Design Consultants and Construction Contractors Accountable When They Deliver Work That Is of Poor Quality and/or Late—and It Continues to Award Them More Work.

- **Design consultants' errors and delays result in additional costs to Metrolinx, yet Metrolinx takes little action to recover costs and prevent this from reoccurring.** Metrolinx allows design consultants to produce designs that are not feasible to construct, contain errors, misestimate the quantity of

materials required, or omit specifications—all with no repercussions. Because designs created by consultants are used by the contractor to calculate bid prices, they need to be free of error; otherwise, there can be considerable cost overruns during construction. Also, since construction cannot begin until the design is finalized, design delays can significantly impact the overall project time frame and cost. In our review of a sample of Metrolinx project documents from the past five years, we noted that consultants made frequent errors in their designs. In one project alone, errors made by the consultant caused a project to be over budget by 35%, or \$13.6 million, a cost that Metrolinx had to pay as a result of the design not including all final requirements. In a sample of six projects whose total initial construction costs were over \$178 million, \$22.5 million *more* had to be spent just because of the design consultants' errors and omissions. There were no repercussions in these cases, and Metrolinx did not factor in this poor performance when selecting these design consultants for future projects.

- **With the exception of two contractors, Metrolinx does not appear to be addressing problems caused by construction contractors that have a history of poor performance on Metrolinx projects.** A contractor might repeatedly be late in delivering work, not construct the project according to the approved design, not follow safety regulations and/or not fix deficiencies on time—yet Metrolinx will hire the contractor for future projects, provided it is the lowest bidder. Only in the cases of two contractors did Metrolinx take past unacceptable performance into consideration. For example:
 - **One contractor was awarded 22 more projects after performing poorly for Metrolinx.** We noted that Metrolinx issued a letter of default to a contractor in 2009 because construction workers had not even

shown up on the project site for several weeks. Despite this, since then, Metrolinx has awarded this contractor 22 more projects worth a total of \$90 million. We reviewed the contractors' performance on a few of these 22 projects and noted that project staff continued to rate its performance as poor. For example, on a project in 2012, this contractor installed several pieces of substituted equipment and building materials that were not approved in the contract (the substitutions were caught by Metrolinx only after-the-fact). On another project in 2013, this contractor took six months, after it had already completed the project, to fix its deficiencies—one significant deficiency was the absence of a functioning camera and surveillance system that posed a safety risk to commuters using the station.

- **Metrolinx terminated a contract with another poorly performing contractor, paid it almost the full amount, and then re-hired it for another contract.** Metrolinx hired the same contractor for Phase 2 of a project to install external cladding (cover) for a pedestrian bridge over Highway 401 even though the contractor had performed extremely poorly on Phase 1. The contractor again had performance issues on Phase 2: it significantly damaged glass covering the bridge, and Metrolinx estimates it will cost \$1 million to replace the glass. Metrolinx terminated the contract with the contractor because of performance issues, even though the construction had not been completed, and paid the contractor almost the full \$8 million of its contract. We noted that, after performing poorly on both Phase 1 and Phase 2, Metrolinx still awarded this contractor another major project valued at \$39 million (to build a new platform at a GO station).
- **Late construction projects have resulted in additional costs, yet Metrolinx rarely takes action against contractors for not delivering on time.** Even though Metrolinx incurs significant costs because of contractors completing projects late (anywhere from four months to 25 months), it seldom takes action against contractors that do not deliver on schedule. For example, on one project alone, Metrolinx paid consultants over \$350,000—or 160%—more than budgeted to oversee this project because the contractor was 25 months late in completing the project. In a sample of eight projects whose total initial budget for oversight services was \$1.35 million, over \$2 million *more* had to be spent because of how late contractors were in completing their projects. That is 150% more than the initial oversight budget total. Although Metrolinx could charge contractors “liquidated damages”—a pre-determined amount included in contracts to cover additional oversight costs if a project is late—it has not always included them in its contracts to allow it to charge liquidated damages. As well, based on information provided to us by Metrolinx, Metrolinx has rarely sought action against contractors for the recovery of additional costs.
- **Metrolinx does not take action against contractors that breach safety regulations during construction.** Metrolinx rarely takes into account whether contractors breached safety regulations that resulted in unsafe site and working conditions when awarding future contracts. We found that even when a contractor has caused safety issues to the public as well as construction workers, Metrolinx has taken no action against it, and has continued to award it future contracts. We noted that in *all* of Metrolinx's audits of compliance with safety regulations at construction sites over the past three years, contractors breached regulations. Instances were found

where contractors frequently erected unsafe scaffolds, or improperly labelled and stored flammable materials. Metrolinx informed us that the contractor, upon Metrolinx's request, had stopped the unsafe behaviour right away; however, we noted that there were no follow-up audits to determine whether the contractor continued to breach safety regulations, nor any repercussions for the contractor for its unsafe actions.

- **Metrolinx is not diligent in ensuring that contractors fix deficiencies in their work in a timely manner.** In three-quarters of the projects we reviewed, we noted that contractors took much longer than the industry standard of two months to fix all deficiencies. On average, these contractors took almost eight months to fix outstanding deficiencies.
- **Metrolinx has not addressed the risk of poorly performing sub-trades being selected by the contractor.** Metrolinx allows contractors to subcontract up to 100% of the work on their projects. Metrolinx has experienced significant issues with sub-trades—to the extent that its staff have requested that Metrolinx pre-screen sub-trades to ensure that those with a poor work history do not jeopardize project timelines.

Metrolinx's Accounting System Allows Payments to Exceed Projects' Approved Budgets.

- **Metrolinx does not have, in its enterprise management system, a control in place to ensure that payments exceeding approved budgets have been approved for over-expenditure.** As a result, project staff must manually keep track of project expenditures to ensure that they are within the budget. However, we found that they are not always properly doing this. In one instance, in March 2013, Metrolinx issued a contractor two payments totalling \$1.2 million over the project's approved \$17 million budget without having authorization to exceed the budget.

Three years later, on the same project, the same problem occurred again: Metrolinx made three payments totalling \$3.2 million over the approved budget without prior authorization.

Metrolinx Has Not Managed Its Relationship with CN and CP in a Way that Ensures Value-for-Money for Ontarians.

- **Metrolinx pays CN and CP without verifying most costs.** Metrolinx's projects with CN and CP are costed in one of two ways. With some CN projects, CN provides an estimate of the total costs, and that estimate becomes the lump-sum amount Metrolinx ultimately must pay for the project. With other CN projects and almost all CP projects, CN or CP invoices Metrolinx based on the project's time and materials. In all cases, Metrolinx pays CN and CP without verifying most costs:
 - We found that Metrolinx does not do sufficient work to determine if the estimated lump-sum costs on CN projects are reasonable. We also noted instances where Metrolinx paid for costs unrelated to its projects, such as costs for maintaining CN railway track.
 - We similarly found that Metrolinx does not verify whether invoices billed by CN and CP actually relate to work done on Metrolinx projects. For example, we found several CN charges to Metrolinx for work CN had done on track that it owned that GO Trains never use. Metrolinx does not have a site inspector at CN or CP to ensure work done by the railways, and, although it has the ability to audit invoices under its agreement with CN, it does not do so.
 - Compared to other rail companies that work for Metrolinx, CN charged Metrolinx significantly higher materials and labour costs. Specifically, materials costs were about 60% higher and labour costs were

130% higher. Information on CP's costs were not detailed enough to allow us to perform the same comparison.

- **CN Railway installed recycled parts; Metrolinx paid for new.** Metrolinx informed us that it may sometimes visually inspect railways once they are built, but inspections are not mandatory, and the results of any inspections that are done are not documented. We noted one instance where recycled parts were being used when only new parts were purchased. Without inspecting the parts used in railway construction, Metrolinx cannot know if it pays for new parts but receives recycled parts instead.
- **Metrolinx pays CN and CP excessive mark-up rates on projects.** All contracts with CN and CP are sole-sourced. CN's mark-up rates on labour and parts are set in a long-term agreement with Metrolinx. These rates are as much as 74% higher than industry benchmarks. Metrolinx has not negotiated any mark-up rates with CP, and they are usually not transparent. We found that CP disclosed their mark-up rates in only one of the projects we sampled, and they were about 30% higher than industry benchmarks.

This report contains 17 recommendations with 38 action items.

OVERALL METROLINX RESPONSE

Metrolinx welcomes the recommendations made by the Auditor General to improve construction procurement and contract management processes. Over the period reviewed by the Auditor General's Office, Metrolinx's annual capital investments, including construction costs, more than doubled. Metrolinx has taken many measures over this period to continue to improve its controls over this program, some of which are outlined below. The observations, insights and recommendations presented in the Auditor General's report will continue to

support our ongoing efforts and commitment to continuous improvement in achieving our mandate of an integrated regional transportation network.

Significant work is underway to ensure that Metrolinx will be "best in class" as it relates to contract and construction management to ensure that we continue to provide value-for-money in our procurement and construction activities. Metrolinx will enhance its current implementation plan to include the recommendations made by the Auditor General. Current activities underway include:

- Metrolinx will continue to implement its enhanced Vendor Performance Management System. This "best practice" system will ensure that we optimize value-for-money by incentivizing good contractor performance and considering past contractor performance in awarding future work.
- Metrolinx continues to implement and adopt stronger contractual terms through the continued use of the Canadian Construction Documents Committee common contractual terms, stronger terms around project safety, the ability to use Metrolinx projects as references, and adoption of rights of exclusion (for example, rights not to award based on poor performance) in Metrolinx contracts.
- Metrolinx is in the process of transforming its Procurement division to strengthen its overall procurement process and vendor performance management system.
- Metrolinx is proactively implementing the Certificate of Recognition (COR) program as a mandatory requirement on all construction procurements. COR is a leading industry safety standard that ensures the contractor has in place a comprehensive health and safety management system.

In 2014, Metrolinx merged with the GO Transit Capital Infrastructure team and Metrolinx's Rapid Transit Implementation team to bring together expertise in project delivery,

program management and quality assurance. The new Capital Projects Group (CPG) is working to implement a best-in-class organization able to deliver on some of the region's most significant transit projects. CPG is currently working to share lessons learned and best practices from its Rapid Transit initiatives and infuse them into its active projects, including the Regional Express Rail program, ensuring consistency when dealing with capital projects. The updated processes being implemented will guide daily operations across CPG.

2.0 Background

2.1 Overview of Provincial Transportation Infrastructure

The province's transportation infrastructure is made up of road infrastructure and public-transit infrastructure, both falling under the responsibility of the Ministry of Transportation (Ministry). (The Ministry is not responsible for the road and public-transit infrastructure of municipalities.)

Ontario's **road infrastructure** is currently valued at \$82 billion. It consists of about 40,000 km of highway lanes covering a distance of about 20,000 km, and almost 5,000 bridges and culverts.

Ontario's **public transit infrastructure** is currently valued at \$11 billion. Operated by Metrolinx, which is an agency of the Ministry, it consists of a network of train and bus routes serving an area of more than 11,000 square kilometres in the Greater Toronto and Hamilton Area (GTHA). Metrolinx vehicles have about 69 million passenger boardings annually. Metrolinx operates trains on about 680 km of railway track on seven train lines. Trains and buses connect cities through 66 train stations and 15 bus terminals spanning from Hamilton in the west, Barrie in the north, Oshawa in the east and Lake Ontario in the south. In addition, there are about 70,000 parking spots in 10 multi-level

parking garages and 139 surface parking lots. Throughout the entire network, there are about 470 bridges for pedestrians and trains.

Metrolinx was established in 2006 as an agency of the Ministry of Transportation (*Metrolinx Act, 2006*). Its mandate was that of a planning agency—to provide leadership in integrating various transit systems within the Greater Toronto and Hamilton Area. In 2009, Metrolinx's mandate expanded when the government of the day merged it with GO Transit (GO). GO had been operating the regional transit system since 1967. Before the merger, Metrolinx did not undertake any construction work itself. After the merger, in addition to its planning responsibilities, Metrolinx became responsible for operating, maintaining and expanding GO's network of trains and buses. It also absorbed GO's construction function, keeping all policies, contracts and procedures intact.

2.1.1 Major Construction Work Planned to Expand Province's Transportation Network

In 2008, the government announced its 25-year Regional Transportation Plan (also known as the "Big Move" plan) to make huge upgrades to Ontario's existing transportation infrastructure. The government identified that traffic congestion alone costs \$11 billion annually, and that Ontario's population will grow by about 40% in the next 25 years.

The Big Move plan set the stage for the single biggest wave of investment to build new transportation infrastructure since the time these systems were initially built. A sizeable investment is being made to upgrade regional public transit to help with traffic congestion. For example, train frequency on each line travelling to and from downtown Toronto is expected to increase to every 15 minutes in the daytime on weekdays. Outside the downtown core, light rail transit is being built in Toronto, Mississauga and Brampton.

Significantly more money is allocated for expansion over the next 10 years than in previous years.

Figure 1: Planned Spending to Rehabilitate and Expand Ontario's Transportation Infrastructure, 2016/17–2025/26

Source of data: Ministry of Transportation and Metrolinx

Type of Infrastructure	Planned Spending to Rehabilitate Existing Infrastructure (\$ billion)	Planned Spending to Build New Infrastructure (\$ billion)	Total (\$ billion)
Highways and bridges	14	4	18
Public transit	3	27	30
Total	17	31	48

As **Figure 1** indicates, the Ministry expects that building new highways, bridges and public transit infrastructure will cost about \$27 billion over the next 10 years.

2.2 Public Transit Construction Projects

In the past five years, Metrolinx has completed about 520 construction projects totalling about \$4.1 billion. These include building new parking lots, expanding GO railway tracks, building tunnels and bridges for trains, and upgrading existing GO stations. Some of these projects were also part of the Big Move plan. These projects cost an average of about \$8 million.

2.2.1 Construction Work on Railway Track

Little Need to Build New Railway Tracks—1967 to 2000

GO has been operating trains since 1967. When established, GO used existing track owned by Canada's two major railway companies: the Canadian National Railway (CN) and the Canadian Pacific Railway (CP). Both CN and CP operate freight trains on their tracks, and GO had agreements to run its commuter trains on their tracks. Although CN and CP accommodate GO's train schedule as much as possible, ensuring that their freight trains stay on schedule takes precedence for them.

Even into the 1990s, there was little need to expand the train network and construct new track. Therefore, during this period, GO continued to only pay a usage fee to CN and CP.

Railway Track Expansion Initiatives—2000 to Present

Demand for GO train service started to increase in the 2000s, and was forecasted to continue. However, railway companies' freight traffic was hindering GO's ability to increase train service. Therefore, GO's strategy was to buy as much railway track and surrounding land that it could from the railway companies.

Between 2000 and 2011, GO acquired 53% of the track it is currently using; between 2012 and 2014, it acquired an additional 26%. Metrolinx paid \$1.2 billion to acquire this land.

Figure 2 shows the chronology of major track purchases. As **Figure 3** shows, Metrolinx currently owns 79% of the track it operates on, while CN owns about 10% and CP 11%.

In instances where CN and CP did not want to sell land to GO or could not negotiate a sale, GO contracted them to construct additional lines of track on CN and CP land. GO then paid CN and CP to use these tracks. This continued after Metrolinx assumed responsibility for GO. If Metrolinx wants to increase the frequency of its train service but existing track cannot handle the increase, it has to contract CN or CP (as required per their agreement) for it to build new track on Metrolinx's behalf.

Figure 2: Changes in Percentage of Track* Owned by Metrolinx since the Inception of GO Transit

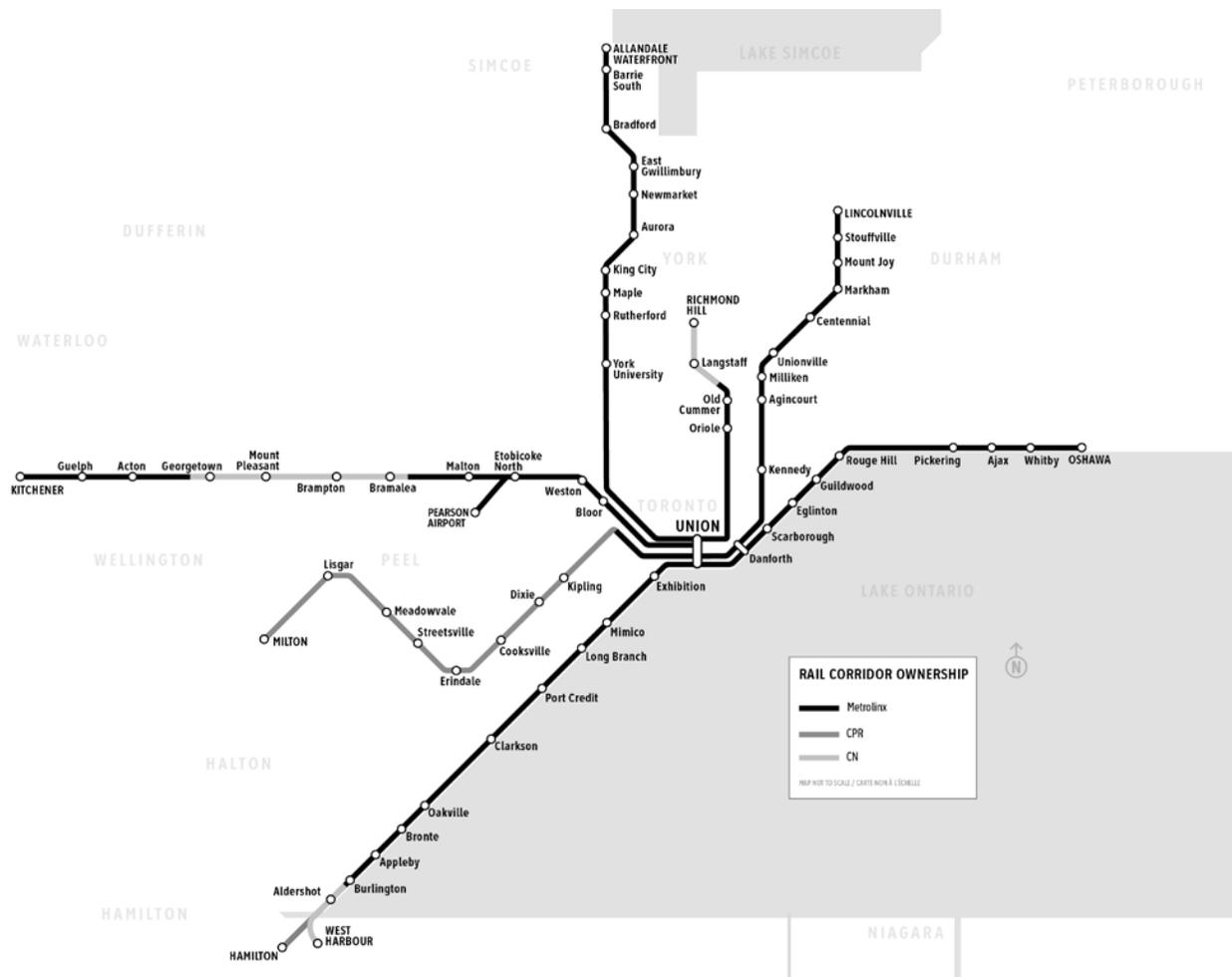
Source of data: Metrolinx

Year(s) in Which Track Was Acquired	Railway Track Purchased from Railway Companies (% of Total as of 2014)	% of Railway Track Used by Metrolinx that Is Owned by Metrolinx
1967-1999	—	0
2000	22	22
2007	8	30
2009-2011	23	53
2012-2014	26	79

* Total track used by Metrolinx covers a distance of 430 km. In addition, Metrolinx also uses another 70 km of track for its seasonal service in the summer from Hamilton to Niagara. Ownership of this 70 km is not reflected in the table above because the Hamilton-to-Niagara service is not part of Metrolinx’s daily commuter service.

Figure 3: Map Showing Track Owned* by Metrolinx, CN Railway and CP Railway

Source of data: Metrolinx



* This ownership map does not include Metrolinx’s railway service from Hamilton to Niagara because it only operates during the summer months and is not part of its daily commuter service.

CN and CP have done many construction projects for GO and Metrolinx because they owned much of the land on which GO trains operate. Over the past five years, Metrolinx has paid CN and CP about \$725 million to construct and upgrade tracks. This is about 18% of Metrolinx's total construction costs in this period.

Other railway construction work done on Metrolinx-owned land has followed a separate procurement process as described in **Section 2.2.3**.

Long-Term Master Agreements Governed How the Railway Companies Would Deliver Construction Projects

Metrolinx negotiated long-term master agreements with both CN and CP. Metrolinx has two agreements with CN—a Master Operating Agreement and a Master Construction Agreement—which are used based on the type of work performed. The Master Construction Agreement has governed how the cost of construction projects would be determined and projects overseen. CP, unlike CN, has a Commuter Operating Agreement in place with Metrolinx, but it does not cover construction. All construction agreements with CP are on a project-by-project basis.

To build new track, Metrolinx provides each railway company with requirements, such as how often GO trains will run on the new track. CN and CP then develop cost estimates for each project. Work begins once this amount is approved by Metrolinx. Under the terms of their respective overall contracts, Metrolinx can inspect the railway company's work, but it is the railway company's responsibility to build good-quality track that meets Transport Canada's railway-track standards.

Projects can be delivered through one of two approaches: "fixed cost" or "time and materials." According to the master agreements, CN projects can be delivered through either approach; CP projects are almost always delivered only through the time-and-materials approach.

- **Lump-sum approach:** Under this approach, CN provides Metrolinx with a fixed price, or lump-sum amount, to build the additional track. This allows Metrolinx to budget sufficient funds for the project and reduces the risk of cost overruns. CN is responsible for bringing the project in within the lump-sum price; if it goes over budget, it must assume the additional cost. If this approach is used, it is important for Metrolinx to negotiate a fair and reasonable price upfront.
- **Time-and-materials approach:** Under this approach, CN or CP charges all actual construction costs back to Metrolinx. This approach is better suited for more complex projects where costs are hard to estimate upfront. If this approach is used, it is important that invoices, labour hours and quantities of material be verified throughout the project. This ensures that Metrolinx is paying only for the work done for its projects.

2.2.2 Metrolinx Fully Outsources Non-CN-or-CP Projects Using the Traditional Model

For projects not on CN or CP land, Metrolinx outsources to external firms almost all work related to a construction project: the design, construction and oversight. One advantage of outsourcing is that Metrolinx does not have to maintain a workforce large enough to complete major projects. However, outsourcing still requires that Metrolinx maintain good oversight throughout all phases of a project.

Metrolinx uses the same project-delivery model that GO had used since it started operating in 1967. Metrolinx contracts with one entity to prepare the design and with a second entity to construct the project based on the design (this is known as the "traditional model"). The other project-delivery model, which the Ministry used for only six of over 250 projects in the past five years, is to contract with a single entity to both design and construct the project.

Under the traditional model, where the construction contractor is not responsible for the design, Metrolinx retains more control and risk of cost overruns. Under the other model, Metrolinx transfers a significant amount of control and risk of cost overruns to the contractor.

Metrolinx engages external consultants, who are qualified engineers, to create project designs. Oversight is outsourced to an external consultant team that is made up of engineers and other construction staff. Metrolinx also has staff that can perform oversight on some projects; however, they do so only for a few projects that are especially complex and time-sensitive.

Metrolinx's Process for Hiring Contractors

On projects not on CN- or CP-owned land, Metrolinx hires contractors using one of two procurement methods:

- **Pre-qualified contractor, lowest-bid:** In this method, a tender is made available only to pre-qualified contractors, and the lowest-bidding pre-qualified contractor is chosen. Contractors are pre-qualified to bid on projects that are similar in size and complexity to projects they have previously completed. When deciding whether to pre-qualify a contractor, Metrolinx assesses a number of factors, such as the contractor's quality-assurance procedures and the experience of its project team.
- **Any contractor, lowest-bid:** In this method, a tender is publicly made available to all contractors. In order to win a contract, the contractor has to be the lowest bidder.

3.0 Audit Objective and Scope

Our audit objective with respect to construction projects in the transportation sector was to assess whether Metrolinx has effective policies and procedures in place to ensure that:

- contractors are selected in a competitive, fair, open and transparent manner that results in contracts being awarded to qualified bidders only, with due regard for economy;
- there is sufficient oversight of the contractors during construction; and
- final construction results in value for money for Ontarians.

Prior to commencing our work, we identified the audit criteria we would use to address our audit objective. Senior management at Metrolinx agreed to our audit objective and criteria. Our audit work was primarily conducted between December 2015 and July 2016.

In conducting our work, we met with key personnel at Metrolinx' head office where the oversight of construction contracts takes place. We interviewed staff involved in procurement, administration and oversight of construction contracts, and examined related data and documentation, including documentation on the quality of construction work done by contractors. We also met with Metrolinx staff involved in design engineering and examined documentation on construction project designs. In addition, we met with Metrolinx staff who are responsible for administering warranties and ensuring that project deficiencies are fixed by the contractor after construction is complete.

We reviewed a sample of construction projects to form our conclusions in some areas (throughout **Section 4**, we indicate where sampling was performed as a basis to form conclusions). Specifically in **Section 4.2** (where we discuss whether Metrolinx prevents poorly performing construction contractors from being awarded future contracts), we reviewed whether Metrolinx continued to award contracts to contractors that were identified to us as having a history of poor performance. In all other areas where sampling was performed, we chose projects at random and reviewed related project data and documentation, and conducted interviews with project staff.

We contacted other jurisdictions to gain an understanding of, and provide comparisons on a

number of areas of construction contract administration and project management, including the use of liquidated damages and contractor insurance.

We asked Metrolinx's Internal Audit Division for any relevant audit reports, but it had not issued any at the time of our audit.

4.0 Detailed Audit Observations—General

These *Detailed Audit Observations—General* apply to Metrolinx overall and Metrolinx's projects with contractors other than Canadian National Railway (CN) and Canadian Pacific Railway (CP). **Section 5.0** presents our audit observations that apply uniquely to CN and CP.

4.1 Metrolinx Is Not Effectively Addressing the Poor Performance of Design Consultants

Design consultants engaged by Metrolinx are professional engineers who generally have specialized expertise designing projects in the transportation sector. Metrolinx outsources a significant portion of this work to about 20 engineering firms; it does not design any projects in-house. The design consultant includes a team of engineers, including an architect, mechanical engineer, structural engineer and civil engineer. The design consultant develops project designs to ensure that the completed structure will meet both Metrolinx's requirements and regulations such as the Ontario Building Code. The design is tendered along with the construction contract.

Any consultant may bid on Metrolinx projects. Consultants are hired based on a scoring system that factors in their bid price and other qualitative considerations (such as the experience of key staff and a review of the consultant's prior work).

4.1.1 Metrolinx Rarely Takes Action Against Consultants that Submit Project Designs Containing Errors

Because designs created by consultants are used by the contractor to calculate bid prices, they need to be free of error; otherwise, there can be considerable cost overruns during construction. However, Metrolinx rarely takes action when design consultants produce designs that are not feasible to construct, that are unclear or contain errors, that misestimate the quantity of materials required, and that omit specifications. Not only are there no repercussions for the design consultant, but we also noted that the resulting cost overruns can be significant. Overall, about half of all construction projects at Metrolinx in the past five years have had cost overruns on average of 23%—for a total of \$303 million.

Understandably, it is possible for even experienced consultants to make errors in their designs. However, the errors we noted were such that they lacked due diligence on the consultant's part. Given that Metrolinx rarely attempts to recover cost overruns from the consultant, there is little incentive for consultants to do better. In addition, fixing these errors during construction can be expensive because Metrolinx negotiates non-competitively with the hired contractor to make the fix, and this contractor is allowed to charge a 20% surcharge on all change orders to account for profit and overhead. (Industry standards provide for surcharges to be incorporated in such situations, but they do not specify the amounts.) If the design was error-free, the price paid by Metrolinx would be based on a competitive bid.

Metrolinx staff explained to us that they commonly face the issue that consultants' designs are not feasible to construct. This means that when a contractor actually attempts to construct according to the design, it will run into major problems that ultimately cost Metrolinx more.

We reviewed a sample of cost overruns on Metrolinx projects to determine how much of them

resulted from design errors and omissions. **Figure 4** shows the additional costs of \$22.5 million that Metrolinx paid as a result of design errors and omissions in some of the projects reviewed.

Additional Costs Incurred During Construction Because Consultants' Designs Are Not Feasible to Construct

Metrolinx staff explained to us that a common issue they face is that consultants' designs are not feasible to construct. This means that when contractors attempt to construct according to the design, they run into major problems.

For example, on one project, the consultant created a design for the construction of boiler rooms at an existing GO station but failed to properly assess site conditions. When the contractor began excavat-

ing, it found that there were many more cables and wires running underground than shown on the design. Although it is normal to discover additional cables and wires running underground during construction, Metrolinx informed us that the consultant had done an inadequate job of identifying them in comparison to what was expected under the circumstances. As a result, it was not feasible to build the boiler rooms in the intended location. Metrolinx eventually determined that the design was not constructible and terminated the construction contract with the contractor. However, by this time it had already paid the contractor \$2.6 million to assess underground conditions in the hope of salvaging the contract. Upon the contract's cancellation, Metrolinx paid another \$1.8 million in termination payments to the contractor (at the time

Figure 4: Additional Costs Incurred by Metrolinx Because of Errors and Omissions Caused by Design Consultants

Source of data: Metrolinx

Project Description	Initial Costs of Construction (\$)	Additional Construction Costs as a Result of Errors and Omissions by Design Consultants (\$)	Amount that Construction Costs were over Budget (%)
Exhibition GO Station Rehabilitation of existing platform and tunnel, and installation of a new elevator	0 ¹	4,324,000 ²	n/a ³
Bloor GO/Union Pearson Express Station Construction of two new platforms for use by GO trains and the Union Pearson Express	38,574,000	13,627,000	35
Erin Mills Bus Station Construction of a new station and bridge with two dedicated bus lanes	16,535,000	1,282,000	8
Weston GO Station Construction of a new platform and modifications to the temporary side platform	27,700,000	1,885,000	7
Stouffville Corridor Construction of a second railway track between the Danforth GO Station and the Unionville GO Station	51,249,000	1,010,000	2
West Harbour GO Station Construction of a new station for the extension of service for the Lakeshore West corridor	44,270,000	400,000	1
Total	178,328,000	22,528,000	13

- As discussed in Section 4.4.1, this project was never constructed. The errors and omissions made by the design consultant were so high that the construction contract had to be cancelled.
- The payments totalling \$4,324,000 that Metrolinx made to this contractor were for doing extra work to identify all of the designer's errors, and for terminating the contract.
- Given that the contract had to be cancelled and no construction costs were actually incurred, the % amount for this column is not applicable.

of our audit, it had retendered the work to a different contractor). These payments to the contractor of \$4.4 million were 55% of the original \$8-million value of the contract. Metrolinx did not recover this amount from the design consultant and in fact paid the consultant an additional \$766,000 to redesign the project.

Additional Costs Incurred During Construction Because Consultants Made Errors in Their Designs

We also noted that consultants also made errors such as estimating the wrong quantity of material that would be required, or produced vague and unclear designs that led to cost overruns during the construction phase.

On one project in **Figure 4**, the consultant made numerous errors that caused a \$38.6 million project to be over budget by 35% or \$13.6 million. These errors included incorrectly estimating the amount of concrete and steel required and the number of underground cables required. This cost an additional \$6.2 million. Metrolinx also had to pay an additional \$5.8 million to the contractor to have additional construction workers present on site so that project timelines could still be met (because fixing the design errors made by the consultant had caused a slowdown in construction work). At the time of our audit, Metrolinx had not attempted to recover the cost overruns it incurred because of the consultant's errors.

Additional Costs Incurred During Construction Because Consultant Failed to Design Major Construction Requirements

We noted several instances where a design consultant omitted certain specifications. Thus, Metrolinx experienced cost overruns because contractors had not accounted for the cost of missing items in their bid price. For example, on one project, the design consultant made an error and did not include in its design the requirement to install a security system.

This error was found during construction; it cost Metrolinx \$256,000 to have this work done.

On another project, the design consultant performed a poor job of surveying the site to determine how many objects were encroaching on Metrolinx's property. Sites are normally surveyed in advance of construction to identify encroachments that need to be removed prior to the start of construction. During construction, however, the contractor was surprised to find that there were about 30 homes whose fences were encroaching on Metrolinx' property that had not been identified by the design consultant. Construction was halted because the contractor had to inform residents of Metrolinx's construction plans and coordinate the removal of fences. The design consultant on this project also failed to identify numerous trees that were encroaching on Metrolinx's construction site. Working with residents of the nearby homes and removing unidentified trees resulted in the project being delayed and \$832,000 in additional expenses to Metrolinx.

Metrolinx Entitled to Recover Cost Overruns Resulting From Design Errors or Omissions, But Has Rarely Done So

Metrolinx's contract with design consultants allows it to recover the cost of their errors and omissions through a claims process with the consultants' insurance company. We noted that Metrolinx did not attempt to recover these costs for any of the projects we reviewed.

When we asked whether Metrolinx had ever done so in the past for other projects, it told us that it had done so in only one instance.

RECOMMENDATION 1

To ensure that it does not incur excessive costs as a result of consultants' design errors and omissions, Metrolinx should implement policies and procedures for reviewing designs for their accuracy, their constructability, and their inclusion of all specifications.

METROLINX RESPONSE

Metrolinx agrees with the Auditor General's recommendation. Metrolinx has historically relied on the professional qualifications of the successfully-tendered Design Consultant; through procurement transformation, we have been developing a more stringent tender process (that is, Request for Qualified Quotations) that puts an emphasis on awarding the contract based on qualifications (previous pertinent experience, qualifications of each design discipline, minimum years of experience) and contracts are awarded on an evaluation weighting of 75% and 25% for qualifications and price respectively. In addition, the use of design-build contracts has also been more recently employed to transfer risk to contractors.

Furthermore, Metrolinx is developing processes to support design compliance, including the identification and documentation of non-compliance (for example, errors and omissions). These processes will identify the parties responsible for the technical review, monitor and encourage consistency in comments, schedule comment resolution meetings, and document and audit against agreed upon resolutions.

We anticipate implementation of these design compliance processes by February 2017.

RECOMMENDATION 2

Where design errors and omissions are found that result in additional costs to Metrolinx, Metrolinx should:

- recover those costs from the design consultant by any means it deems reasonable, including through errors and omissions insurance; and
- consider the design consultant's performance in the awarding of future business.

METROLINX RESPONSE

Metrolinx agrees with the Auditor General's recommendation. If errors or omissions are discovered during the construction phase, Metrolinx works collaboratively with the consultant, the contractor and legal counsel to develop a feasible, cost effective and timely resolution to the issue. In some cases, resolution may include the filing of an errors and omissions claim with the vendor to compensate Metrolinx for additional costs. These efforts are ongoing.

Where there are continued issues with design consultants, the newly developed Vendor Performance Management (VPM) system will document and flag the vendor's performance for consideration during future tenders. Implementation of the VPM system is now substantially complete. Output from the system will first be used in the evaluation of tenders by the end of March 2017. In the following year, VPM output will progressively become available for use across all work categories.

RECOMMENDATION 3

To ensure that all cost overruns resulting from design consultants' errors and omissions are assessed for potential recovery, Metrolinx should implement policies and procedures that:

- enable tracking of cost overruns; and
- clearly define the roles and responsibilities of the staff involved in recovering the overruns.

METROLINX RESPONSE

Metrolinx agrees with the Auditor General's recommendation. As part of managing project budgets and contract costs, processes and procedures will be enhanced so that any construction cost changes due to design error and omissions will be reviewed, documented and assessed for cost recovery. As part of the revised procedures, roles and responsibilities will be defined to ensure consistent capture of

the costs attributed to design errors and omissions, enabling the organization to acquire the information needed to more easily recover these costs.

4.1.2 Metrolinx Is Not Effectively Addressing the Problem of Design Consultants Not Meeting Deadlines

There are serious consequences if design consultants do not meet deadlines—the entire project is delayed because construction work cannot begin until the design is finalized. However, nothing in design consultants' contracts addresses missed deadlines. The only action Metrolinx can take against late-delivering design consultants is to terminate the contract. Furthermore, Metrolinx does not take consultants' track record for timeliness into account when hiring them for future projects.

Through our review of project files, we identified that design consultants were not meeting timelines because the consultant team lacked the necessary expertise or not did not have enough staff to complete the work on time.

We noted one project where a design consulting firm made numerous mistakes that demonstrated it did not understand the project nor what was required of it. Metrolinx informed us that the design consultant should have taken no more than nine months to produce a suitable design; instead, it took 17 months. This significantly delayed the construction phase of the project. Metrolinx noted numerous errors in the design consultant's work and requested them to be fixed; yet, when it reviewed the consultant's final submission, it noted that the consultant still had not addressed many of the requested changes. In a letter sent to the consulting firm, Metrolinx stated the following about the consultant's performance:

In reflection of [*Consultant X*]'s level of performance experienced in relation to the project, Metrolinx formally wishes to convey our discontent. We feel that design quality and coordination issues along with prolonged reso-

lution of project issues is causing undue delay and confusion. The copious amount of design revisions originating from [*Consultant X*]'s poorly managed quality control process has become abundantly evident since the inception of construction. This re-occurring issue has caused delay and increased costs, which is not acceptable to Metrolinx. The construction of the improved Station is a high-profile and time sensitive project needing to be addressed by a professional level of management. We are concerned that level of management is not being provided.

In another project involving the construction of new station platforms, we noted the design consultant missed deadlines and delayed the project, which took nine months instead of five months to complete. Metrolinx staff noted that the delays were mainly a result of the design consulting firm being disorganized and unable to guarantee that its engineers were available and free to complete the design. During a six-month period on this project, the design consultant did not respond to numerous emails and phone calls from Metrolinx. Also, throughout the project, the design consultant provided designs in a piecemeal manner. Without having a complete design, the contractor hired by Metrolinx was unable to order special construction materials that required a long lead time for delivery.

Again, in both of these projects, and other projects we reviewed, despite the fact that the design consultants clearly did not provide professional and timely service, Metrolinx did not hold them financially accountable.

RECOMMENDATION 4

To ensure that construction projects are not delayed because of the design consultant's failure to meet project timelines, Metrolinx should:

- include contract provisions that allow it to address poorly performing consultants who do not meet project timelines; and

- implement a system where consultants' track record for timeliness is taken into account when hiring them for future projects.

METROLINX RESPONSE

Metrolinx agrees with the Auditor General's recommendation and is taking action by implementing a Vendor Performance Management (VPM) system that will provide regular and timely feedback on a consultant's timeliness and will provide a defensible and documented basis for assessing their suitability to bid on future projects. Output from the system will first be used in the evaluation of tenders by the end of March 2017. In the following year, VPM output will progressively become available for use across all work categories.

Further, Metrolinx will look into provisions to contracts that will allow it to address poorly performing consultants that do not meet project timelines.

4.2 Metrolinx Rarely Prevents Poorly Performing Construction Contractors from Being Awarded Future Contracts

Even when a contractor has a history of poor performance on Metrolinx projects, Metrolinx takes little action to prevent it from working on future projects. A contractor might repeatedly be late in delivering work, not construct the project according to the approved design, not follow safety regulations and/or not fix deficiencies on time—yet Metrolinx will hire the contractor for future projects, provided it is the lowest bidder. Metrolinx rarely factors reviews of a contractor's references and the contractor's past performance into its decision to award it a contract.

Similarly, once Metrolinx has put a contractor on its roster of pre-qualified contractors, it does no further assessment of whether the contractor's performance has continued to be acceptable.

We noted that there are several contractors that have a history of poor performance to which Metrolinx continues to award construction projects.

4.2.1 Metrolinx Awarded One Poorly Performing Contractor 22 More Projects after Issues Began in 2009

We noted that, in 2009, Metrolinx issued a letter of default to one contractor because construction workers had not even shown up on the project site for several weeks. (Such letters are only issued where a contractor has made no attempt to rectify serious problems.) Despite this, since then, Metrolinx has awarded this contractor 22 more projects worth a total of \$90 million. We reviewed a sample of these projects and noted that the contractor continued to perform poorly on some of these projects.

In 2012, for example, this contractor installed several pieces of substituted equipment and building materials that were not approved in the contract. Although contractors are required to have Metrolinx review and approve all such substitutions to ensure they meet required specifications, the contractor did not do so.

- In one case, this contractor used concrete in the base of a train platform that was not air-entrained according to the requirements (air-entrained concrete has billions of microscopic air pockets that allow water trapped in the concrete to expand during winter). When Metrolinx staff learned that this inferior concrete had been used, they chose to accept it because making the contractor replace it would have taken too long and further jeopardized project timelines. However, this concrete may require earlier maintenance in the future because it is more susceptible to cracks than the concrete that had been specified.
- In another instance, this contractor installed an inferior-quality diesel-dispensing machine even though it posed a safety risk (in this instance, because of the safety risk, Metrolinx instructed this contractor to replace it with the specified equipment).

Unapproved substitutions should not occur in the first place because they are against the terms of Metrolinx's agreement with the contractor, and because if they are not adequate, they can cause excessive delays while being fixed. In addition, there exists a risk that substitutions may remain undetected – which could increase future costs to Metrolinx, or pose a safety hazard.

Despite this contractor performing many unapproved substitutions, it was awarded another contract in 2013. On this project, valued at \$9 million, the contractor was late in fixing about 25 construction deficiencies in its work. Metrolinx's generally accepted time frame is 30 to 90 days; however, the contractor took six months. One of the deficiencies was the failure to install a functioning camera and surveillance system in a GO station. The absence of a functioning system during this period posed a security risk for commuters using the station.

Metrolinx continues to allow this contractor to bid on contracts.

4.2.2 Metrolinx Awarded a Contractor Phase 2 of Pickering Bridge Project Even Though It Had Performed Extremely Poorly on Phase 1

The contractor for Phase 1 of the construction of a pedestrian bridge over Highway 401 in Pickering performed so poorly that Metrolinx staff had to take over performing many of its duties. Nevertheless, Metrolinx hired the same contractor for Phase 2 of the project because it was the lowest bidder. On Phase 2, the contractor caused significant damage to the bridge. Nevertheless, Metrolinx paid the contractor almost the full \$8 million of their contract. We noted that, after performing poorly on both Phase 1 and Phase 2, Metrolinx still awarded this contractor another major project valued at \$39 million.

The bridge in question is a landmark structure allowing pedestrians to cross 14 lanes of Highway 401 between the Pickering GO Station and

the evolving Pickering City Centre development. Phase 1 of the project involved the construction of the bridge and stairwells; Phase 2 involved the installation of external cladding over the bridge. The bridge was to serve, according to the City of Pickering website, “as an iconic, luminous landmark, signifying where Pickering and Durham Region begin.”

Phase 1: Contractor Demonstrated Complete Lack of Experience in Building Bridges

Although building the bridge structure and stairwells would be fairly straightforward for an experienced contractor, the contractor awarded the job was performing poorly; as a result, Metrolinx staff had to take over and manage many of its responsibilities on this \$19-million project.

For example, the contractor had no experience in installing the bridge trusses (a bridge truss is the metal skeleton that is the most basic component of the bridge), something that a contractor constructing a bridge would be expected to know how to do. In fact, it installed one truss upside down. Seeing this, Metrolinx project staff stepped in to manage the truss installation even though this was clearly the contractor's responsibility. They managed the truss supplier and related sub-trades, arranged the delivery of the trusses, shut down Highway 401 during installation, and managed other aspects of traffic flow. Metrolinx staff also went so far as to find a hauling company to move the trusses to the site: work that all should have been managed by the contractor. The contractor was still paid the full \$19 million in payments.

Phase 2: Contractor Again Won Contract Despite Poor Performance then Damaged the Bridge

Although Metrolinx was aware of this contractor's lack of experience, its poor work ethic, and its unwillingness to improve performance, Metrolinx did not restrict it from bidding on Phase 2 of this project. Because this contractor's bid was the lowest, Metrolinx awarded it the contract for the second phase of work.

Figure 5: Design of Iconic Pickering Pedestrian Bridge vs. Bridge as Actually Constructed

Source of data: Metrolinx



Artist's Rendering of North Plaza of the Pickering Pedestrian Bridge, showing special cladding design, which should have been built by 2013.



Photo of North Plaza of Pickering Pedestrian Bridge at the time of our audit in September 2016.

The contractor's performance was again poor—poor enough, in fact, that Metrolinx eventually terminated its contract. But not before the contractor caused significant damage to the bridge. By improperly welding some metal components, workers splattered metal over large areas of glass. A glass expert hired by Metrolinx later identified that 87% of the glass had been damaged, and recommended that it all be replaced. Metrolinx estimates it will cost about \$1 million to fix the glass.

Metrolinx also discovered that the contractor built the stairwell incorrectly (in Phase 1). Because the stairwell had been built too wide, the cladding material would break if the contractor attempted to stretch it over the stairwells. The contractor did not fix the stairwell and, at the time of our audit, the problem still had not been solved. Metrolinx was working with an engineering firm to develop a cost-efficient solution to fix the stairwell problem at its own expense. **Figure 5** shows the concept of the iconic bridge, and what is in place today because of the contractor's mistake in constructing the stairwell.

Metrolinx terminated the contract with the contractor, even though the stairwell portion of the job had not been completed. Nevertheless, Metrolinx signed a settlement agreement, and paid the contractor 99% of the contract's original value of \$8 million.

We noted that after the contractor's poor performance on both Phase 1 and Phase 2 of this project, Metrolinx awarded this contractor another project valued at \$39 million.

After that, Metrolinx chose not to award the contractor work on a few projects (for which the contractor provided the lowest bid) because it was not deemed qualified to perform the work based on past performance with Metrolinx. We discuss our concerns with this in **Section 4.2.3** below.

4.2.3 Metrolinx Lacks a Process to Prevent Poorly Performing Contractors from Bidding on Future Contracts

Although it is rare for Metrolinx to reject contractors on the basis of poor performance, we noted that, in the case of the contractor discussed in **Section 4.2.2** above, it did so because it felt it had sufficient documentation to defend its decision, if necessary, if the contractor took it to court—which in fact it did. Metrolinx told us that the legal burden of proof is so high that it cannot require staff to document poor performance to this degree on all projects.

In addition to rejecting the contractor discussed in **Section 4.2.2**, Metrolinx informed us that it has rejected only one other contractor in the past 18 months because of performance issues. At the time of our audit, contractors that had a history

of performance issues (including the contractor discussed in **Section 4.2.1** that had poor performance since 2009) were able to continue to bid on Metrolinx contracts. This is because Metrolinx does not have a process in place to identify poorly performing contractors when it is making the decision to award contracts. Thus, contractors can take advantage of this and continue to perform poorly without repercussions.

RECOMMENDATION 5

To ensure that contractors known to have poor performance do not jeopardize the success and safety of future Metrolinx projects, Metrolinx should implement policies and procedures to:

- track contractors' performance in a centralized system; and
- incorporate this performance into its decision to award future business with Metrolinx.

METROLINX RESPONSE

Metrolinx agrees with the Auditor General's recommendation and agrees it is important to manage contractors with a history of safety issues. Metrolinx has begun to implement a process to address this issue, including an enhanced reference check process, however additional activities are underway to address the recommendations. In January 2015, Metrolinx began implementation of its Vendor Performance Management (VPM) system that evaluates performance of vendors on current contracts and generates individual performance scores, which will be included in the evaluation of future bids in order to drive continuous vendor improvement and influence the award of future contracts. Output from the system will first be used in the evaluation of tenders by the end of March 2017. In the following year, VPM output will progressively become available for use across all work categories.

Metrolinx is also proactively ensuring contractor safety performance by implementing the Certificate of Recognition (COR) program as a mandatory requirement on all construction procurements. COR is a leading industry safety standard that ensures the contractor has in place a comprehensive health and safety management system.

4.3 Metrolinx Does Not Take Action Against Contractors that Breach Safety Regulations During Construction

Metrolinx does not take into account whether contractors have breached safety regulations during construction when awarding future contracts. Even when contractors' failure to secure safe conditions has resulted in safety issues to the public as well as construction workers, Metrolinx has taken no action against the responsible contractor.

Primary responsibility for establishing workplace safety regulations lies with the Ministry of Labour, which establishes safety standards (through the *Occupational Health and Safety Act*) that must be met by contractors while performing construction work. The regulations within the Act dictate matters such as what type of protective equipment must be worn, how scaffolds should be erected, and what measures should be taken while working in public areas. It is the contractor's responsibility to ensure that they meet safety standards.

However, Metrolinx is indirectly responsible to ensure that a safe workplace is maintained on its projects at all times. For this reason, Metrolinx conducts periodic audits of construction sites to assess whether a contractor is following all safety regulations. It audited 25 different projects in the past three years. We noted that in each of the 25 projects, Metrolinx staff found instances of contractors not following safety regulations and procedures. Regulations that were frequently breached include:

- *Flammable materials not properly stored and labelled:* In three projects, the contractor stored highly flammable materials, such as gasoline and diesel, in improper containers without required signage, such as “No Smoking”. This increased the risk of a fire or explosion if workers were to smoke too close to the flammable materials.
- *Scaffolds erected improperly:* In three audits of two different projects, the contractor improperly erected scaffolds by failing to install a fence or guardrail on the scaffold, and failing to properly secure all scaffolding pipes together. Construction workers are at risk of injuring themselves if they fall over the edge.
- *Construction site not closed off:* On one project, Metrolinx staff noted that the construction site was not fenced off and was open to public access. Since the construction site was in the middle of a GO station, it should have had a 1.8-metre-high fence to separate it from public areas.

In each of these instances, Metrolinx informed us that the contractor, upon Metrolinx’s request, had stopped the unsafe behaviour right away. However, we noted that there were no further follow-up audits to determine whether the contractor continued to breach safety regulations, nor any repercussions for the contractor for its unsafe actions. Although injuries did not occur as a result of these safety violations, we noted that similar safety breaches on other projects did cause injuries to the public or workers, including the following:

- While workers performed some routine excavations, a gas line ruptured because gas lines were not properly labelled and handled as per regulations. This resulted in a gas leak that posed the risk of a fire or explosion
- A scaffolding pipe fell on a road, hitting a vehicle, because all pipes were not properly erected and secured.
- A pedestrian who wandered onto a construction site slipped and fell because the site, even though in the middle of a GO station, was not

partitioned properly and was open to public access.

Although Metrolinx is aware of these safety breaches, the contractors continue to work for Metrolinx without being fined or having to face other repercussions.

We recognize that Metrolinx requires its contractors to have a Certificate of Recognition that certifies that a contractor has in place a comprehensive health and safety management system. Although a contractor can have this Certificate, this does not always mean that it operates in accordance with the Certificate’s conditions.

We asked Metrolinx whether it has prevented contractors that have a history of breaching safety regulations from bidding on future Metrolinx projects within the past five years; Metrolinx informed us that it has done so in one instance.

RECOMMENDATION 6

To reduce the risk of jeopardizing worker and public safety because of safety breaches made by the contractor, Metrolinx should implement policies and procedures to address all instances of safety breaches found during safety audits, and all instances of safety incidents by:

- requiring contractors to develop remedial plans to ensure that safety breaches or safety incidents do not re-occur;
- implement follow-up audits to verify whether remedial plans have been implemented; and
- take frequent and/or serious safety breaches and incidents into consideration, as part of its contractor performance management system, when awarding future contracts to contractors.

METROLINX RESPONSE

Metrolinx agrees with the Auditor General’s recommendation and will further strengthen its audit process by requiring the follow-up of all safety audits. Safety is a key Metrolinx priority,

and we have “zero tolerance” for safety violations. Metrolinx has an established Construction Safety Management Program that includes mandatory safety training for all workers, including those of subcontractors, doing construction on rail corridors. Over 20,000 workers have been trained and safety infractions can result in revocation of the ability to work on Metrolinx projects.

Metrolinx includes various remedies in its contracts, including strict requirements to remedy issues where safety breaches occur. These contractual terms work together to reduce the risk of safety violations by ensuring that the contractor complies with all safety obligations. Compliance is currently monitored through periodic site audits; however, where safety breaches or safety incidents do occur going forward, contractors will be required to develop remedial plans and Metrolinx will conduct and document the results of follow-up audits to verify that the remedial plans have been implemented.

Metrolinx has substantially implemented a new Vendor Performance Management System, which will take into account past safety performance and influence future contract awards. During the evaluation of each contractor bid submission, references will be reviewed and safety-related feedback will be factored into the evaluation. Additional system-based components of the program are to be completed by March 2017.

4.4 Construction Contractors’ Delivering Work Late Results in Additional Costs to Metrolinx—and Inconveniences Commuters

Just as Metrolinx does not address the problem of design consultants who are late in delivering work, Metrolinx does not take action against contractors that do not deliver on schedule—even though it incurs significant costs because of contractors completing projects late.

A common tool used in the construction industry to incentivize contractors to deliver projects on time is to assess financial penalties, such as liquidated damages, if a contractor is late in completing work. Liquidated damages are an estimate of the costs an organization would incur in the event that a contractor breaches the terms of the contract—for example if a contractor finishes a job late, an organization would incur additional costs for amounts it pays to consultants who oversee the contractor. This means that if the contractor is late in delivering a project, and Metrolinx had incorporated liquidated damages in its contracts, Metrolinx could charge and recover the amounts it had specified in the contract. Unlike other penalties and fines, liquidated damages are legally enforceable—meaning that the courts would generally uphold these amounts in the event that the contractor disputes these fines through a lawsuit—if the amount is a reasonable pre-estimate of damages, and if it can be determined that the contractor is at fault for the delay.

The use of liquidated damages is an easy way to promote timely delivery by contractors, and is a standard practice in the industry. For example, they are used in Ontario by the Ministry of Transportation and in other North American jurisdictions by transit agencies in cities such as Chicago, New York City and Washington, DC.

We noted that Metrolinx does not incorporate liquidated damages provisions as a standard clause in all of its contracts, but rather incorporates it on a case-by-case basis only.

4.4.1 Metrolinx Incurs Significant Costs Because of Contractors Completing Projects Late

During our audit, we reviewed several projects that were completed later than scheduled. For the most part, delays on these projects were as a result of contractors not adhering to project schedules. **Figure 6** shows examples of the additional costs incurred by Metrolinx because of delays caused

Figure 6: Additional Costs Incurred by Metrolinx because of Delays Caused by Contractors¹

Source of data: Metrolinx

Project Description	Months Project Delayed due to the Contractor	Initial Budget for Oversight Services (\$)	Additional Costs for Consultants' Oversight Services because of Delays (\$)	Amount that Oversight Costs Were Over Budget (%)
Barrie Fuelling Facility Construction and installation of new fuelling systems for trains	6	97,000	153,000	158
Burlington GO Station Construction of a new station building to address increased ridership and crowding issues	24	193,000	501,000	260
Clarkson GO Station Construction of a multi-level parking garage to alleviate significant parking shortages	12	180,000	104,000	58
Lincolnvile Fuelling Facility Construction and installation of new fuelling systems for trains and buses	25	218,000	355,000 ²	163
Malton GO Station Construction of a new station entrance and other upgrades to improve platform accessibility	14	151,000	361,000	239
Maple GO Station Construction of various upgrades to the station	4	43,000	54,000	126
Mount Pleasant GO Station Construction of a new parking lot to alleviate significant parking shortages	4	169,000	54,000	32
Pickering GO Station Construction of a multi-level parking garage to alleviate significant parking shortages	7	299,000	495,000	166
Total		1,350,000	2,077,000	
Average				150

1. These amounts only include additional costs paid to consultants for overseeing the contractor (they also exclude taxes). Metrolinx informed us that it also incurs other costs when projects are delivered late, such as the amount of lost revenue, which are difficult to estimate.
2. As discussed in Section 4.4.1, additional costs for this project were \$585,000. Metrolinx recovered \$230,000 from the contractor, and thus the remaining \$355,000 was a cost fully borne by Metrolinx.

by contractors. (Some delays occur on projects because of factors outside the contractor's control, such as delays in receiving construction permits from the relevant authorities. However, we did not include these types of delays in Figure 6.)

In the projects we reviewed, liquidated damages were not incorporated in the terms of the contract. As such, Metrolinx could not charge contractors

a financial penalty for delivering work late even though it incurred significant additional costs because of the contractors' delays.

We asked Metrolinx why it does not incorporate liquidated damages in all its contracts. It informed us that it does not do so because liquidated damages are only an estimated amount that is calculated at the beginning of a project, and it

would prefer to recover actual costs it incurred. It informed us that actual costs are usually greater than the original estimate (these costs could include factors such as loss of revenue that are not included in the liquidated damages estimate).

Although we were informed that Metrolinx's preferred approach was to recover these actual costs through a lawsuit against the contractor, we noted that Metrolinx has never, in fact, taken any contractors to court to recover actual costs it incurred because of contractors' delays. In only one of the nine projects we reviewed, we noted that Metrolinx attempted to partially recover actual damages it incurred, not through a lawsuit, but rather by negotiating with the contractor. On the Lincolnville Fuelling Facility project, Metrolinx recovered \$230,000 of the total \$585,000 incurred in additional costs (the remaining \$355,000 was a cost borne by Metrolinx).

Examples of Why Contractors Cause Delays

There are several reasons why contractors are not able to meet deadlines. They include the following:

- **Lack of activity on construction site:** On one project, the contractor fell about one month behind schedule because construction staff failed to show up to work. Initially, there were delays in getting mobilized, and later, construction materials that arrived on site remained unused and were not installed for several days. The contractor also delayed the installation of a barrier wall that was critical to meeting project timelines. Because of the number of days of inactivity on this project, any cushion built into the project schedule for weather and other unforeseen conditions was lost.
- **Inability to manage large projects:** On another project, the contractor was unable to manage its staff and schedule when any changes were required on the project. Changes are normal on construction projects, and contractors have to be able to quickly provide quotes for changes and be able to carry out

the changes in a timely manner. However, project staff informed us that the contractor was slow in providing quotes and rarely submitted project schedules that would allow Metrolinx to develop strategies to get back on schedule. When the contractor was rated at the end of the project, its performance was so poor that it received a score of 2 out of 9 for its ability to stay on schedule, 3 out of 9 for its ability to remain organized throughout the project, and 3 out of 9 for its ability to manage and respond to changes on the project.

4.4.2 Contractor-Caused Delays Postponed Much-Needed Service Improvements for Commuters

In addition to increasing costs for Metrolinx, delays caused by contractors can also negatively affect GO commuters. Of the projects reviewed, we noted that commuters at two different GO stations were inconvenienced because the contractor was significantly late in building two new parking garages (the same contractor was hired to build both garages). Commuters at these two GO stations had faced parking shortages for six months and one year.

At one station, a garage was to be built to address the shortage of parking spaces so severe that GO customers sometimes parked on sidewalks. The contractor was to build a multi-level parking garage that could hold 1,500 cars. However, because the contractor was significantly delayed, Metrolinx decided to open the lower floors of the garage while the contractor continued to build the upper floors. During this time, only 700 of the planned 1,500 parking spaces that were needed at the GO station were actually available. In the end, the contractor was about a year late in completing the project. During this time, customers also did not have access to the garage's elevators.

At the second GO station, the contractor was about six months late in building a 1,200-car parking garage; commuters were forced to park

elsewhere in public parking lots. Even after the six month delay, the contractor took an additional two months to complete a pedestrian bridge connecting the parking garage to the GO station. During that time, commuters on all floors had to use an alternative route and walk a longer distance to the station.

Other difficulties Metrolinx faced with this contractor include:

- In one instance, Metrolinx sent a letter to the contractor expressing concern that the project was already one year behind schedule and the delay was impacting its customers. The contractor simply replied that Metrolinx had failed to identify how customers were being impacted; it did not address the issue of how it planned to get back on schedule.
- In another instance, the contractor failed to provide an updated project schedule reflecting revised timelines even after Metrolinx requested it nine different times over a two-month period.

Despite these serious problems with the contractor, Metrolinx took no action to fine them for being late in completing the project. This contractor can continue to bid on Metrolinx projects.

RECOMMENDATION 7

To ensure that Metrolinx limits its exposure to additional costs and that its customers are not inconvenienced because of contractor-caused delays on construction projects, Metrolinx should incorporate disincentives, such as liquidated damages, in all its construction contracts for situations where contractors fail to meet project timelines.

METROLINX RESPONSE

Metrolinx agrees with the Auditor General's recommendation. Metrolinx is moving forward with developing and documenting a process to objectively calculate appropriate liquidated damages (LD) for each project. With the ability to assign an LD amount, staff will be able to

more consistently include the LDs as part of the contract requirements and therefore be able to impose these LDs when contractors fail to meet project timelines.

In order to help with project timelines, Metrolinx is also incorporating a scheduling system, which will be used to help monitor and manage the contractor's progress. This will allow Metrolinx to oversee contractors more diligently and identify when the contractor is trending to delivering the project late. This more robust scheduling requirement is being implemented for new initiatives and is currently being finalized with sign-off expected by December 2016.

4.5 Metrolinx Is Experiencing Delays With Contractors Not Fixing Deficiencies in Their Work in a Timely Manner

Metrolinx experiences delays when contractors do not fix deficiencies in their work that remain outstanding after a project is substantially complete. We noted that Metrolinx does not take such delays into account when selecting contractors for future contracts. In 15 out of 20 projects we reviewed, we noted that contractors took much longer than the industry standard of two months to fix all deficiencies. On average, these contractors took almost eight months to fix outstanding deficiencies. These issues were not restricted to one contractor. On a few projects we reviewed, we noted it took the contractor more than one year to fix deficiencies.

Once Metrolinx determines that a structure or facility is ready for its intended use, it issues the contractor a "certificate of substantial completion." It is accepted practice in the construction industry that some deficiencies might still exist even though the contractor has received the certificate. For example, a building deemed ready for use might still have some exposed nails or uncovered electrical wires that need to be fixed. The important

issue is that such deficiencies be taken care of within about two months (the industry standard).

Under the *Construction Lien Act*, Metrolinx is required at substantial completion to pay the contractor 10% of the total project value, which has been held back until this point. With this payment, the contractor has now received almost the full amount of the contract—usually 98%—so there is little financial incentive left for it to fix deficiencies quickly. We also noted that Metrolinx does not consider a contractor’s speed in fixing deficiencies when making decisions on awarding future contracts.

For example, on one project for the construction of a parking garage at the Clarkson GO station, it took the contractor 19 months after substantial completion to fix leaking pipes, automatic door openers not working, and an electrical box not having a lid, meaning that electrical wires and cables were uncovered.

We also noted that staff in operations who are responsible for administering warranties were unaware of warranty provisions that were included in the Metrolinx contract. For example, Metrolinx staff were unaware that deficiencies were covered, under warranty, for a period of two years after they were fixed. Metrolinx staff in operations informed us that it is common for problems to arise even after contractors fix deficiencies; however, they have never tracked nor followed up on these problems with the contractor because they were unaware of the warranty provisions for deficiencies.

When there are many deficiencies, or even if the deficiencies create a safety risk, although Metrolinx would prefer to fix the deficiencies itself rather than wait for the contractor to do so, it does not because doing so would void the contractor’s warranty. For example, if Metrolinx staff fixed a leaking pipe by sealing it, the contractor would void the warranty on the pipe and related components.

We noted that on one project, a contractor had about 300 deficiencies in total, including serious issues such as a smoke detector system not functioning in a room where electrical equipment was

running, a heating system that did not produce adequate heat in the winter, and information signs hanging in a way that they would swing in the wind, posing a safety hazard for commuters. On this project, the contractor was unresponsive to multiple emails from Metrolinx staff asking for the deficiencies to be fixed. Despite the inconvenience and safety risks to Metrolinx customers caused by these deficiencies, Metrolinx did not take action to fix them themselves in order not to void the contractor’s warranties.

RECOMMENDATION 8

To ensure that deficiencies do not remain unfixed, Metrolinx should:

- include contract provisions that require contractors to fix deficiencies within acceptable industry standards;
- take contractors’ past performance in fixing deficiencies into consideration, as part of its contractor performance management system, when awarding future Metrolinx business; and
- provide training to staff responsible for administering warranties to ensure they have sufficient knowledge and understanding of all warranty provisions stipulated in the construction contract.

METROLINX RESPONSE

Metrolinx agrees with the Auditor General’s recommendation. Metrolinx will review its current practice for contractors fixing deficiencies and incorporate changes into future contracts that align timeframes for completing these fixes that are more in line with industry standards.

The new Vendor Performance Management (VPM) system will also track and use individual project close-out reports, and identifies any recurring issues around remediation of deficiencies. Implementation of the VPM system is now substantially complete. Contractors’ past performance in fixing deficiencies will be built

into this system to ensure past performance is considered. The use of this system will first be used in the evaluation of tenders by the end of March 2017.

Metrolinx will ensure staff responsible for administering warranties use consistent methods, requirements, and timelines for remedying deficiencies across Capital Projects Group contracts. This will be facilitated through the implementation of the new Contract Management and Administration procedures and associated staff training, by third quarter 2017. Metrolinx will revise its warranty provisions to provide an incentive to its contractors to remedy warranty items, which may include use of holdbacks and other security.

4.6 Metrolinx Allows Contractors to Subcontract up to 100% of Projects Yet Does Not Vet Subcontractors

Metrolinx allows contractors to subcontract up to 100% of their work to subcontractors, yet it does not pre-screen the subcontractors for reliability. Also, because Metrolinx does not have a direct contractual relationship with the subcontractors, it is limited in the actions it can take when subcontractors fail to perform at expected levels. Common industry practice is for organizations to require a contractor to disclose *all* its subcontractors shortly after winning the project. However, Metrolinx does not require this; it only requires contractors to disclose information about its *major* subcontractors.

Subcontracting in itself is not problematic because some large projects can only be delivered with the co-ordination of various sub-trades. Sub-trades are usually small contractors that specialize in specific areas such as roofing, plumbing and electrical. Subcontractors, even small ones, can still have a major impact on large infrastructure projects. They need to be skilled, professional and timely so as not to adversely affect the quality of the project or hinder overall project timelines. No

matter how professional the main contractor is, the quality of the sub-trades can severely impact project timelines.

4.6.1 Subcontractors' Poor Performance Delays Projects; No Process in Place to Track and Prevent Them From Working For Metrolinx Again

Metrolinx has experienced issues with sub-trades; for example, in 2010 a sub-trade walked off the job on one project and jeopardized project completion. Subsequent to that incident, Metrolinx staff requested that Metrolinx pre-screen sub-trades to ensure that sub-trades with a poor work history do not jeopardize project timelines. However, we noted that Metrolinx has not implemented such a process.

In our review, we noted that Metrolinx experienced a similar situation again during the construction of a station building in 2013. On this project, the contractor was supposed to complete roofing and mechanical work promptly so that the project could advance to the next phase. However, this work was not done for about two months and delayed the project. During this time, Metrolinx was actually not aware that the contractor had subcontracted this work, and that there were issues with the sub-trade. Eventually, the sub-trade walked off the job, taking important project documents and drawings. This led to additional delays as it took the contractor about another three months to reacquire the documents and find a replacement sub-trade.

In this case, Metrolinx could have put the main contractor at default because it is the contractor's responsibility to complete the work. We noted that Metrolinx decided not to pursue this route because finding a new contractor at that point would have further delayed the project and increased construction costs.

Although it is the contractor's responsibility to ensure a project is completed on time, it is important for Metrolinx to pre-screen which sub-trades

will be doing the work to ensure that it is taking proactive steps in managing its projects and timelines.

4.6.2 Metrolinx Allows Contractor to Subcontract 100% of the Project; Sub-Contractor Performance Issues Significantly Delay the Project

During our audit, we noted one project in which the contractor subcontracted 100% of the work to a sub-trade, which in turn further subcontracted half its work to sub-sub-trades—which it failed to pay. The sub-sub-trades were unpaid and had walked off the job, delaying the project by eight months.

One important control to ensure that subcontractors do not walk off the job is by requesting the main contractor to certify that all sub-trades have been paid. Metrolinx requests this certification from the main contractor before actually paying it. However in this case, although the main contractor was able to certify that it had paid its sub-trades, there were unpaid sub-sub-trades that walked off the job, delaying the project by eight months.

In addition, because the main contractor had subcontracted 100% of the work, it was never seen on site. Yet when Metrolinx staff attempted to deal with the situation, the subcontractor refused to take direction from them because it said it was not legally obliged to do so.

RECOMMENDATION 9

To ensure that poorly performing sub-trades do not delay projects, Metrolinx should assess industry best practices of pre-screening sub-trades and consider implementing a policy on pre-screening sub-trades based on industry best practices.

To ensure that poorly performing sub-trades do not adversely impact projects, Metrolinx should implement, through its contractor performance management system, a process to hold general contractors accountable for the performance of their sub-trades.

METROLINX RESPONSE

Metrolinx agrees with the Auditor General's recommendation. Metrolinx requires that contractors provide a listing of all sub-trades performing major divisions of work within five business days after contract execution. Metrolinx will review industry best practices and revise its current process of pre-screening contractors to incorporate both large and small projects with respect to sub-trades.

Metrolinx is incorporating a Quality Management Program (QMP) that requires every consultant and contractor to submit a quality management plan detailing how that firm ensures quality products and services. All sub-consultants or sub-contractors will be required, as a flow-down, to provide the same. Metrolinx will, in turn, review the QMP for robustness and thoroughness. Metrolinx will also audit the vendors against their QMP to provide assurance that firms are following their own processes to provide us with quality construction or consultant deliverables. This clause has already been implemented in large consultant contracts that are currently being procured and will be included in future construction procurement by June 2017.

The performance of the general contractor will be evaluated by Metrolinx's Vendor Performance Management (VPM) system. Should a sub-trade of a contractor fail to perform, it will be reflected in the contractor's VPM score, which will then be used to evaluate and qualify the contractor for future Metrolinx projects. This ensures that the contractor is incented to effectively manage the performance of its sub-trades. The VPM is substantially implemented, and related system components will be implemented, by March 2017.

RECOMMENDATION 10

To ensure that it can protect its rights as an owner and prevent contractors from misusing their right to subcontract, Metrolinx should:

- set limits on the total amount of work that contractors can subcontract to any one company; and
- include contract provisions that protect its interests in situations where sub-trades and sub-sub-trades are used.

METROLINX RESPONSE

Metrolinx agrees with the Auditor General's recommendation and has recently taken steps to mitigate the noted risks by now including provisions that contractually obligate the contractor to ensure performance of its sub-trades. These contractual terms hold the contractor accountable for its sub-trades' performance. Additionally, should a sub-trade fail to perform, this will be reflected in the contractor's performance and captured in its Vendor Performance Management (VPM) score, which will then be used to evaluate the contractor for future Metrolinx projects. While the VPM system is substantially implemented, system-based components will be fully implemented in March 2017.

Metrolinx has identified a strategy for implementing a maximum percentage of work that contractors can subcontract for delivery of the work. Next steps involve meetings with industry associations (for example, Ontario Road Builders' Association and Ontario General Contractors Association) for their input prior to implementation. We anticipate incorporating the required percentages into all consultant and construction contracts by June 2017.

4.7 Metrolinx Accepts Handover of Nearly Completed Projects even though Critical Items Are Still Outstanding

Metrolinx does not require that all essential elements of a project be completed before it takes ownership of the project from the contractor. Although project handover usually occurs when about 98% of project payments have been made, some items that are critical to the operation of the structure or facility can still be outstanding at that point. We noted that Metrolinx does not specify which items must be completed before handover. We also noted that Metrolinx has taken ownership of projects well in advance of the contractor completing basic work necessary for the operation of the structure or facility. This is especially a concern because, as discussed in **Section 4.4**, contractors are often late in delivering items after substantial completion.

On station improvement projects, we noted that there is no requirement for a contractor to install security cameras and related surveillance systems before handing over a project. We noted that several stations had opened for public use without a surveillance system. In one case, the contractor took four months after handover to install the surveillance system. This poses a security risk: in the event that a safety incident occurs on Metrolinx property, video footage would not be available in investigating the incident.

On projects for the construction of multi-level parking garages, we noted that there is no requirement for a contractor to ensure that elevators are functioning prior to handing over the project. In one case, we noted that it took the contractor over a year after the garage had opened to install elevators. This inconveniences commuters—and particularly those who have difficulty or are unable to climb stairs.

On projects relating to the installation of fuelling or maintenance systems, we noted that there is no requirement for a contractor to provide training and

operating manuals before handing over a project. On one project where several complex systems were installed, we noted that it took the contractor two months after the facility was already in use to provide a complete set of training and operating manuals. Operating systems without manuals increases the risk that staff will operate them incorrectly or, in the event a system malfunctions, staff may not be able to resolve the problem.

RECOMMENDATION 11

To ensure that projects can be safely and successfully operated once substantially complete, Metrolinx should develop and implement the use of a substantial completion checklist requiring, at a minimum, that critical items needed to operate the project and ensure commuter safety have been completed or received prior to Metrolinx issuing a certificate of substantial completion.

METROLINX RESPONSE

Metrolinx agrees with the Auditor General's recommendation. Metrolinx has a standard form called a "Project Handover To Stakeholder at Substantial Completion" that is filled out by the contract administrator based on an onsite review of the project work. Metrolinx will enhance its current standard to be more comprehensive with respect to detailed items supporting operational readiness. This recommendation will be implemented immediately.

RECOMMENDATION 12

To ensure that performance issues with both design consultants and contractors can be effectively resolved during the project, Metrolinx should:

- issue mandatory work orders to compel consultants or contractors to complete work in the time frame and manner required by Metrolinx;

- implement a dispute-resolution process where claims filed by consultants or contractors (that dispute the costs associated with the work order) are reviewed by Metrolinx staff who are independent from the project team; and
- track the results of all claim reviews in a centralized system.

METROLINX RESPONSE

Metrolinx agrees with the Auditor General's recommendation and is currently working collaboratively with consultants, contractors, and legal counsel to develop a feasible, cost effective, and timely resolution to current and future performance issues. Metrolinx has the ability, under its contract, to issue mandatory work orders to compel the vendor to complete work within the necessary timeline and will enforce its right to issue these mandatory work orders in the future when it feels it is necessary.

Metrolinx will incorporate a dispute-resolution process whereby Metrolinx staff who are independent from the project team will review claims filed by consultants or contractors and will ensure the results of all reviews are tracked centrally. Although a centralized system is not in place, an interim solution has been initiated as of July 2016 to allow claims tracking in an Excel based log. Capital Projects Group staff are currently working on data collection and monthly updates to the log. The complete implementation of the interim solution is targeted for the end of 2016, with full implementation of the contract management system that incorporates the dispute-resolution reviews and their results, anticipated for the third quarter of 2017.

4.8 Limitations in the Accounting System Led to Metrolinx Making Payments to Contractors Beyond Projects' Approved Budgets

Metrolinx does not have a control in place that ensures that payments exceeding approved budgets have been approved for overexpenditure. Given that Metrolinx issues some \$800 million a year in construction payments, one would expect that it would have basic automatic controls in place to ensure that only payments within budget are being made when authorization to exceed a budget is not in place. However, this is not the case.

The following illustrates typical internal controls for contract management in an accounting system. Bolded text indicates where these typical internal controls were lacking at Metrolinx:

1. When an organization hires a contractor, it establishes a budget for the project, setting out the maximum amount that is approved to be spent. One or more persons with sufficient authority approves the budget. (There may be a hierarchy of approval; for example, at Metrolinx, projects over \$10 million must be approved by the Board of Directors.)
2. The project and its approved budget are entered into the organization's accounting system under a unique Purchase Order by staff in the procurement department.
3. As each invoice is received, project staff (who work for the organization) verify it, sign off on it, and code it with the correct Purchase Order. This is to ensure that payments can be tracked against the project's budget in the accounting system.
4. The invoice is submitted to the accounting department, which enters the payment amount and the Purchase Order number into the accounting system. **(This is not the case at Metrolinx. A system defect in the accounting system prevents the accounting department from entering the Purchase Order.)**
5. Before an invoice is paid, the accounting system ensures that there is sufficient money in the budget for that Purchase Order. **(This is not the case at Metrolinx. Without a Purchase Order entered into the system as pointed out in step 4, the accounting system cannot check whether there is sufficient money in the project's budget before paying the invoice.)**
6. If there is not enough money left in the budget, the accounting system will not allow for a cheque to be issued. Someone with sufficient authority must approve a budget increase before payment is made. This approval is an important element of internal control as it ensures that project budgets for multi-million-dollar projects are appropriately managed and overseen by people that are far removed from the project and have an independent perspective. **(This is not the case at Metrolinx. We noted that without any check to ensure payments are within budget as pointed out in step 3, the system issues payments regardless of whether the payment is under budget or will exceed the budget. Given that Metrolinx issues about \$800 million in payments a year for construction projects, the fact that it does not follow this internal control practice is especially concerning.)**
7. When a project is completed, the Purchase Order is inactivated on the accounting system. No further invoices can be entered against this project. This prevents any unauthorized payments being made against a completed project. **(This is not the case at Metrolinx. There are several Purchase Orders that are still active in the accounting system even though the projects are completed.)**

Our audit identified the following instances where payments were made above the approved budgets. Although these payments were for services received, they were paid before budget increases were approved:

- In March 2013, Metrolinx paid the contractor on one multi-year project two payments totalling \$1.2 million over the project's approved \$17 million budget. Three years later, after a budget extension with the same contractor, the same problem occurred again. In April 2016, Metrolinx made three payments totalling \$3.2 million over the approved budget. These payments were able to be made because the accounting system did not alert Metrolinx that the budget had been exceeded.
- In another instance, Metrolinx was not aware until we informed it that \$100,000 had been paid over an approved budget.

In these instances, Metrolinx should not have issued a cheque until a budget extension was approved by someone with sufficient authority, as noted in step 6.

To determine the number of payments that were made without even being tracked against their assigned Purchase Orders, we asked Metrolinx for a listing of all payments made to all its construction contractors. We found that in the last five years, out of 7,300 payments Metrolinx made to these contractors, 4,600—or 63%—were made without being tracked against their assigned Purchase Orders in Metrolinx's accounting system.

Metrolinx informed us that, since its accounting system lacks the automatic controls of steps 5 and 6, it often relies on its project staff to manually track invoices and payments to ensure they do not exceed budgets. However, we found some significant drawbacks to this manual control approach that make it prone to error:

- On a typical project, staff in four different positions—the project co-ordinator, the project manager, the manager and the senior manager—have authority to approve invoices and submit them to the accounting department.
- Many projects last two or three years, during which time the initial project team is often totally replaced with new project staff—a normal practice at Metrolinx, with staff being reassigned to other projects. This makes it dif-

ficult to maintain consistency in the oversight of total project costs.

These problems are exacerbated when project staff incorrectly assume that the accounting system automatically performs control steps 5 and 6. We noted instances where project staff who were expected to manually track budgets did not realize that the accounting system was not equipped to inform them when a project budget had reached its approved limit.

As for step 7—automatically closing Purchase Orders when a project is complete—we noted that Metrolinx's external auditors have reported this risk to Metrolinx as far back as 2011. However, Metrolinx has not taken action to resolve the issue. At the time of our audit, unclosed Purchase Orders for completed budgets had remaining budgets of about \$4 million.

RECOMMENDATION 13

To ensure that only authorized payments are made to contractors within approved or authorized increased budgets, Metrolinx should:

- correct its accounting system to ensure that it issues payment only for invoices up to the approved budget and Purchase Order limits;
- clarify and communicate to staff, who are responsible for manually tracking payments against project budgets, their roles and responsibilities on this regard;
- close out the Purchase Order numbers on all completed projects; and
- put a process in place to close out future Purchase Orders upon project completion.

METROLINX RESPONSE

Metrolinx agrees with the Auditor General's recommendation. An automated process was created in 2012 to close out Purchase Orders. However, after changes in the system were made, the process no longer functioned as designed. Metrolinx is in the process of implementing and upgrading the Accounts Payable

system. This will eliminate the defects noted in closing out purchase orders once projects are complete. System implementation and upgrades will be completed by September 2017. In the meantime, Metrolinx will manually review and close out all existing purchase order numbers on completed projects.

In addition, Metrolinx is implementing a contract management system that processes the invoices against approved budget and disallows payments that exceed the approved budget.

Data input and training on requirements and roles and responsibilities has begun on two rail corridors as of Fall 2016.

5.0 Detailed Audit Observations—CN and CP

As discussed in **Section 2.2.1**, Metrolinx and its predecessor, GO Transit, have been highly dependent on CN and CP. As the need for improved regional public transit increased in the 2000s, building more track for commuter trains became a government priority. To fulfil it, GO Transit and Metrolinx had to either purchase land from CN and CP or enter into agreements for the use of CN and CP land. In the latter case, CN and CP retained the exclusive right to build track improvements on the land they owned.

CN and CP have been in a very strong position when negotiating with GO Transit and Metrolinx because:

- GO Transit and Metrolinx had no alternative but to work with CN and CP (CN and CP have constituted a monopoly in this sense);
- CN and CP knew the volume of work that the Big Move plan would require over a number of years; and
- CN and CP knew how important improved transit was to the government.

Given this situation, it is incumbent on Metrolinx (and GO Transit before it) to find ways to spend

taxpayers' and commuters' money prudently while also meeting the need for increased commuter rail capacity in the GTHA. Our audit findings indicate that Metrolinx has not done so.

We have concerns that Metrolinx has not managed its relationship with CN and CP in a way that is in the best financial interests of Ontarians. Specifically, Metrolinx has been weak in the following areas:

- Metrolinx pays CN and CP invoices without verifying if they are legitimate—or if the invoiced work has actually been done on Metrolinx projects rather than on other CN or CP projects (**Section 5.1**).
- Metrolinx does not verify the quality of materials CN and CP use in construction. This has enabled CN to use recycled materials in cases where Metrolinx expected and paid the cost of new materials (**Section 5.2**).
- Metrolinx pays CN and CP mark-up rates on construction costs that are significantly higher than the mark-up rates that can be considered to be industry benchmarks (**Section 5.3**).

5.1 Metrolinx Pays CN and CP Without Verifying Most Costs

On average, Metrolinx pays CN and CP about \$145 million a year for the work they perform on the 20% of the track that GO Trains operate on. Metrolinx does not adequately verify—or does not verify at all—whether the costs CN and CP submit for this work are reasonable.

We discuss how this is the case for CN's "lump-sum projects" in **Section 5.1.1**. We discuss how this is the case for "time-and-materials projects" in **Section 5.1.2**. In **Section 5.1.3**, we discuss how project costs charged by CN are much higher than what other contractors charged on comparable projects. In **Section 5.1.4**, we discuss how Metrolinx does not obtain from CP the information it needs to analyze the reasonableness of CP costs.

5.1.1 Metrolinx Performs Limited Review of CN's Lump-Sum Project Cost Estimates

While Metrolinx has a process to ensure bids on non-CN projects are fair and reasonable, it does little to nothing to ensure the fairness and reasonableness of CN's lump-sum-project costs (see **Section 2.2.1** for details on lump-sum projects). Metrolinx simply pays these costs when they are invoiced. This means it pays:

- labour costs without knowing the hours of labour behind them (labour costs can amount to almost one-quarter of total project costs); and
- subcontractors' and transportation costs without knowing the construction plan behind them (subcontractors' and transportation costs can amount to almost a third of the total project cost).

In one instance for example, Metrolinx performed no review of the lump-sum cost CN estimated and charged for a \$95-million project for a nine-mile track extension on the Lakeshore West corridor.

In another instance, we noted that Metrolinx attempted to analyze the reasonableness of a part of the lump-sum cost CN estimated and charged. It compared just the labour costs of this project to the labour costs of a similar non-CN railway project. It found that CN's labour costs were 130% higher than the other project's labour costs yet did not investigate why. The labour costs made up only about 30% of the overall \$75-million cost of the CN project—Metrolinx did not analyze the remaining 70% of CN's costs.

Metrolinx Failed to Identify Unrelated Costs Included in CN's Lump-Sum-Project Costs

We noted one instance where, even though Metrolinx did not do any cost analysis of a particular project, it became aware after it had paid CN's invoices that some of the invoiced costs were not related to the project.

Specifically, CN charged Metrolinx to clean out track ballast on a railway track for CN freight trains that Metrolinx never uses (track ballast is the track bed, made up of gravel and other rocks; cleaning it out is a common maintenance activity done every three or four years, costing about \$740,000 per mile).

There were other similar concerns brought forward in the past where CN's invoices contained amounts unrelated to the specific Metrolinx projects.

If Metrolinx reviewed such lump-sum costs and requested more detailed information, it could identify when costs potentially include amounts that are not part of a project (such as the maintenance costs incurred to clean track used only by CN), or costs that Metrolinx is not required to pay (such as cost overruns).

RECOMMENDATION 14

To ensure that the costs that Metrolinx pays CN are reasonable and relate only to contracted work, Metrolinx should obtain detailed information to support the lump sums CN estimates and charges and review it thoroughly. The information should include, but not be limited to:

- estimated labour hours, which Metrolinx should assess for reasonableness; and
- the construction plan, which Metrolinx should assess for the reasonableness of costs such as materials, transportation, subcontracted services and rented goods and services

METROLINX RESPONSE

Metrolinx agrees with the Auditor General's recommendation and will improve its review process for CN-related estimates and charges. Harmonized procedures are being implemented to provide a consistent and comprehensive review process that includes obtaining detailed information to support the reasonability of all construction estimates and charges, including CN.

5.1.2 Metrolinx Does Not Ensure that It Is Paying Only for Costs Actually Incurred on Its Projects

Just as Metrolinx does not know whether the costs it pays CN for lump-sum projects are reasonable, it does not ensure that the costs it pays CN and CP for all other projects were actually incurred. These other projects are time-and-materials projects (see **Section 2.2.2** for details on time-and-materials projects). As a result, we found cases similar to those described in the previous section, where Metrolinx paid CN and CP for costs not related to the contracted project.

For example, our review of a sample of CN invoices for the Lakeshore West GO Train expansion project between 2006 and 2008 found several that related to work CN did on track it owned that GO trains never use.

We were not able to obtain more recent invoices relating to work CN did for Metrolinx because Metrolinx did not ask CN to provide them. Although under its long-term agreement with CN, Metrolinx has the right to audit all CN invoices for a period of six months after they are issued, we found that Metrolinx has not done so.

We also noted Metrolinx has no process for verifying the charges on CN and CP invoices. Rather, Metrolinx simply ensures that actual costs do not surpass original construction estimates. Only rarely does Metrolinx review time-and-materials construction estimates for reasonableness, just as is the case for lump-sum projects.

Furthermore, if CN or CP’s actual costs come in under the original estimate, CN or CP could still invoice Metrolinx up to the original estimate, even

if the work is not done or is done for some other project. Metrolinx staff would not look into the possibility that the costs are not valid because the estimated cost was not exceeded.

In all projects we reviewed, CN and CP’s actual costs were almost equal to the original estimates.

Metrolinx provides a substantial amount of funds for railway expansion on CN and CP land. Because Metrolinx is very dependent on CN and CP for use of their railways and building of the railways, an onsite inspector at CN and CP would provide a strong control that Metrolinx is only billed for services performed.

5.1.3 CN’s Construction Charges Found to Be Higher than Other Railway Companies’ Construction Charges

We compared the materials costs CN charged for projects in 2013 and 2014 to the materials costs charged by Metrolinx’s rail parts supplier. We also compared the amount CN charged for labour to the amount charged by another rail contractor on a comparable non-CN project. These cost comparisons are shown in **Figure 7**.

CN charged significantly higher rates for both materials costs and labour costs.

5.1.4 Metrolinx Does Not Obtain the Information Needed to Determine Whether CP’s Projects Are Competitively Priced

We noted that Metrolinx cannot determine whether CP projects are overpriced because CP does not provide any details or breakdown of its construction

Figure 7: Comparison of Amounts Paid by Metrolinx to CN vs. Another Rail Company

Source of data: Prepared by the Office of the Auditor General of Ontario based on information provided by Metrolinx

Type of Cost	Amount Charged by CN(\$)	Amount Charged by Another Rail Company (\$)	Percentage by which CN’s Price Was More Expensive (%)
Cost of materials used to construct one mile of railway track	1,500,000	950,000	58
Cost of labour to construct one mile of railway track	976,000	425,000	130

estimates. As shown in **Appendix 1**, CP's estimates for a project of almost \$2 million can be as short as a two-page letter. The estimates specify only how much design will cost, how much construction will cost, and the total cost—with no further breakdown provided.

RECOMMENDATION 15

To ensure that Metrolinx pays only for Metrolinx construction costs actually incurred by CN and CP and that these costs are reasonable, Metrolinx should:

- obtain detailed invoices and follow a process to validate each item to ensure its reasonableness;
- for each project contracted for with CN and CP, assess the reasonableness of labour and materials costs;
- perform audits on CN invoices as allowed under the Metrolinx/CN long-term agreement;
- negotiate with CP to put in place the ability for Metrolinx to perform audits on CP invoices for all corridors, and perform the audits; and
- consider placing a Metrolinx inspector at sites where CN and CP are performing construction work for Metrolinx.

METROLINX RESPONSE

Metrolinx agrees with the Auditor General's recommendation and will continue to build on current practices to further mitigate the risks noted. Harmonized procedures are being developed to provide a consistent and comprehensive review of invoices, and will explicitly require invoices to be reviewed to ensure they correctly represent the status of the contract's progress and that charges are reasonable, including the reasonableness of labour and material costs.

Metrolinx will conduct periodic audits on CN invoices as allowed under its long-term contract and will negotiate with CP to incorporate the

allowance of audits on CP invoices and ensure audits are conducted. The terms and conditions of any new agreement will be subject to negotiation with CN and CP, and will be subject to any applicable approvals (including Section 28 of the *Financial Administration Act*).

In addition, Metrolinx will assess if it places its own inspector on CN and CP construction sites or obtain a third party to complete quality assurance inspections throughout CN and CP projects.

5.2 Metrolinx Does Not Require Verification That CN and CP Have Used New Construction Materials When Projects Call For Them

The parts used in construction projects may be new or recycled. Recycled parts are generally safe and can be between 20% to 50% cheaper than new parts. Usually though, Metrolinx pays for and requires CN and CP to use only new parts.

To determine whether the parts used meet their specifications (are new when required) and have no defects, the railway under construction must be inspected. The inspection can be physical (a close look) or involve cameras or other technology.

Metrolinx informed us that its staff may sometimes visually inspect railways once they are built. However, we noted that such a process is not mandatory, nor are its results documented.

5.2.1 CN Installed Partially Worn Parts But Charged Metrolinx for New Parts

Metrolinx recently became aware that CN likely used recycled parts on a GO project but charged it for new parts. Since Metrolinx does not perform inspections nor maintain any inspection records, it asked CN to investigate this further. CN admitted this had in fact taken place—but, CN said, only to a very limited extent. According to CN, it had charged GO Transit for new rail instead of recycled rail for a 0.37-mile section of track on a Lakeshore West

expansion project. CN estimated the difference in cost to be only about \$25,000.

CN indicated it was not aware of any other instances when it substituted recycled parts for new. However there were other similar concerns brought forward in the past.

RECOMMENDATION 16

To ensure that it receives the quality of material it pays for on all its construction projects, Metrolinx should implement an independent inspection process.

METROLINX RESPONSE

Metrolinx agrees with the Auditor General's recommendation. Where appropriate, third-party documented quality assurance inspections will be conducted throughout the project to ensure compliance of material quantities, quality and that the contractors are supplying materials within standards written in contract documents. This process will be implemented by April 2017.

5.3 Metrolinx Pays CN and CP Excessive Mark-Up Rates

All contracts with CN and CP are sole-sourced. Metrolinx's long-term master agreement with CN

establishes the mark-up rates CN can charge on top of labour and materials costs. These mark-up rates, or surcharges, are intended to cover those of CN's overhead costs that cannot be directly determined, such as railway administration costs. We found that these mark-up rates exceeded the normally accepted industry benchmark.

For our comparison, we used the rates published by the Canadian Transportation Agency (CTA). As **Figure 8** shows, CN's mark-up rates on labour and parts were considerably higher than those CTA suggests. We noted that Metrolinx has not renegotiated these high mark-up rates in recent years—it last amended them in 2003 as part of a restructure of its long-term agreement.

Unlike CN, CP does not have a long-term construction agreement with Metrolinx. Therefore, there is no set understanding between Metrolinx and CP as to how construction projects should be costed, and what mark-ups would be acceptable. We noted that CP disclosed its mark-up rates in only one of the projects we sampled, shown in **Figure 8**. In other projects we reviewed, Metrolinx does not know what CP's mark-up rates were as they were embedded in the total cost. This makes it difficult for Metrolinx to assess whether CP's costs are reasonable and fair, and whether the mark-up rates they charge are in line with industry standards.

Figure 8: CN and CP Mark-Up Rates Compared to Suggested Industry Mark-Up Rates¹

Source of data: Metrolinx and the Canadian Transportation Agency

	Labour Costs	Costs of New Railway Parts	Costs of Old or Partially Worn Railway Parts
Suggested industry mark-up (%)	64	48	none established
Mark-up used by CN on all projects (%)	138	69	22
Difference	+74	+21	—
Suggested industry mark-up (%)	64	48	none established
Mark-up used by CP (%) ²	96	50	none found in our sample
Difference	+32	+2	—

1. These comparator mark-up rates have been suggested by the Canadian Transportation Agency (CTA). The CTA's main responsibility is to facilitate issues related to railway crossings that arise between railway companies and utility companies, municipalities or landowners. Although the work that CN performs for Metrolinx is more varied than just railway crossings, Metrolinx informed us that constructing railway crossings is more complex than building straight track. Therefore, the mark-up rates suggested by the CTA are acceptable for use as an industry benchmark.
2. There are no established mark-up rates between Metrolinx and CP and costs received from CP do not typically specify mark-up rates. We nevertheless found that in only one of the CP projects we sampled, CP did specify the mark-up rates shown here.

RECOMMENDATION 17

To ensure that Metrolinx does not pay excessive construction costs to CN and CP, it should:

- renegotiate its long-term master agreement with CN so that mark-up rates are more in line with industry benchmarks; and
- negotiate an agreement with CP to ensure that estimates outline all costs in detail and that all mark-up rates are in line with industry benchmarks.

METROLINX RESPONSE

Metrolinx agrees with the Auditor General's recommendation and has initiated the renegotiation of the master construction agreement with CN to ensure that contractual terms remain current with industry and help to ensure value for money. The terms and conditions of any new agreement will be subject to negotiation with CN, and will be subject to any applicable approvals (including Section 28 of the *Financial Administration Act*).

A similar process to negotiate with CP to ensure that estimates outline all costs in detail and that terms remain current with industry will also be conducted.

Appendix 1: CP Estimate Approved by Metrolinx for \$1.9 Million Project

Source of data: Metrolinx

CP  www.cplc.ca

May 24, 2016

Metrolinx
50 Bay Street, Suite 1005
Toronto, Ontario
M5J 3A5

Attention: 

Re: Galt North Track Restoration – CP Dupont Signal Installation

Appended below is an estimate of the signal work costs that will be incurred by Canadian Pacific to support the Galt North Track restoration scheduled for 2016. The following is a breakdown of the estimated costs for Canadian Pacific work including:

- Mile 2.61 – Approach Signals 25 and 26
 - Design, Material, Testing & Commissioning Labour
- Mile 4.60 – Dupont
 - Design, Material, Testing & Commissioning Labour
- Mile 4.99 – West Toronto
 - Design, Material, Field Construction Labour, Testing & Commissioning Labour

Design		
Signal Design (1)	\$	307,587
Material		
Signal Material (2)	\$	1,179,360
Construction		
Signal Construction (3)	\$	302,580

Testing & Commissioning

Signal Testing & Commissioning (4) \$ 81,637

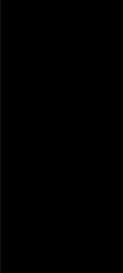
Grand Total \$ 1,871,164 plus taxes

(1) Signal Design includes internal design labour and external design services.
 (2) Signal Material includes bungalow, switch machine, lights, cables, etc.
 (3) Signal Construction includes internal construction and supervision resources and external contracted services such as directional boring and miscellaneous contracted services.
 (4) Testing & Commissioning includes internal T&C labour.

This estimate does not include any design, material, or labour required to accommodate multiple phases of track construction.

This is an estimate only and actual costs incurred will be billed. The charges for signal work will be invoiced to Metrolinx with reference to Metrolinx' purchase order number.

Yours truly,



Canadian Pacific