



West LRT Audit

July 17, 2013



The City Auditor's Office completed this project in
Conformance with the *International Standards for the
Professional Practice of Internal Auditing*.

Table of Contents

Executive Summary	<i>i</i>
1.0 Introduction	1
1.1 Audit Objectives, Scope and Approach	1
1.1.1 Objective	1
1.1.2 Scope and Approach	2
2.0 Background	2
3.0 Observations and Recommendations	6
3.1 Project Budget	6
3.1.1 Initial Budget Approval	6
3.1.2 Budget Adjustments	7
3.2 Expenditure	9
3.2.1 Expenditure Monitoring	10
3.2.2 LRT Construction Costs	11
3.2.3 Land Costs	15
3.2.4 Financing Costs	16
4.0 Conclusion	18

Executive Summary

This audit was undertaken as part of the City Auditor's Office 2013 Audit Plan.

The West Light Rail Transit (West LRT) is an 8.2-kilometre-long line extending west from the west end of downtown 7th Avenue to 69th Street S.W. The line contains six stations, including Calgary's first elevated LRT station and first underground LRT station. In November 2007, City Council approved funding to allow the West LRT project to proceed. Construction started in February 2010. Construction of the line and stations was completed on time, and the West LRT officially opened for service on 10th December 2012. Final landscaping is expected to be completed during 2013, along with the on-going preparation of any surplus land for sale.

The audit examined project budget setting and approval, funding approval, and expenditure management between 1st January 2007 and 31st December 2012. We interviewed City staff that were part of the West LRT project team, reviewed relevant project documentation, and applicable policies, procedures and legislation.

Since the approval of the West LRT project in 2007, The City has made significant progress in defining corporate project management practices. Work is on-going developing a Corporate Project Management Framework (the Framework), providing standardized capital project management practices and tools for project managers across The City. The intent of the Framework is to improve City project management practices. The City's Project Management Policy for Capital Projects requires large capital projects (such as West LRT) to follow the Framework. The release of the first wave of Framework standards and guidance represents a significant step by The City in defining project management processes and building consistency in project management practices across The City.

The West LRT project has been successful in many ways. The project was completed on time, and was forecast at December 31, 2012, to be slightly under approved budget (\$1.336 billion versus an adjusted budget of \$1.387 billion). The City utilized several new approaches to complete the work (for example the use of a land acquisition strategy, and the use of a Fairness Advisor for the key procurement) and is currently conducting project Lessons Learned exercises. The evaluation of this project represents an opportunity for The City to further enhance the Corporate Project Management Framework by including lessons learned from the West LRT project.

Project Budget

Our review of the West LRT project identified an opportunity for further information regarding budget requests to be provided to Council, which would strengthen transparency and the decision making process. In November 2007, Council approved a \$700 million budget for the West LRT project. We did not identify sufficient information

presented to Council setting out what project scope was to be achieved for the amount of money requested. We did not identify information setting out the basis of the cost estimation request leading to the budget request, or the anticipated level of confidence in the estimate and associated contingency included in the request. A September 2011 report by the United Kingdom's Department for Transport¹ states that poor initial cost estimating is a factor in costs for light rail projects exceeding initial government funding in the UK and the United States. The report concludes that it is vital that promoters of light rail projects have full confidence in the factors that make up their project cost.

We found that all budget adjustments were approved by Council. At December 31, 2012, the approved budget was \$1.387 billion. We identified an opportunity to enhance the clarity of information provided to Council supporting budget adjustment requests. Two budget adjustments approved by Council totalling \$299.9 million were supported by limited written documentation setting out the reason why the adjustments were required e.g. whether the adjustment was required for a cost increase, specific change to scope etc.

Providing Council with clear communication regarding budget requests, including the basis of the request, reason for request, and any applicable comparative information will enhance The City's project management by providing a clearly defined initial project budget.

Project Expenditure

At December 31, 2012, the forecast project expenditure was \$1.336 billion, \$51 million less than the approved adjusted budget.

We examined project expenditure management, and observed that all categories of expenditure were being monitored. We identified improvements for project expenditure controls, including the development of budget monitoring processes and tools, and establishing a defined process analyzing project contracting decisions.

We examined the three largest categories of expenditure: LRT construction (including the Design/Build contract), land costs, and financing costs. Further information about these costs is in Section 3.2 of this report.

Finally, we identified an opportunity for developing and implementing a process to ensure that lessons learned from new City practices on projects benefit all City project managers. Through this structure, The City can continue to evolve and enhance its project management framework on an on-going basis.

¹UK Department for Transport, Green Light for Light Rail, September 2011

1.0 Introduction

This audit was undertaken as part of the City Auditor's Office 2013 Audit Plan.

1.1 Audit Objectives, Scope and Approach

1.1.1 Objective

Our audit work is supported by a risk-based approach. Through interviews with project staff and review of project documentation, we compiled an overview of the financial position of the project, and identified key areas of West LRT expenditure. We then assessed the overall project budget and types of expenditure by determining the dollar value, and making a judgment regarding the value of learning for The City from the types of expenditure.

Based on our risk assessment, the audit objectives and associated criteria were to:

1. Determine whether the project budget was managed effectively by assessing whether:
 - a. The original (baseline) project budget was appropriately defined, approved, and (within expected variance ranges for the class of estimation) sufficient to achieve the project's scope;
 - b. Requests for budget adjustments were documented, supported by appropriate analysis and approved; and
 - c. Expenditure was monitored against budget; significant variances investigated, and appropriate action taken to address those variances.
2. Determine whether the Design/Build contract was effectively managed by assessing whether:
 - a. Anticipated risks and benefits of the contract type were considered in the decision to procure a Design/Build contractor;
 - b. The contract was competitively tendered;
 - c. Contract payments were only made for work completed of the required quality; and
 - d. The City analyzed the use of a Design/Build contract to improve management of future capital construction projects.
3. Determine whether project funding was effectively managed by assessing whether:
 - a. Funding decisions considered the costs/benefits/risks of types of funding available to The City;
 - b. Costs of funding were monitored, significant variances investigated, and appropriate action taken to address variances.

1.1.2 Scope and Approach

The audit examined project budget setting and approval, funding approval, and expenditure management between 1st January 2007 and 31st December 2012.

Our audit approach included the following:

- Conducting interviews with City staff that were part of the West LRT project team or who were otherwise connected to this project from Transportation Infrastructure (TI), Finance and Supply, and other Business Units across the City;
- Reviewing project budget, expenditure, procurement and financing documentation;
- Reviewing relevant policies, procedures, guidelines, reports, reconciliations, business and strategic plans, and legislation; and
- Reviewing other files and documents as required.

2.0 Background

The West Light Rail Transit (West LRT) is an 8.2-kilometre-long line extending west from the west end of downtown 7th Avenue to 69th Street S.W. The route (Figure 1) crosses 11th Street and follows Bow Trail to 33rd Street, where it bends to the south and then travels west along 17th Avenue to 69th Street S.W.

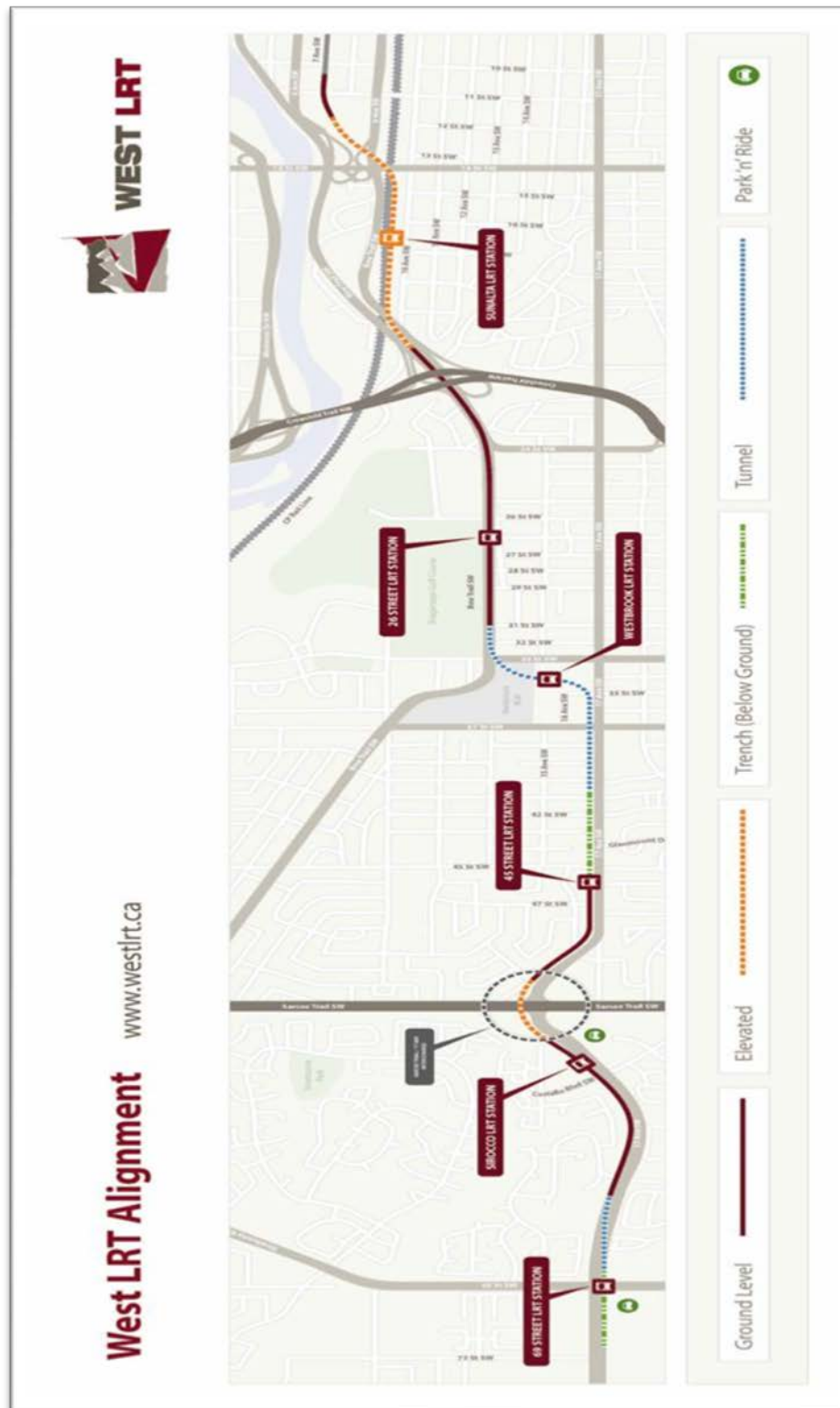


Figure 1: West LRT Alignment (source: West LRT Project Office)

The West LRT line contains six stations, including Calgary's first elevated LRT station at Sunalta (Figure 2) and first underground LRT station at Westbrook (Figure 3).



Figure 2: Sunalta Station (source: West LRT Project Office)



Figure 3: Westbrook Station (source: West LRT Project Office)

The West LRT Line concept was first approved by Council in 1988. In November 2007, City Council approved funding to enable the West LRT project to proceed. A total of \$700 million was approved by Council, including:

- \$50 million for design and strategic land purchase;
- \$84 million for light rail vehicles to service the line; and
- \$566 million for the construction of the six stations and 8.2 km of track.

The scope and cost of the project increased during 2008 and 2009 through public engagement, engineering requirements, and Council decisions. Key changes included:

- Modifying the station and line at 45th Street from at-grade to below grade;
- Inclusion of an associated project to build a parkade at 69th Street;

- Inclusion of an associated project to redevelop the Sarcee Trail/17th Ave interchange as part of the line construction; and
- Inclusion of the relocation and redevelopment of a high school situated along the line.

The City chose to use a Design/Build² project delivery approach. The City issued a Request for Proposals (RFP) in February 2009 and awarded the Design/Build contract in October 2009. The schedule in the RFP required the project to be substantially complete and ready for revenue service and operations no later than December 2012. Construction started in February 2010 with roadwork and utility relocation. Construction of the line and stations was completed on time, and the West LRT officially opened for service on December 10, 2012. Final landscaping is expected to be completed during 2013, along with the on-going preparation of any surplus land for sale.

Since the approval of the West LRT project in 2007, The City has made significant progress in defining corporate project management practices. Work is on-going developing a Corporate Project Management Framework (CPMF, the Framework), providing standardized capital project management practices and tools to projects across The City. The intent of the Framework is to improve City project management practices. The City's Project Management Policy for Capital Projects requires large capital projects (such as West LRT) to follow the Framework. Framework standards and guidance are being developed in three waves of activity: wave 1 standards and guidance were released to the Business Units on November 1, 2012, and work on wave 2 standards and guidance is underway. Wave 3 projects standards and guidance will be developed later in 2013.

² Design/Build refers to a Project Delivery System in which a single entity provides the Owner with all services necessary to design and build the facility. The entity provides the Owner with a single point of responsibility for the work.

3.0 Observations and Recommendations

In conducting this audit, we reviewed the management of the West LRT project since 2007, but also observed the subsequent changes to City project management practices that have taken place since the approval of the West LRT project.

We have grouped our audit observations into two themes, firstly, those related to the project budget (Section 3.1) and secondly those related to project expenditure (Section 3.2).

3.1 Project Budget

We examined the project's initial budget approval, and subsequent budget adjustments.

3.1.1 Initial Budget Approval

In November 2007, Council approved a \$700 million budget for the West LRT project. The breakdown of the \$700 million approved budget was:

- \$84 million for the purchase of 21 Light Rail Vehicles;
- \$50 million for design and strategic land purchase; and
- \$566 million representing the remaining budget required for West LRT.

Leading practices for setting a project budget call for a clearly defined project scope and a basis for cost estimation that is clearly explained. A September 2011 report by the United Kingdom's Department for Transport states that poor initial cost estimating is a factor in costs for light rail projects exceeding initial government funding in the UK and the United States. According to the Project Management Institute's Guide to the Project Management Body of Knowledge (PMBOK):

- The scope baseline is one of the inputs to estimating costs for a project. The scope statement provides the product description, acceptance criteria, key deliverables, assumptions, and constraints about the project.
- Cost estimates are used to determine the budget. Cost estimation is an approximation of the funds needed to complete project activities. Cost estimates are a prediction based on the information known at a given point in time. The accuracy of a project estimate will increase as additional details become available.

PMBOK also describes tools and techniques used for estimating project costs. Among these, are two techniques called Analogous Estimating and Parametric Estimating. Analogous cost estimating uses the values of cost and budget from previous, similar projects for estimating the cost of the current project. Parametric Estimating uses statistical relationship between historical data and other variables to calculate cost.

We did not identify sufficient information presented to Council setting out what project scope was to be achieved for the amount of money requested. For example, it is not clear whether:

- All anticipated land purchases were included in the budget as \$50 million is included for “design and strategic land purchases”.
- The land acquisition budget took into consideration risks such as the rising cost of land or the possibility of contaminated sites. It is unclear if a contingency amount was set aside for such purposes.

The report presented to Council stated that \$566 million represented “the remaining budget required for the West LRT”. This could imply to a reader that no additional funds would be needed for this project.

We did not identify communication provided to Council setting out the basis of the cost estimation (such as the work completed to arrive at the estimation) leading to the budget request. We also did not identify communication to Council regarding the anticipated level of confidence in the estimate and associated contingency included in the request.

We did not identify the use of analogous or parametric cost estimating provided to Council. For example, project documentation did not contain comparisons to similar LRT projects that might have assisted Council in its decision-making process. Council was not presented with unit cost information (such as the cost per kilometre) for this project in comparison to similar projects.

In November 2007, when the West LRT budget was approved by Council, no project cost estimation standard existed at The City. The City first published a standard (CPMF Estimation & Contingency Standard) in November 2012. The purpose of this document is to establish a common understanding of cost estimating and contingency among City project managers engaged in capital construction projects. The goal is to build consistency in estimating and contingency, to develop a common estimating and contingency language, and to build on the strengths of current estimating and contingency practices. However, The City’s standard and supporting guidance document do not require communication to Council regarding the estimation process and assumptions on which a project budget request is made (Recommendation 1).

3.1.2 Budget Adjustments

The effective management of budget adjustments requires that each instance of budget adjustment be appropriately approved and supported by sufficient information to indicate its purpose. Reasons behind budget adjustments may include, among other things, un-anticipated cost inflation or changes in project scope. Documentation should be available to support budget adjustment requests from the original budget to the final approved budget.

During the course of this audit, we were able to obtain supporting documentation evidencing how the original budget increased from \$700 million to \$1.4 billion. We found that all budget adjustments were approved by Council. Table 1 shows the amounts approved by Council with a brief description of what was approved:

Description	2007 Nov	2008 Jun	2008 Sept	2009 May	2009 Oct	2010 June
	\$ Million					
West LRT construction, design and strategic land purchases, 21 light rail vehicles	700.0					
Revision of the Alignment. At-grade Median Bow Trail 19 th St SW – 33 St SW		16.0				
Transfer of funds for Bow Trail work (Crowchild Trail to 37 th Street)			15.4			
Transfer of funds for Sarcee Trail /17 th Ave Interchange			60.0			
Cost share with Province for School construction			30.0			
Budget Adjustment				172.9		
Trenching of line between 41 St SW and 46 St SW					61.0	
Transfer of funds for Heritage Operations Centre					29.7	
Budget Adjustment					127.0	
Budget reduction						(5.0)
Total Approval	700.0	16.0	105.4	172.9	217.7	(5.0)
Cumulative Total	700.0	716.0	821.4	994.3	1,212.0	1,207.0
Financing Costs	Council also approved \$180 million of financing costs to fund the project (see Section 3.2.3)					180.0
						1,387.0

Table 1: West LRT Council Budget Approvals

We identified an opportunity to enhance the clarity of information provided to Council. Two budget adjustments approved by Council totalling \$299.9 million were supported by documentation regarding the adjustment requested, but documentation included limited information why the adjustments were required e.g. whether the adjustment was required for a cost increase, specific change to scope etc.

\$172.9 million budget increase, approved by Council in May 2009

The report to Council identifies that \$142 million of this adjustment relates to land. The report does not identify why this adjustment is required: for example whether estimated land costs have increased beyond what was originally included in the original budget request, or whether assumptions regarding land acquisitions have changed etc. We were informed by Administration that a verbal briefing on this adjustment was provided to Council in camera (i.e. without public or media present) due to the commercial sensitivities regarding land acquisition. Other components of this adjustment reflect changes in project scope.

\$127.0 million budget increase, approved by Council in October 2009

The report to Council identifies all scope changes made to the project from initial Council approval to the date of the report, including the cause (e.g. public engagement), a summary of available project funding, and projected project expenditure. We

understand from Administration that the adjustment requested represented scope changes yet to be funded, although this is not explicitly stated in the documented report.

Providing documented information to Council to support project budget requests enhances the project decision making process, and increases transparency. Supporting information should include:

- Project scope expected to be covered by the request;
- Estimation process and assumptions;
- Comparative costs; and
- Reasons for adjustments from previously approved budgets.

Recommendation 1

The City Manager enhance the Corporate Project Management Framework by adding the requirement for requests for project funding/approval from Council to include:

- Information on scope of project as it relates to the budget request.
- Assumptions underlying the budget request, including but not limited to the class of estimate and consequential range of estimation, contingency, etc.
- Information on comparative projects as applicable.
- Information on changes that have led to a budget adjustment request.

Management Response

Agreed

Action Plan	Responsibility
<p>Management concur with the importance of revisiting the CPMF, and adjust as necessary, to insure it clearly stipulates the need to include and link scope, budget, class of budget, inclusion of contingency and the trigger for the budget adjustment.</p> <p>Inclusion of comparable projects is valuable where available.</p>	<p><u>Lead:</u> Director - IIS</p> <p><u>Support:</u></p> <p><u>Completion Date:</u> 2013 December 31 or concurrent with CPMF planned updates in Q1 & Q2 of 2014.</p>

3.2 Expenditure

Table 2 shows project forecast expenditure at 31 December 2012. Expenditure has been grouped into six categories. The audit examined project expenditure monitoring, as well as the three largest categories of expenditure (see Table 2): LRT construction costs, land costs, and financing costs.

3.2.1 Expenditure Monitoring

Effective monitoring of expenditure requires that:

- All types of expenditure are monitored against budget, and appropriate action is taken to address variances, and;
- Expenditure forecasts are accurate, up to date, and complete.

Interviews indicated that each category of expenditure was being monitored by City staff. Expenditure was monitored by the use of reports from The City's financial system, and through spreadsheets.

On December 31, 2012, the Council-approved project budget was \$1.387 billion, and the expenditure forecast for the project at completion was \$1.336 billion. Table 2 provides more detailed information on the expenditure forecast for the project:

Expenditure Category	Forecast: Project Completion
	\$ Million
LRT Construction	890.8
Land	162.4
Financing	108.0
Light Rail Vehicles	84.4
School Construction	55.1
Parkade Construction	34.9
Total	1,335.6

Table 2: Forecast Expenditure, December 31 2012

By the end of 2012, LRT, School, and Parkade construction costs were almost fully expended. Light Rail Vehicles (LRVs) were purchased and are running on the line. The City was able to purchase 23 LRVs rather than the anticipated 21 for the cost of \$84 million. Forecast total land costs have less certainty as costs are still being determined, and land revenues (where remnant land is sold) will be generated in 2013 and subsequent years. The forecast above assumes that no further financing costs will be incurred, and does not include any expenditure on public art.

We observed that the structure of budget monitoring did not support effective project budget management.

- Budget and costs should be recorded in The City's financial system using a coding system ("Dept IDs", "Programs") to indicate the project or Business Unit that they relate to. However, budgeted financing costs of \$230.7 million to be borrowed against the Province's Municipal Sustainability Initiative (MSI) were all allocated to the West LRT Project even though some budgeted costs related to other projects.
- In one instance, the person considered the "budget owner" in The City's financial structure was not the person who had created the portion of the project budget. In another instance, the person considered the "budget owner" was not the person monitoring the portion of the budget. These instances increase the risk

that budget monitoring is ineffective either because the budget is not understood, or the budget is not closely monitored by the appropriate person.

Recommendation 2

The City Manager develop project budget monitoring processes and tools to facilitate effective project budget management, and incorporate them into the Corporate Project Management Framework.

Management Response

Agreed

Action Plan	Responsibility
Management concur with the need to have project budget monitoring processes and tools to facilitate effective project budget management incorporated into the Corporate Project Management Framework.	<u>Lead:</u> Director - IIS <u>Support:</u> <u>Completion Date:</u> 2013 December 31 or concurrent with CPMF planned updates in Q1 & Q2 of 2014.

3.2.2 LRT Construction Costs

The largest category of project expenditure is LRT construction costs, with a forecast at project completion of \$890.8 million (see Table 2). The City chose a Design/Build approach to complete the construction of the line. The City tendered for a Design/Build contractor to complete the work. The City also used a series of smaller contracts to complete any construction work not forming part of the Design/Build contract. The City employed an engineering firm to perform the role of "Owner's Engineer" to manage the Design/Build contractors.

In examining construction costs, we assessed whether:

- Anticipated risks and benefits of the contract type were considered in the decision to procure a Design/Build contractor;
- The contract was competitively tendered;
- Contract payments were only made for work completed of the required quality; and
- The City analyzed the use of a Design/Build contract to improve management of future capital construction projects.

Project Delivery Method

A project delivery method relates to contractual arrangements for the approach implemented to accomplish the goals of a project. For any given project there is likely to be more than one project delivery method that would be appropriate.

An effective project delivery analysis and decision process involves the evaluation and consideration of different project delivery methods. Anticipated risks and benefits of different project delivery methods are explicitly presented and evaluated in measurable terms. Lessons learned sessions from the project are also to be expected as a source of analysis of the adopted project delivery method.

We noted that the decision to use a Design/Build project delivery method was approved by Council in November 2007. High level information about the potential benefits of this project approach was provided to Council at the time. We did not identify detailed analysis of anticipated risks/benefits of the Design/Build approach, or analysis of alternative project delivery methods. Administration informed us that the Owner's Engineer prepared a report for The City with recommendations on the delivery methodology.

A project Lessons Learned exercise was undertaken in February 2012, which included high level analysis of the project delivery method. Further West LRT Lessons Learned exercises are underway at the time of this report.

We were informed by management that the development of corporate guidance on project delivery strategies ("Contracting Strategies") is underway as part of wave 2 of the Corporate Project Management Framework. As with other elements of the Framework, projects of the size of West LRT will be required to follow the guidance. Therefore, no recommendation is raised relating to this observation.

Tendering

Competitive tendering is a key method for obtaining goods and services at the most economical price, based on current economic conditions in the open marketplace. Through an established competitive tendering process, proposals are evaluated on the basis of predetermined criteria including quality of design and price to obtain value for the money. The contract is awarded to the highest rated (i.e. best) proposal.

We observed that The City conducted a competitive tender process for the Design/Build contract, involving a Request for Qualifications (RFQ) followed by a two stage (technical then financial) Request for Proposals (RFP). The City employed an independent Fairness Advisor³ to provide assurance that the procurement process described in the RFP and RFQ were applied fairly.

³ The role of the Fairness Advisor was to satisfy herself on the overall fairness of the procurement process for the West LRT Project.

The RFQ was issued on November 3, 2008. Four submissions were received. The three highest rated proponents were selected following the pre-determined evaluation process. The Fairness Advisor reported on the RFQ process and concluded that the each of the respondents was provided with a fair opportunity to have their proposal considered, and that the criteria appeared to have been applied consistently and in accordance with the Evaluation Manual.

The RFP was issued on February 16, 2009. All three qualified proponents from the RFQ submitted technical bids. All three bids were evaluated as technically compliant. Financial submissions for each proponent were evaluated and the lowest cost bid was selected as the preferred proponent. The Fairness Advisor reported on the RFP process, and concluded that the RFP process was conducted in a fair manner in accordance with procedures set out in the RFP.

All proposal costs were compared to an estimate completed by the Owner's Engineer⁴ prior to their receipt. The Owner's Engineer estimate was \$118 million (14%) more than the highest proposal price. We did not identify any analysis investigating and attempting to explain these differences. The City does not have a policy framework in place defining to what extent such cost variances are to be analyzed. Understanding significant differences in proposal costs helps provide assurance that The City is receiving good value for money, and that proposed costs are realistic regarding the scope of the work to be completed.

Recommendation 3

The City Manager enhance the Corporate Project Management Framework by incorporating the requirement to conduct and document analysis where project contracting decisions vary by more than anticipated (based on class of estimate) percentage.

Management Response

Agreed

Action Plan	Responsibility
Management concur with the importance of revisiting the CPMF, and investigating tools and processes to address as necessary, the documentation and analysis of decisions where variance is greater than expected based on class of estimate.	<u>Lead:</u> Director - IIS <u>Support:</u> <u>Completion Date:</u> 2013 December 31 or concurrent with CPMF planned updates in Q1 & Q2 of 2014.

⁴ The role of the Owner's Engineer was to manage a team undertaking the development of alternative alignments, participate in public consultation and briefings to Senior Administration, develop a contracting strategy and cost estimates.

A number of tendering techniques and practices were used by the City for the first time in tendering for the Design/Build contract. These included the use of a Fairness Advisor, a secured website for bid questions and answers, and payments to unsuccessful proponents in return for the use of intellectual property in their bids. Project Lessons Learned exercises are underway and include high level analysis of elements of the procurement process. However, The City does not have a formal mechanism in place setting out how successful initiatives identified on major projects can be shared across The City for the benefit of all Business Units engaged in project management.

Recommendation 4

The City Manager incorporate into the Corporate Project Management Framework a feedback loop to ensure that lessons learned from new City practices on projects are incorporated into the Framework on an on-going basis for the benefit of all project managers.

Management Response

Agreed

Action Plan	Responsibility
Management concur that the Corporate Project management Framework should incorporate a 'lessons learned' to continually improve City skills and practice.	<u>Lead:</u> Director - IIS <u>Support:</u> <u>Completion Date:</u> 2013 December 31 or concurrent with CPMF planned updates in Q1 & Q2 of 2014.

Design/Build Contract Payments

For any project, expenditure controls are essential to ensure that The City only pays appropriate project costs.

Through this audit, we set out to determine if:

- Records of payments matched those recorded in The City's financial system;
- Payments were for unique pieces of work (i.e. no duplicate payments);
- Changes to expected payment totals were supported by change orders⁵;

⁵ A change order is work that is added to or deleted from the original scope of work of a contract, which changes the original contract amount and/or completion date.

- Change orders were for legitimate (i.e. related to construction, not entertainment for example) reasons and supported by paperwork showing approval, and;
- Payments made were supported by assessment from the Owner's Engineer that work invoiced was complete and of the right quality.

We reviewed five of the largest contract payments to the Design/Build contractor (reviewed payments totalled \$179.4 million out of total payments of \$770.0 million). All five payments reviewed were supported by:

- Letters signed by the Owner's Engineer confirming that percentages of work stated in the payment application were reviewed and represented a reasonable estimate of work satisfactorily performed;
- Evidence of review of the invoices by the Owner's Engineer;
- Evidence of review and approval of the invoices by the Project Manager;
- Schedules with the description of the contracted items, with the item prices and completion to date;
- Progress Certificates with confirmations by the Owner's Engineer that work had been reviewed and satisfactorily performed; and
- Progress Certificates signed by the Project Manager.

We also examined all 38 invoices sent by the Design/Build contractor and confirmed that no duplicate payment was made.

Project Change Orders up to December 31 2012 totalled \$33.8 million. We examined the five largest Change Orders (total \$16.4 million). We found that the initiation and approval of Change Orders were defined by a Change Management process. Change requests were initiated by either the Project Management Team or the Design/Build contractor. Change requests listed the reasons for change, scope of change, cost and time impacts of change. Change Orders were approved by the Project Manager, and charged against the contingency for the project.

3.2.3 Land Costs

At December 31, 2012, estimated land project land costs were \$162.4 million, including the cost of acquiring land to date, projected future costs, and future estimated revenue from sales of surplus land.

The City used a new approach to acquire land ahead of construction. A land acquisition strategy, including deadlines for acquisitions, was approved by Council. A dedicated real estate team of a Project Lead, Land Agents, Communications and Legal was established and given responsibility for meeting the deadlines. Using this approach, all land was acquired prior to the start of construction, enabling construction to proceed without any delays related to land acquisition.

A Lessons Learned exercise was completed following the acquisition of the required properties. We were informed that The City has used the land acquisition process on

other subsequent City projects, an example being the acquisition of land required for the 52nd Street widening project.

3.2.4 Financing Costs

The effective management of project funding decisions includes the existence of documentation showing consideration of all possible funding options. The decision to borrow money, finance a project by The City's own means, or any other option should be documented, including a cost-benefit analysis.

Council approved the use of Provincial Municipal Sustainability Initiative (MSI) funding for this project at the time of project budget approval in 2007. We have not identified any analysis of funding options available at the time. In 2007, no project funding analysis standard existed at The City. The Corporate Project Management Framework (2012 onwards) includes a requirement for projects to have a documented Business Case, including analysis of project funding options. Therefore, no recommendation will be raised relating to this issue.

The 2007 audited accounts indicate that limited other sources of funding were available. At 31 December 2007, The City held \$70.9 million in cash or cash equivalents, and \$1.8 billion of investments. However, of these investments, \$817 million were allocated to reserves set up by Council for designated purposes. Of these reserves, the only reserve with a designated (through legislation) purpose appropriate for West LRT expenditure was the Miscellaneous Capital Reserves. In 2007, \$10 million were available in this reserve.

Interest costs on borrowing in 2009 were around 2.85%. As noted above, in 2007, The City held \$1.8 billion of investments, of which \$1 billion was not in restricted reserves. Notes to The City's audited accounts indicate that return on City investments was as follows:

- 2009: 2.7%
- 2010: 2.6%
- 2011: 2.6%

It is therefore likely that the difference between the cost of borrowing \$108 million to fund the project ahead of the receipt of MSI funding, and the opportunity cost of using City held investments, is immaterial in relation to the overall cost of the project.

The risk of MSI funding not being provided as set out by the Province was articulated in the information provided to Council. This risk was to be mitigated by deferring or deleting future projects financed by fuel tax revenue. No financing costs were included in the initial Council budget requests (November 2007).

In May 2009, Administration reported to Council that a decline in energy prices pushed the Province into a significant downturn resulting in lower provincial revenues and a delay to the delivery of MSI funds from the Province to Municipalities. Council approved funding of up to \$230.7 million (\$165 million in 2009, increased by \$65.7 million in 2010) in interest costs for bridge financing so that projects could continue ahead of the receipt

of MSI funding. As noted in section 3.2.1 (Expenditure Monitoring) of this report, all budgeted borrowing costs of \$230.7 million against MSI were allocated to the West LRT project budget in The City's financial system, even though some borrowing was expected to relate to other projects. Management indicated that \$180 million of the \$230.7 million was expected to relate to West LRT.

Actual borrowing costs for the project up to 31 December 2012 equalled \$108 million. These interest costs are paid by using MSI funding, and therefore result in less City projects being delivered for the amount of MSI available to the City. Management do not anticipate that any further borrowing is required related to this construction project.

4.0 Conclusion

Since the approval of the West LRT project in 2007, The City has made significant progress in defining corporate project management practices. Work is on-going developing a Corporate Project Management Framework (CPMF, the Framework), providing standardized capital project management practices and tools for project managers across The City. The intent of the Framework is to improve City project management practices. The City's Project Management Policy for Capital Projects requires large capital projects (such as West LRT) to follow the Framework. The release of the first wave of Framework standards and guidance represents a significant step by The City in defining project management processes and building consistency in project management practices across The City.

The West LRT project has been successful in many ways. The project was completed on time, and is currently forecast to be slightly under approved budget (\$1.336 billion versus an adjusted budget of \$1.387 billion). The City utilized several new approaches to completing the work (for example the use of a land acquisition strategy, and the use of a Fairness Advisor for the key procurement) and is currently conducting project Lessons Learned exercises. The evaluation of this project represents an opportunity for The City to further enhance the Corporate Project Management Framework by including lessons learned from the West LRT project.

Our review of the West LRT project identified an opportunity for further information regarding budget requests to be provided to Council, which would strengthen transparency and the decision making process. A September 2011 report by the United Kingdom's Department for Transport states that poor initial cost estimating is a factor in why costs for light rail projects exceeded initial government funding in the UK and the United States. The report concludes that it is vital that promoters of light rail projects have full confidence in the factors that make up their project cost. Providing Council with clear communication regarding budget requests, including the basis of the request, reason for request, and any applicable comparative information will enhance The City's project management by providing a clearly defined initial project budget.

In examining West LRT expenditure, we also identified improvements for project expenditure controls, including the development of budget monitoring processes and tools, and establishing a defined process analyzing project contracting decisions.

Finally, we identified an opportunity for developing and implementing a process to ensure that lessons learned from new City practices on projects benefit all City project managers. Through this structure, The City can continue to evolve and enhance its project management framework on an on-going basis.

Acknowledgement

We would like to thank the staff of Transportation Infrastructure, Finance & Supply, and Corporate Services for their assistance and support throughout this audit.