



**Regina Public
Library**

Central Library Business Case – Phase 1
Regina Public Library

May 1st, 2017

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1. Executive summary

1.1 Introduction

The Central Library building in Regina has a number of serious deficiencies, and is not able to meet the functional requirements and operate as an efficient and effective modern library. The Central Library has not had any major general renovation since its original construction in 1962. Regina Public Library (“RPL”) has undertaken several initiatives and studies since October 2008 to assist with the decision making for the development of the Central Library (the “Project”).

The building assessment conducted by Group2 Architecture Interior Design (“Group2”) in 2015 identified a number of issues including non-compliance with current building code and accessibility standards, thermal bridging issues related to the building envelope, inadequate insulation values for walls, curtain wall detailing and glazing, and issues related to inadequate slopes for the existing flat roof. Group2 provided recommendations to address the building code discrepancies, improve accessibility and meet current health requirements, and strategies to deal with building exiting issues, fire separations and fire protection systems. Group2 has also provided recommendations to replace the outdated and aging structural, mechanical, and electrical components of the Central Library.

RPL is currently exploring various options for the Project. RPL has engaged Deloitte to prepare a business case for the Project, and to assess the costs and benefits associated with the potential alternatives.

1.2 The options

The options which are currently under consideration include:

- **Option 1** - Renovate and modernize the Central Library so that it meets the required building code standards and improves the functionality of the current facility. The floor area of the Central Library will not be expanded under this option and will remain at 71,860 ft²;
- **Option 2** - Renovate and modernize the Central Library so that it meets the required building code standards, and expand on the current facility so that the current functional requirements are fully met and the future needs of the community can be accommodated. Under this option, the total floor area will be increased by 78,140 ft² by building new floors on top of the existing building, so that the total floor area of the Central library is at least 150,000 ft² ; and
- **Option 3** - Build a new Central Library with a floor area of least 150,000 ft².

The costs associated with developing new parking area, purchasing new land (if required) and developing lease space as part of the building are not included in the analysis for each of the options under consideration.

1.3 Benefits assessment

The Project could bring various benefits to RPL and the City of Regina, and such benefits could vary based on the option which RPL eventually selects. RPL provided insights about the qualitative benefits for each of the three options under consideration. Subsequently, Deloitte assessed the relative degree to which those benefits vary for each of the three options. Based on the results of the qualitative assessment of the benefits, it appears that RPL and the community as a whole could achieve maximum benefits by proceeding with option 3 for the Project. However, the results of the benefits assessment should be read in conjunction with the results of the quantitative assessment.

1.4 Quantitative assessment

A quantitative analysis has been performed to estimate the Net Present Value (“NPV”) for each of the three options under consideration. The quantitative analysis took into account the capital, lifecycle maintenance and operating costs for each of the options, over the estimated life of that option. Where possible, the risks relating to each of the options have been quantified through a Monte-carlo triangular simulation and added to the NPV estimate of the relevant option to come to an NPV after risk for each of the options.

Table 1: Summary of NPV for each of the options (\$ thousands)

Table title	Option 1	Option 2	Option 3
NPV before risk	106,073.56	187,712.95	189,833.60
Risk (NPV)	4,400.41	7,323.59	5,903.49
NPV after risk	110,473.97	195,036.54	195,737.09

As expected, option 1 has the lowest NPV estimate as this option has the lowest capital, lifecycle and operating costs. Option 2 and option 3 have similar NPV estimates, however approaching double the cost of option 1.

1.5 Conclusion

The quantitative analysis shows that option 1 is the least expensive option available to RPL; however, this is to be expected as the gross floor area of the Central Library is not increased under this option. For both option 2 and option 3 the foot print of the Central Library will be increased to 150,000 square feet and this is reflected in the costing. Options 2 and 3 have similar capital costs; however, option 3 represents a completely new building, while option 2 retains the current building and expands by adding new floors on top of the existing Central Library.

The results of the qualitative assessment revealed that option 3 is the option which is likely to provide the community with the most benefits; however, from a financial perspective, this option also represents the most expensive option available to RPL. From the analysis contained in this report it is clear that RPL should consider both the benefit assessment and the quantitative analysis in deciding which option to move forward. RPL should also take into account the potential cost implications of maintaining the existing building until it decides the future course of action for the Central Library.

2. Introduction

2.1 Statement of work

Deloitte has provided assistance in the past to RPL for the Project, including a funding / delivery model review study and development of a business case for PPP Canada. Deloitte's previous role on the Project ended in 2012 with the near completion of a PPP Canada Business Case for the Project. The business case was never submitted to PPP Canada due to changes in project eligibility criteria. Since that time RPL has endeavored to advance the Project through a series of activities including public consultations, alternate site studies, assessment of the current state and development of a five year remediation plan for the existing Central Library.

RPL recently hired Deloitte to update the business case that will allow the Board of Directors to make further decisions on the future of the Project. RPL is at a point in the planning process that requires a "new" business case for the Project that consolidates the issues, trends, and research from past reports and consultations as well as provides an assessment of the costs and benefits associated with potential alternatives.

2.2 Proposed options

The options which are currently under consideration include:

- **Option 1** - Renovate and modernize the Central Library so that it meets the required building code standards and improves the functionality of the current facility. The floor area of the Central Library will not be expanded under this option and will remain at 71,860 ft²;
- **Option 2** - Renovate and modernize the Central Library so that it meets the required building code standards, and expand on the current facility so that the current functional requirements are fully met and the future needs of the community can be accommodated. Under this option, the total floor area will be increased by 78,140 ft² by building new floors on top of the existing building, so that the total floor area of the Central library is at least 150,000 ft² ; and
- **Option 3** - Build a new Central Library with a floor area of least 150,000 ft². For the purposes of this business case update, the land on which the new Central library will be developed on has not been taken into consideration

The costs associated with developing new parking area, purchasing new land (if required) and developing lease space as part of the building are not included in the analysis for each of the options under consideration.

2.3 Approach

The business case has been updated according to the following approach:

- **Consultations and document review** – The assumptions for the various options were defined, and further refined jointly by Deloitte and RPL through multiple meetings. Deloitte reviewed the reports pertaining to all the initiatives undertaken by RPL since 2008. Deloitte though consultations with RPL, leveraged key qualitative information from those reports to assess the benefits for each of the option.
- **Cost validation** – Deloitte reviewed the costing for each of the three options, based on a combination of the work performed by Tech-Cost Consultants Ltd. ("TCCL") in 2012 and the 2015 BTY Regina Public Library Modernization report, and updated the cost estimates with input from TCCL to reflect current pricing.
- **Quantitative analysis** – Deloitte identified multiple risks which are relevant to the Project. Deloitte facilitated a session to quantify the impact and probability of occurrence of each of the risk.

workshop was attended by RPL and TCCL. Subsequently, Deloitte calculated the Net Present Value (“NPV”) of each of the three options under consideration, taking into account the amount and timing of all the relevant cash flows for each option.

3. Project background

3.1 Regina Public Library

RPL is established in Saskatchewan legislation through the Public Libraries Act, 1996 and is a board governed, integrated cultural organization that exists to provide opportunities for discovery and learning in an inclusive, customer-centred, and safe environment with a vision that states “We are a dynamic hub of literacy, learning, curiosity and new ideas, integral to the social and economic vibrancy of Regina. We inspire individuality, connection and diversity.” RPL operates out of nine different locations including the Central Library in downtown Regina.

The general management, regulation, and control of the Library are vested in the Regina Public Library Board (the “Board”). The Board consists of the City Mayor, one City Councillor, and seven members of the public appointed by the City Council for a two year term. One half of the Board positions are appointed every January. The Board composition and funding mechanism for RPL, both as specified by the Public Libraries Act, illustrate that while RPL is an autonomous corporation (also as specified by the Act) it is strongly tied to, and reliant on, the City of Regina.

3.2 City of Regina

The City of Regina, with a population of approximately 225,000, is a Saskatchewan municipality created and empowered by the Province of Saskatchewan through the Cities Act, 2011.

The results from the 2016 Census indicate Regina’s population has increased by 11.4% since 2011, an average growth of 2.3% per year. As per the City’s Official Community Plan, the demographic profile of the City is changing. The City is getting younger as the number of persons in their twenties now exceed the senior population. As more young families move to the City, the demand for community facilities such as libraries is increasing.

3.3 Central library development – Project milestones and decisions

RPL has undertaken several activities and studies from 2008 to 2012 as part of its initiative to identify a new facility to replace the existing Central Library.

- **October 2008:** The Board made the Central Library Development an active project under the strategic plan,
- **February 2009:** An Expression of Interest invitation for architects was published and distributed. This was the beginning of the Board driven process to deal with the Central Library question. Several expressions of interest were received from national and international design firms. Also at this time the Central Library Development (“CLD”) Selection Committee was formed.
- **Spring/Summer 2009:** The CLD Selection Committee proposed, and the Board adopted, the recommendation to negotiate with P3 Architecture and Harvard Developments, based on their joint proposal. Agreements were signed with Harvard Developments and P3 Architecture, and City Council was consulted. Following the initial round of design open house consultations, the design parameters were developed and included: retain all existing public service components; provide for a new library of 150,000 ft²; remain in the current location; building horizon of 25 years; establish a civic presence and cultural precinct at Victoria Park; and adequate parking.

The RPL received a report from PHH ARC Environmental, the report included findings from a building assessment on asbestos within the Central Library. The report included recommendations and costs.

- **January 2010:** The Central Library Development Plan (functional program) was finalized. This plan translates staff function and public activities into spatial relationships within the building. It established that an ideal footprint for the RPL portion of the building would be just over 3,100 m² and use five floors (including future expansion space).
- **January to March 2011:** The Central Library (Cultural Centre) Feasibility Study was finalized and issued. This study consolidated and summarized all of the work from February 2009 through to this date. The Cultural Centre concept included the Central Library, significant public meeting spaces, Theatre Company, art gallery, hotel, retail, leasable space. Discussions to purchase the Masonic Temple and land were already under way. RPL was investigating, and preparing for a funding application to PPP Canada at that time.
- **April to June 2011:** The Board representatives met with the City Manager and the CEO of the Globe Theatre to pursue a partnership to include the Globe Theatre in the Library-led Cultural Centre concept. The space needed for the Globe was approximately equal to that originally allocated to the Mackenzie Art Gallery. In June, City Council endorsed *"in principle the Cultural Centre Redevelopment Project as a vital community project towards revitalization of the downtown and the enhancement of the city's cultural vibrancy"*. The Board applied for PPP Canada funding for RPL's part of the Project.
- **July/August 2011:** P3 Architecture refined the concept design drawings both to include the Globe Theatre option and to show phasing of the Project to meet PPP Canada's requirements. To ensure that the Project could continue if the Masons decided not to sell their land, the new drawings considered only land already owned by or accessible to RPL.
- **November 2011:** The Board formally offered to purchase the adjacent building and land owned by the Masonic Temple. In addition to other terms, the proposed purchase amount was just under \$5 million. The Project was approved at the first stage of PPP Canada's process and the Board approved the funding to develop a business case for the next stage of the process.
- **Spring 2012:** The Masons turned down RPL's offer to purchase. The PPP Canada Business Case was adapted to accommodate the new information.
- **June 2012:** The Board withdrew from the PPP Canada funding process. RPL had successfully completed the program submissions and had advanced successfully through the process. PPP Canada suggested that, while RPL met the criteria for the program, federal priorities in other categories of infrastructure would not lead to a successful outcome for RPL's application. Work on the business case for the PPP Canada submission was stopped, though it was almost complete. Discussions with the Globe Theatre continued as that partnership was not dependent upon the PPP Canada option. With the loss of the Mason's land, the Board endeavoured again to consider other land in downtown but found no viable options.
- **July to October 2012:** RPL and the Globe Theatre pursued options to maximize the footprint of a building on the current Central Library land including a utilities study and a traffic study. Options included maximum footprint without encroaching on the street and maximum footprint with encroachment on the street. The cost to move utilities would cost several million dollars. Whether Lorne or Smith Streets, hampering traffic in the downtown with further street closures was not recommended.

RPL has undertaken a number of new initiatives including building condition assessments and public consultations since 2014. These initiatives are part of RPL's renewed focus on the Central Library to fully understand the current state of the building, and to determine the needs of the community for a functional building.

- **September 2014:** A series of public dialogues took place over the summer and early fall of 2014, and DIALOG presented their preliminary results to the Board.
- **February 2015:** DIALOG issued their report on the *21st Century Central Library* to inform Board's decision-making process. Group2 issued its engineering and architectural report on the state of the current Central Library building. The report included staging of maintenance and repair items to minimize risk during the Board's decision-making process.

- **July 2015:** As part of the insurance renewal in 2015, a condition of renewal was to have a structural engineer inspect the building and provide recommendations. RPL contracted J.C. Kenyon, a structural engineering company, to inspect the granite cladding on the Central Library building and provide recommendations and costs.
- **November 2016:** RPL contracted J.C. Kenyon to develop more detail on the 2015 granite study. In November, the first phase of a five year remediation plan was completed as the entire exterior granite was re-caulked and re-pointed.

3.4 Key issues

The building assessment conducted by Group2 Architecture Interior Design (“Group2”) in 2015 identified number of issues including non-compliance with current building code standards, thermal bridging issues related to the building envelope, inadequate insulation values for walls, curtain wall detailing and glazing, and issues related to inadequate slopes for the existing flat roof. Group 2 provided recommendations to address the building code discrepancies, improve accessibility and meet current health requirements, and strategies to deal with building exiting issues, fire separations and fire protection systems. Group2 has also provided recommendations to replace the outdated and aging structural, mechanical, and electrical components of the Central Library.

Issues identified by Group2 include:

- Thermal performance and energy efficiency of the existing building no longer meets today’s standards;
- Discrepancies with current building code requirements related to building size and construction relative to occupancy, health requirements/ washroom facilities, barrier free accessibility, ramp and stair requirements, mezzanine configuration & construction, fire separations, and escalators;
- Issues with building envelope including curtain wall detailing, insulated strategies without modern air/vapour barriers, thermal bridging of structural elements, single or early double glazed window modules, and inadequate roof slopes on flat roofs;
- Reference to potential asbestos containing materials which need to be removed from the building during future renovations in order to remove the danger and ongoing maintenance associated with the problem. RPL has started addressing this issue to a certain extent as part of its ongoing small improvement projects;
- The roof is relatively flat - large rainfall events, or rain fall on top of winter snow accumulation in early spring could lead to load conditions in excess of the roof’s design capacity. These excessive loads could lead to structural damage if the water and/or snow loads are allowed to pond on the roof;
- The existing services (sanitary sewer, storm water, domestic water and natural gas) are beyond their rated service life;
- The boilers, converters, condensate tank and piping related to the steam system are original to the building and are beyond their rated service life;
- The converters and piping related to the hot water piping system are beyond their rated service life;
- The control system is the original pneumatic system and dates to the original 1961 building construction. The system is beyond its rated service life and is increasingly difficult to maintain;
- The electrical service is appropriate for the current peak load of the facility (approximately 384 kVA), but has little capacity for the addition of any substantial loads; and
- The majority of the light fixtures are well past their life expectancy, and their lamp technology is outdated. Some of the service spaces do not have sufficient lighting.

Refer to Appendix F for detailed summary of the findings identified in the 2015 Group 2 Building Assessment report.

3.5 Trends

In the February 2015 Building Assessment report, Group2 provided an overview of the elements which RPL could consider as major renovations while taking the decision to modernize the Central Library towards incorporating the trends and amenities of the 21st century library.

Key trends and best practices include:

3.5.1 Flexibility

The public library should incorporate the ability to adapt and evolve to diverse and changing needs in design decisions wherever possible. This includes concepts such as flexible space, wide distribution of power outlets, generic infrastructure, etc.

3.5.2 Furnishings and finishes

Design decisions should equally consider qualitative expression and ease of maintenance. Furnishings and finishes should create spaces of inspiration rather than reflect a utilitarian purpose.

3.5.3 Indoor/outdoor connection

Keep opportunities to connect the indoor and outdoor environments, including access to windows, natural light, interior planting, etc.

3.5.4 Wayfinding

In addition to a welcoming entry, visual connections to different areas should allow users to explore options before committing to a particular route. A facility that is bright and open with access to natural light and windows will improve orientation.

3.5.5 Place for community

The public library increasingly provides spaces and opportunities for meeting, gathering, and nurturing a sense of community connectedness and reflect the diversity of the community.

3.6 Public consultation

In 2014, RPL engaged DIALOG to solicit feedback from the public about the proposed Project. Several key themes emerged through DIALOG's public consultation process.

- The Central Library is seen as a place of learning and discovery for all ages;
- The arts and culture components of the Central Library - specifically the Dunlop Art Gallery and Film Theatre – are seen as assets;
- Greater representation of First Nation and Metis people is desired;
- More community and meeting spaces are needed;
- Comfort, attractiveness, accessibility, safety and overall quality of inside space is important, and need improvement;
- Different destinations and experiences are welcomed in the library;
- Diverse perspectives exist on whether to retain, renovate or rebuild the building; and
- There is desire to support and create spaces for developing other literacies, including those related to digital and other technologies.

3.7 Decision making

The key theme that emerged from our consultations with RPL is the potential implication of not making a timely decision for the development of the Central Library. RPL has undertaken several small improvement projects over the years, as part of its ongoing stopgap measures to maintain the Central Library and to keep

it functional. RPL will need to invest millions of dollars in the coming years in order to address some of the key issues that require immediate to near term attention.

Option 1 discussed in this report contemplates renovating and modernizing the Central Library so that it meets the required building code standards and improves the functionality of the current facility. The longer it takes to decide a course of action for the Project, the more the expense incurred with improvement projects to address the key issues. Under a delayed decision scenario, option 1 becomes a more cost effective option, while option 2 and option 3 would become more expensive.

4. Benefits assessment

The Project will enhance RPL’s ability to deliver library services to the community, which will contribute to the local and provincial economy over the long term. The Project could bring various benefits to RPL and the City, and it could vary based on the option which RPL would eventually select.

RPL prepared a document describing the qualitative benefits for each of the three options under consideration. Subsequently, through consultations, Deloitte and RPL assessed the relative degree to which those benefits vary for each of the three options, based on a rating system as follows:

✓ Low; ✓✓ Medium; ✓✓✓ High

Table 2: Benefits assessment for each of the options

Category	Criteria	Option 1	Option 2	Option 3
Building architecture	1. Iconic public building that inspires and generates pride in both the City and the Central Library	✓	✓	✓✓✓
	2. Preserve the heritage exterior architecture	✓✓✓	✓✓	✓
Capacity	3. Meet the current functional requirements of the Central Library	✓	✓✓✓	✓✓✓
	4. Meet the increase in need for library facilities due to the future projected growth in population	✓	✓✓✓	✓✓✓
Design	5. Meet the building code requirements	✓✓✓	✓✓✓	✓✓✓
	6. Satisfy the growing demand for emerging technologies and the public need and expectations for emerging services	✓	✓✓	✓✓✓
	7. Incorporate contemporary and future electrical and network requirements	✓	✓✓	✓✓✓
	8. Allows for phased design and expansion over multiple years	✓	✓✓	✓✓✓
	9. Address public safety in both the interior and exterior spaces	✓✓	✓✓	✓✓✓
Financial	10. Maximize cost certainty in construction	✓	✓	✓✓✓
	11. Minimize building operating costs	✓	✓✓	✓✓✓
	12. Ensure that building, after 30 years, is fit for purpose and does not require immediate capital investment	✓	✓✓	✓✓✓
Library Service Operations	13. RPL has full and flexible access and use of the facility	✓	✓	✓✓✓

Category	Criteria	Option 1	Option 2	Option 3
	14. Support for co-location of system-wide centralized services together	✓	✓✓	✓✓✓
	15. Maximize flexibility of RPL in making programming changes	✓	✓✓	✓✓✓
Environmental	16. Environmental impact caused due to demolition	✓✓✓	✓✓✓	✓✓✓ ¹
	17. Environmentally sustainable design	✓	✓✓	✓✓✓
	18. Operate and maintain the facility as efficiently as possible	✓	✓✓	✓✓✓
Social/Economic	19. Maximize access to library services to the community	✓	✓✓	✓✓✓
	20. Maximize quality of library services delivered to patrons	✓	✓✓	✓✓✓
	21. Ensure facility is clean, inviting, and hospitable to patrons	✓	✓✓	✓✓✓
	22. Attractive downtown public library becoming a catalyst for public engagement, participation, and cause an economic benefit	✓	✓✓	✓✓✓

Based on the results of the qualitative assessment of the benefits, it appears that RPL and the City could achieve maximum benefits by proceeding with option 3 for the Project. However, the results of the qualitative assessment should be read in conjunction with the results of the quantitative analysis which are discussed in the subsequent sections of this report.

¹ The environmental impact is applicable even if RPL decides to build the facility in a new site.

5. Risk analysis

5.1 Introduction

All infrastructure investments have inherent risks related to their design, construction, operation, and maintenance over their useful life. Risk is defined as “the threat or probability that an action or event, will adversely or beneficially affect an organization’s ability to achieve its objectives.” Understanding the risks is critical to enable RPL to make informed and appropriate decisions.

5.2 Risk process

5.2.1 Risk workshop

Deloitte facilitated a risk quantification session on the 3rd March 2017 which was attend by RPL and TCCL. The list of participants is shown in the Table below.

Table 3: Risk session attendees

Attendee	Organization
Kevin Saunderson	Regina Public Library
Mark Wainwright	Deloitte
Arun Narayanan	Deloitte
Kevin Drake	Tech-Cost Consultants Ltd.

5.3 Risk Identification

Prior to the risk quantification session, Deloitte identified 29 risks relevant to the Project; these risks have been detailed in the table below. It is important that the analysis of risk involves the best experience and expertise available to make a judgement regarding the probability that any of the risks identified may materialize and the impact that the risk could have if it were to materialize.

Table 4: Project risks identified

#	Risk	Description
1	General approvals	
1.01	Delay in Approvals	The risk that approvals and related operating permits are delayed, or are awarded based on conditions being imposed on RPL which impact the project schedule, delaying the time to reach financial close. Delaying the process could result in costs to RPL (e.g. construction price inflation during the period of delay).
2	Site conditions	
2.01	Utility Relocations and Upgrades or Modifications	The risks associated with utility relocations and upgrades or modifications at the site, including cost increases as well as unforeseen utility relocations, e.g. the utility did not appear on subsurface maps.
2.02	Pre-Existing Environmental Conditions on Site	The risk of pre-existing (a known unknown) environmental contamination at the site (e.g. asbestos), which requires mitigation and/or remediation and which could delay the works or make them more complex to execute.

#	Risk	Description
2.03	Construction Activity Results in Contamination	The risk that construction activity results in contamination of the site. This could result in temporary closure of the site and delay in commissioning.
2.04	Unknown On-site restrictions	The risk of any unknown on-site restrictions, such as on-site easement etc. that could cause a delay in the process and/or lead to increased costs (e.g. due to remediation efforts required).
2.05	Approvals & Permits (Other than EA and Related Operating Permits)	The risk that the project approvals and expenditure authorities with respect to permits and other authorizations delay the beginning of construction and any eventual operation.
3	Design Risks	
3.01	Stakeholder Consultation	The risk that consultation with stakeholder groups identifies mitigation measures that attempt to revise or impact the design of the facility (external elements) causing delays in the Project.
3.02	Failure to Meet Design Requirements (Discovered Prior to Commissioning)	The risk that the design of the facility fails to deliver services at the required levels of performance, heritage protection, capacity, and quality, caused by a failure to translate performance into the design, leading to additional design and development costs.
3.03	Change in Design Specifications	The risk that changes to the design are required, caused by legislative, regulatory, or policy changes. This can lead to additional design costs.
4	Construction risks	
4.01	Construction Scheduling, Coordination and Management	The risks associated with scheduling, coordinating, and managing construction activities, such as coordinating the work of sub-contractors and the procurement of equipment and materials. Scheduling and co-ordination issues can lead to delay, additional costs (subcontractor claims), or disruption.
4.02	Cost Estimation Range	Cost estimates as developed have an embedded estimation range. These could increase or decrease costs.
4.03	Condition of the Existing building	Unforeseen condition of the existing building, could lead to additional work, increase in cost, and delay the completion of the Project
4.04	Deficiencies (on new construction)	The risk that defects are discovered during the construction of the Project, which may result in increased costs to the construction contractor if it must rectify the defects (alternatively a sub-trade may be required to rectify the work). In any case, defects will result in delay and disruption to the construction schedule.
4.05	Construction Equipment Availability	The risk that special pieces of equipment are not available when required for construction works, resulting in delay and increased costs.
4.06	Construction Contractor Default (or sub)	The risk that the construction contractor defaults and must be replaced, resulting in delay and additional costs.
4.07	Scope Changes by RPL – During Construction	The risks associated with RPL changing the performance specifications during the construction period through issuing change orders.
4.08	Design Coordination Issues	The risk that change orders are requested by the contractor during construction due to design coordination issues, design completion and/or design gaps.
4.09	Inflation Risk	The risk that construction price inflation (including prices of labour, materials, and other cost drivers) will increase at a rate that is greater than that estimated by the construction contractor.
4.10	Weather	The risk that weather conditions result in delays to construction and increased costs.

#	Risk	Description
4.11	Utility Coordination	The risk that weather conditions result in delays to construction and increased costs.
4.12	Commissioning Delays - Deficiencies	The risk that there are delays in the commissioning process due to a poorly defined commissioning process and/or due to RPL not appropriately carrying out its role in the commissioning process, which result in a delay in the date of facility commercial operations. Delays will result in additional costs for the contractor.
5	Operational risks	
5.01	Labour Costs	Risk that labour costs for facility operator staff will be higher than anticipated (wages rise faster than anticipated).
5.02	Other Operations Costs	Risk that non-labour costs for facility will be higher than anticipated.
5.03	User Satisfaction	The risk or inability to meet user expectations and/ or a general lack of attention to specifics of the facility and related service requirements.
6	Maintenance risks	
6.01	Lifecycle Maintenance Performance (Maintenance Schedule)	The risk that major capital repair/lifecycle maintenance for the Project is not performed when required. This includes the risks associated with deferred maintenance, and/or scheduled maintenance not performed close to the end of a contractual term. Deferred maintenance can result in reduced asset life.
6.02	Design and Construction Defects - Poor workmanship	The risks associated with design errors, construction deficiencies, or substandard work and materials which emerge during the operations period, as related to the existing structures. Deficiencies which emerge during the operations period cause unexpected problems and result in increased costs in order to rectify or mitigate problems.
6.03	Unanticipated Maintenance	The risk that unplanned maintenance that affects the life, safety & immediate operation of the Project is required.
6.04	Major Reconfiguration and Improvements	The risk of required improvements, expansion, and any other changes required by RPL.
6.05	Lifecycle Maintenance Costs	The risk that life cycle maintenance costs are higher than projected. This includes the risk that the components or assets identified for lifecycle maintenance would require higher renewal costs or sooner than estimated or fail early.

5.4 Risk quantification methodology

Risk quantification occurs once the risk identification, description, and allocation activities have been completed to a sufficient degree. Selected risks are quantified to ensure there is sufficient money in the all-in project budget to successfully deliver the project. The risk adjustment included in the project budget must account for both transferred risks (which the private party will include in its bid) and retained risks.

Risk quantification is a time consuming exercise and should focus on the most material risks to the project. Typically, only 10 – 30 of the potentially hundreds of risks are quantified. In some cases a single quantified risk can capture the potential impact of multiple risks. While risks are quantified individually, the total quantified risk values should be viewed from a portfolio perspective. It is expected that some risks will come to pass, some will not and, of those that do occur, the impact may be greater or lower than expected. The expectation is that, by quantifying the key material risks, the project team will have a sufficient reserve in place to adequately address risk events within the Project budget.

Several factors are considered in determining which risks to quantify. These may include:

- Materiality - If the risk were to materialize, would it have a significant impact (financial, schedule, public perception, program delivery)?
- Estimable – Can the risk impact be reasonably and accurately estimated?
- Risk Ranking - How high is the risk ranking (low/medium/high/extreme)?

The decision on which risks to quantify involves examining past precedent projects, as well as considering unique project-specific risks that warrant further attention.

All risks are quantified using a triangular distribution which involves inputting three key variables: best case, expected case, and worst case. Using a triangular distribution is often regarded as a good proxy for a normal distribution but is much more straightforward in terms of obtaining the appropriate inputs.

5.4.1 Risk quantification and the project contingency

The contingency is a critically important item in the project budget and should not be removed and replaced with the quantified risk amount.

In traditional cost estimating, large contingencies are often added to the expected cost, reflecting the fact that unforeseen circumstances may arise that could result in additional costs or delays. These contingencies represent an initial estimate, based on the cost consultant's experience, of the expected additional costs that may be attributed to risks or costs that are unknown at the time of the estimate.

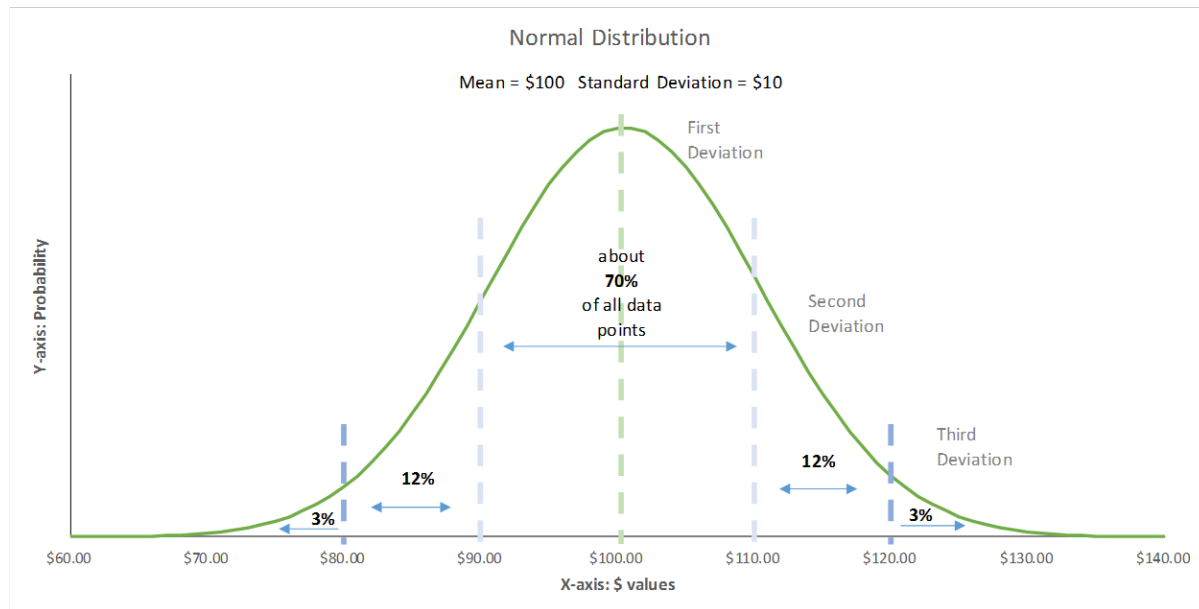
Contingencies are not dealt with consistently across all cost consultants estimates. The cost consultant examines how developed the project planning is and bases the contingency on previous experience. When the cost consultant creates the contingency for the project's indicative design/reference concept estimate, the cost consultant assumes the contingency will be spent, which means the contingency cannot be regarded as a substitute for risk costing. A project team should review the contingency with the cost consultant to confirm costs are not being double counted. For this Project the cost consultant has confirmed that the contingency is intended to be spent by the contractor and would be included in its construction price.

5.4.2 Monte Carlo analysis and risk distributions

The expected value of each quantified risk is calculated based on the assumed distribution, estimated probabilities, and scenario outcomes for each risk. In order to quantify the overall risks and develop aggregated distributions, Deloitte makes use of statistical software, called @Risk, to perform a Monte Carlo analysis. Monte Carlo analysis provides a means of evaluating the effect of uncertainty using a large number of scenarios. It is a tool used to estimate the total variation of project risk resulting from the individual quantified risks. The Monte Carlo analysis takes the assumptions for each risk, aggregates them, and then runs thousands of simulations to produce a distribution of the total value of quantified risks.

The Monte Carlo analysis produces distributions that often approximate a normal distribution curve, also known as a bell curve, as illustrated in the figure below.

Figure 1: Example of normal distribution curve



To help understand the distribution, the mean of \$100 refers to the average data point and the standard deviation of \$10 refers to the amount of variability. Generally most risks are expected to fall close to the mean as illustrated by the green dashed line. Approximately 70 per cent of the risk outcomes are expected to fall between \$90 and \$110. If one refers to the three per cent indicated by the dotted blue line at \$120 on the x-axis on the far right (also referred to as the 97th percentile), one can say that there is an estimated 97 per cent chance that the risk values will be at or below \$120. This is equivalent to saying there is an estimated three per cent chance that the risk values will exceed \$120.

When developing the project budget, the percentile point that is selected on the risk distribution curve will depend on the level and quality of information available, as well as the project team’s level of risk aversion.

5.5 Incorporating risk into the financial model

The results of the Monte Carlo simulation are separated into capital, operating and maintenance risks, depending in which phase of the Project they are expected to occur. The risks are then inserted into the financial model for each of the options.

The financial model accounts for the capital risks by adding the value of the capital risks, as determined by the Monte Carlo simulation, to the nominal value of the construction costs, determined by the financial model.

The operational risks are accounted for by distributing the total value of the operational risk over the entire operational period, whereby in each year, the value of the risk is determined by increasing the previous year’s risk by the long-term inflation assumption. This is done for both retained and transferred risks, and the totals of these risks then equate to the value determined by the Monte Carlo simulation.

5.6 Risk results

The results of the risk quantification are shown in the table below, the total risk value under option 1 is \$5.8 million while under option 2 and option 3 the total risk value is \$9.8 million and \$8.0 million respectively.

Table 5: Risk cost summary (mean \$ thousands)

	Option 1	Option 2	Option3
Capital risks	3,607.26	6,861.40	5,669.67
Lifecycle maintenance risks	530.43	722.23	611.42
Operating risks	1,749.47	1,804.74	1,291.05
Total	5,887.16	9,388.37	7,572.14

The results of the risk quantification are similar for each of the options; there are a number of reasons for this including:

- The impact of each of the risks quantified by the risk simulations is often similar for all three of the options;
- The probability of each of the risks actually occurring is often comparable for each of the options; and
- No construction or operational efficiencies have been taken into account and therefore the quantum for each of the options are close.

5.7 Individual risk cost estimates

The individual risk cost estimates for each of the options can be found in Appendix C, D & E – Risk matrix of this report.

5.8 Unquantified risks

In addition to the risks quantified in the section above, the Project team identified the risk that the longer it takes to make a decision regarding which of the options to pursue, the less feasible option 2 and option 3 become.

Over the last few years RPL has resisted investing significant sums of money to improve or perform maintenance on the current library unless it is absolutely necessary, however as time passes the current library is going to require significant sums of money to be spend in order to keep the facility functional and available to the general public. As more money is invested into the current library a point is going to be reached where the amount invested into the current library is so significant, that it makes no sense to pursue any of the other options presented in this business case.

6. Financial analysis

6.1 Introduction

This section outlines the cost estimates, schedules, risk quantification, and financial modelling undertaken to estimate the NPV for each of the three options under consideration. The methodology applied in calculating the NPV is consistent with generally accepted principles applied to capital budgeting.

6.2 Methodology

The NPV comparison is the best way to illustrate the total value of the different options as it takes into account the amount and timing of all the relevant cash flows for each of the option. The financial analysis outlined in this section consists of the following steps.

- Identify the schedules that drive the timing of costs for each of the three options;
- Establish cost estimates for each of the options;
- Estimate the risks, taking into account the differences in risk probability and impacts that result from different risk allocations in each of the options; and
- Using cash flow methods that encompass the planning, design, construction, and operation of the facility, calculate the NPV of the risk-adjusted cost estimate for each of the options.

6.3 Modelling assumptions

6.3.1 Project schedule

The Project schedule for each of the options is shown in Table 6 below. It is important to note that at this early stage of the Project the dates are still indicative and the Project schedule is likely to be refined to reflect a more accurate schedule as the Project develops.

Table 6: Project schedule

	Option 1	Option 2	Option 3
Project planning start date	1 st January 2018	1 st January 2018	1 st January 2018
Construction/renovation start date	1 st January 2020	1 st January 2020	1 st January 2020
Construction length	24 months	48 months	36 months
Renovation length	<i>24 month period for renovation included in the construction length above</i>	<i>24 month period for renovation included in the construction length above</i>	<i>No renovation required by option</i>
Operations start date	1 st January 2022	1 st January 2024	1 st January 2023

1st January 2018 has been selected as the NPV date, as this is considered to be the earliest date at which a decision will have been made regarding which option to pursue.

6.3.2 Project operating term

A 30-year operating period has been selected for each of the Project’s options and commences at the end of the construction phase of the Project (substantial completion). The length of the operating period is in line with other projects similar in nature, where their operating terms typically range between 25 and 30 years.

6.3.3 Project administration fees

The costs relating to managing and administering the Project have been estimated as a percentage of the total construction costs together with the Project contingencies and include the following:

- Project management fees – 1.50% of total construction and contingency costs;
- Legal & accounting fees – 2.00% of total construction and contingency costs;
- Warranty & insurance fees - 1.00% of total construction and contingency costs; and
- Permit fees - 1.00% of total construction and contingency costs.

A breakdown of the Project administration fees is shown in Table 7 below.

Table 7: Project administration fees (\$ thousands)

	Option 1	Option 2	Option 3
Project management fee	\$469	\$1,063	\$1,160
Legal & accounting fees	\$625	\$1,417	\$1,547
Warranty & insurance fees	\$313	\$709	\$773
Permits	\$313	\$709	\$773
Total	\$1,720	\$3,898	\$4,253

The Project management fees and Legal & accounting fees are recognised evenly over both the Project planning and construction periods, while the warranty & insurance fees and the permit costs are recognised over the construction period.

6.3.4 Site costs

Option 3 is the only option which may require the purchase of a new land parcel on which the library will be built. At this stage of the Project no land site has been identified and it has been decided by RPL that the cost of land should not be included as part of the financial analysis as such cost will be potentially be offset by the sale of the existing Central Library site. The costs associated with preparing the site for construction are shown below. The site planning fees is based on 0.5% of the options construction and contingency costs.

Table 8: Site servicing costs (\$ thousands)

	Option 1	Option 2	Option 3
Site servicing costs	\$350	\$750	\$750
Site planning fees	\$156	\$388	\$420
Total	\$506	\$1,138	\$1,170

6.3.5 Design and soft costs

The design and soft cost estimates are the cost consultant’s best approximation of the costs to perform any specialist studies required by the new library, design consultants fees and the expected cost to commission the new library including LEED documentation. These costs will be refined at a later stage of the Project.

With the exception of the LEED documentation cost, each of the costs shown in Table 9 are based on a percentage of the option’s construction and contingency costs (shown in the sections that follow). These percentages used to calculate the costs are as follows:

- Prime consulting fee:
 - Option 1 – 12% of total construction and contingency costs;
 - Option 2 – 11% of total construction and contingency costs; and
 - Option 3 – 10% of total construction contingency costs.
- Commissioning fees are calculated as 0.5% of the total construction costs for all three of the options;
- Disbursements are calculated as 2% of the total construction and contingency costs for all three of the options; and
- Specialist studies are calculated as 1% of the total construction and contingency costs for all three of the options.

Table 9: Project design and soft costs (\$ thousands)

	Option 1	Option 2	Option 3
Prime consulting fees	\$3,751	\$7,796	\$7,733
Commissioning fees	\$156	\$354	\$387
Disbursements	\$625	\$1,417	\$1,546
Specialist studies	\$313	\$709	\$773
LEED documentation	\$300	\$300	\$300
Total	\$5,145	\$10,576	\$10,739

6.4.6 Construction costs

Each of the three options under consideration by RPL have unique construction or renovation requirements; the costs associated with these requirements are presented below. Option 1 only involves the renovation of the current facility, and as expected has the lowest construction costs of \$26.6 million, option 2 includes renovating the current facility and increasing the capacity by approximately 78,140 square feet to a total capacity of 150,000 square feet. Included in the costing is an allowance for both structural and mechanical enhancements to the existing building to allow for additional floors to be erected on top on the existing library.

Option 3 is the construction of a new library with a total capacity of 150,000 square feet, although this option is the most expensive at \$ 68.7 million, it is \$7.1 million more than option 2 and represents a completely new library.

It is important to note that at this early stage of the Project an indicative design has not been developed for any of the three options and that the costing is based on a combination of the work performed by Tech-Cost consultants Ltd in 2012 and the 2015 BTY Regina Public Library Modernization report and updating the costing estimates to reflect current pricing.

Option 1 renovation cost estimates are shown in the table below, the costing only includes the cost to renovate the current facility.

Table 10: Option 1 renovation costs

	Size (Square feet thousands)	\$ per Square Foot	Total (thousands)
Renovation costs			
Architectural	71.860	\$172.43	\$12,391
Structural	71.860	\$22.48	\$1,615
Mechanical	71.860	\$73.39	\$5,274
Electrical	71.860	\$36.70	\$2,637
Site	71.860	\$5.81	\$418
General requirements	71.860	\$31.74	\$2,281
Allowances	71.860	\$23.01	\$1,653
Abatement	71.860	\$4.65	\$334
Total			\$26,603

Table 11 below presents the renovation and construction costs required to modernize and expand the current library building (option 2).

Table 11: Option 2 renovation and expansion costs

	Size (Square feet thousands)	\$ per Square Foot	Total (thousands)
Renovation costs			
Architectural	71.860	\$172.43	\$12,391
Structural	71.860	\$22.48	\$1,615
Mechanical	71.860	\$73.39	\$5,274
Electrical	71.860	\$36.70	\$2,637
Site	71.860	\$5.81	\$418
General requirements	71.860	\$31.74	\$2,281
Allowances	71.860	\$23.01	\$1,653
Abatement	71.860	\$4.65	\$334
Total renovation costs			\$26,603
Expansion costs			
Architectural	78.140	\$165.51	\$12,933
Structural	78.140	\$95.69	\$7,477
Mechanical	78.140	\$73.39	\$5,735
Electrical	78.140	\$36.70	\$2,868
Site	78.140	\$11.61	\$907
General requirements	78.140	\$42.33	\$3,308

Allowances	78.140	\$23.01	\$1,798
Total expansion costs			\$35,026
Total renovation and expansion costs			\$61,629

The costs to build a new library is, as expected, the most expensive at approximately \$68.7 million and is shown in the table below.

Table 12: Option 3 construction costs

	Size (Square feet thousands)	\$ per Square Foot	Total (thousands)
Construction costs			
Demolition costs	71.860	\$16.26	\$1,168
Architectural	150.00	\$165.51	\$24,826
Structural	150.00	\$95.69	\$14,353
Mechanical	150.00	\$73.39	\$11,008
Electrical	150.00	\$36.70	\$5,505
Site	150.00	\$11.61	\$1,741
General requirements	150.00	\$42.33	\$6,349
Allowances	150.00	\$23.01	\$3,451
Abatement	150.00	\$2.23	\$334
Total			\$68,738

In addition to the costs shown above, each of the options will develop a new parking area at a total costs of \$10 million.

Should RPL choose to build a new building on a site different than the current site of the Central Library, the demolition costs shown above (\$1,168,300) would be removed, however the cost of land for such alternate location would need to be considered as part of the project cost.

6.4.7 Contingencies

A number of contingencies have been provided for this Project including; a design contingency which allow for changes required to the design of the library (discovered before or during construction); and a construction contingency allowing for changes required during the construction of the library including change orders. The contingencies are calculated as a percentage of the option’s construction costs as shown below:

- Design contingency – 7.5% of total construction costs (for all three options);
- Construction contingency
 - Option 1 – 10% of total construction costs;
 - Option 2 – 7.5% of total construction costs; and
 - Option 3 – 5% of total construction costs.

Table 13 below provides a breakdown of the contingencies for each of the options in 2017 dollars.

Table 13: Project contingencies (\$ thousands)

	Option 1	Option 2	Option3
Design contingency	\$1,995	\$4,622	\$5,155
Construction contingency	\$2,660	\$4,622	\$3,436
Total	\$4,655	\$9,244	\$8,591

6.4.8 Temporary accommodation

Each of the options is required to undergo either renovation or construction work to the current library. As such, temporary accommodation space will be required during these works.

The cost consultant has estimated that the renovation work required on option 1 can be completed over a two year period. Under this scenario RPL will be required to lease approximately 71,860 square feet as temporary accommodation for a two year period at \$40 per a square foot per annum.

Option 2 requires a much longer renovation and construction period, it is envisaged that the renovation and construction work can be phased over a four year period. Under this scenario RPL will be required to lease approximately 71,860 square feet as temporary accommodation for a four year period at \$40 per a square foot per annum.

Table 14: Temporary accommodation (\$ thousands)

Basis	Option 1	Option 2	Option 3
Temporary leases	\$5,749	\$11,498	\$8,623

For the purpose of this financial analysis it has been assumed that option 3 will require temporary accommodation for a period of three years at \$40 dollars per square foot per annum.

6.4.9 Other costs

The Project’s cost consultants have estimated that RPL will incur the following additional costs shown in Table 15 below in order to prepare the library for use by the general public. These costs are based on a percentage of the option’s construction and contingency costs and may be developed further as the Project progresses.

Table 15: Other Project costs (\$ thousands)

	Basis	Option 1	Option 2	Option 3
Furniture & Fixtures	5% of construction and contingency costs	\$1,563	\$3,544	\$3,867
Equipment	5% of construction and contingency costs	\$1,563	\$3,544	\$3,867
IT	3% of construction and contingency costs	\$938	\$2,126	\$2,320
Decanting		\$1,000	\$1,000	\$1,000
Total		\$5,064	\$10,214	\$11,054

6.4.10 Private financing and contribution payment assumptions

No private financing or contributions payments (either milestone payments/ progress payments or substantial completion payments) have been considered for any of the options under this financial analysis. As the

Project is developed further these assumptions will be reviewed, and if necessary, considered as part of a refined financial analysis for the Project.

6.4.11 Economic assumptions

Table 16 below shows the economic assumptions that have been considered for this financial analysis and is applicable to all of the options under consideration.

Table 16: Economic assumptions

	Economic assumption
Discount rate	3.559% ²
Construction inflation rate	2% per annum
Operational inflation rate	2% per annum
PST	6%
GST	Not considered as the GST paid by the Library is refunded back to them.

6.4.12 Lifecycle maintenance costs

The estimates for the lifecycle costs are based on the work performed by Tech-Cost consultants Ltd for the 2012 business case prepared for RPL by Deloitte and Tech-Cost consultants Ltd. The following assumptions have been made in determining the lifecycle costs for each of the options.

Option 1: Renovation of current library

Lifecycle maintenance cost will be incurred within the same operational year as estimated by TCCL in the 2012 business case. The lifecycle maintenance cost estimates in 2012 for a new library build have been adjusted by inflation (2% per annum) and then proportioned to the size of the building to get to the cost estimates used for this report.

In developing the capital costings for option 1, TCCL envisaged replacing all the existing mechanical and electrical elements of the current library, and therefore no “inefficiency factors” relating to the lifecycle maintenance costs for the current library have been allowed. A lifecycle maintenance cost sensitivity has been performed in order to determine what the potential impact an increase or decrease in the lifecycle maintenance costs could have on option 1’s overall NPV.

Option 2: Renovation and expansion of current library

Lifecycle maintenance cost will be incurred within the same operational year as estimated by TCCL in the 2012 business case. The lifecycle maintenance cost estimates in 2012 for a new library build have been adjusted by inflation (2% per annum) and then proportioned to the size of the building to get to the cost estimates used for this report.

In developing the capital costings for option 2, TCCL envisaged replacing all the existing mechanical and electrical elements of the current library, and therefore no “inefficiency factors” relating to the lifecycle maintenance costs for the current library have been allowed. A lifecycle maintenance cost sensitivity has been performed in order to determine what the potential impact an increase or decrease in the lifecycle maintenance costs could have on option 2’s overall NPV.

² This is a combination of British Columbia’s (3.68%) and Alberta’s (3.438%) 30 year borrowing weight as at 17th March 2017. The Province of Saskatchewan’s has a similar credit rating of AA+

Option 3: New library

Lifecycle maintenance cost will be incurred within the same operational year as estimated by TCCL in the 2012 business case. The lifecycle maintenance cost estimates in 2012 have been adjusted by inflation (2% per annum) to get to the cost estimates used for this report.

Table 17: Lifecycle maintenance costs (\$ thousands)

	Option 1	Option 2	Option 3
Year 5	\$194.64	\$406.28	\$406.28
Year 8	\$9.73	\$20.31	\$20.31
Year 10	\$875.86	\$1,828.26	\$1,828.26
Year 15	\$681.22	\$1,421.98	\$1,421.98
Year 16	\$9.73	\$20.31	\$20.31
Year 20	\$1,849.04	\$3,859.67	\$3,859.67
Year 24	\$9.73	\$20.31	\$20.31
Year 25	\$4,719.91	\$9,852.31	\$9,852.31
Year 29	\$7,444.81	\$15,540.24	\$15,540.24
Total	\$15,794.67	\$32,969.68	\$32,969.68

6.4.13 Building operating costs

The operating cost estimates for each of the three options are based on either the actual library operating costs for 2017 as provided by RPL, or based on the work performed by TCCL for the 2012 business case prepared by Deloitte.

Option 1: Renovation of the current library

The operating cost estimates for this option are based on the current operating costs of the library (in 2016 terms) adjusted for inflation (2% per annum).

Option 2: Renovation and expansion of current library

The operating cost estimates for this option are based on the current operating costs of the library (in 2016 terms) adjusted for inflation (2% per annum) and then adding a premium to these costs to reflect a larger building size as well as any inefficiencies that may arise as a result of the expansion to the current building. The following premiums have been added to the building operating costs:

- Administration costs – 15%
- Wages, benefits and Honoraria – 35%
- Building services costs – 45%.

Option 3: New library

The operating cost estimates for this option are based on the current operating costs of the library (in 2016 terms) adjusted for inflation (2% per annum) and then adding a premium to these costs to reflect a larger building size. The following premiums have been added to the building operating costs:

- Administration costs – 15%
- Wages, benefits and Honoraria – 25%
- Building services costs – 30%.

Table 18: Operating costs (\$ thousands)

Description	Option 1	Option 2	Option 3
Administration costs	\$23.04	\$26.49	\$26.49
Wages, benefits and honoraria	\$660.4	\$891.59	\$825.55
Building services costs	\$900.35	\$1,305.51	\$1,170.46
Total	\$1,583.79	\$2,223.59	\$2,022.50

6.5 Results

The results of the modelling work undertaken are summarized in Table 19. The table is a net present value as at 1 April 2017 using the assumed discount rate of 3.559% for this analysis.

The NPV comparison is the best way to illustrate the total value of the different options as it takes into account the amount and timing of all the relevant cash flows for each option.

Table 19: Net Present Value of each of the options (\$ thousands)

	Option 1	Option 2	Option 3
NPV of capital costs			
NPV of the capital costs	60,397.61	118,741.49	124,244.78
NPV of lifecycle maintenance costs			
NPV of lifecycle costs	10,197.79	20,650.72	20,966.35
NPV of operational costs			
NPV of operating costs	35,478.16	48,320.74	44,622.48
NPV of Project risks			
NPV of capital risks	3,194.07	6,076.85	4,931.45
NPV of lifecycle maintenance risks	280.66	356.33	312.39
NPV of operational risks	925.68	890.41	659.64
Total NPV	110,473.97	195,036.54	195,737.09

As expected, option 1 represents the least expensive option to RPL, with option 2 and option 3 having similar values, which are however approaching almost double the cost of option 1 but also providing double the finished square footage of option 1. In making a decision with which option to move forward, RPL should consider both the qualitative and quantitative analysis contained in this report.

Construction costs nominal values

The construction cost nominal values are shown in the table below. The construction costs shown in the section above have been increased by inflation (2% per annum) over the entire construction period.

Table 20: Nominal construction costs (\$ thousands)

	Option 1	Option 2	Option 3
Total construction costs	67,849.00	136,778.64	141,732.62

6.6 Sensitivity analysis

6.6.1 Lifecycle maintenance efficiency

The lifecycle maintenance costs for option 1 and option 2 are based on the lifecycle maintenance costs for a new building, however option 1 is the renovation of existing library and option 2 consists of a combination of renovation of the existing library and a new build (78,140 square feet). In order to understand the impact on the NPV of option 1 and option 2 if the lifecycle maintenance costs are more or less expensive than anticipated, a number of sensitivities have been performed. No adjustments have been made to the lifecycle maintenance costs for option 3 and has been provided for comparison purposes only.

Table 21: Lifecycle maintenance costs sensitivity (\$ thousands)

	Option 1	Option 2	Option 3
Lifecycle maintenance costs + 10%	111,493.75	197,101.61	195,737.09
Lifecycle maintenance costs + 5%	110,983.87	196,069.08	195,737.09
Base case - NPV	110,473.97	195,036.54	195,737.09
Lifecycle maintenance costs - 5%	109,964.09	194,004.00	195,737.09
Lifecycle maintenance costs - 10%	109,454.20	192,971.47	195,737.09

Based on the current inputs into the financial model it is clear that neither option 1 nor option 2 is sensitive to a change in the lifecycle maintenance costs, this may be due to the fact that the majority of the lifecycle maintenance costs are heavily weighted towards the end of the 30 year operating period.

6.6.2 Operating cost efficiency

The operational costs for option two is the proration of option 1 and option 3 operational costs and is based on the size of the renovation and the size of the new construction for option 2. In order to understand the impact a change in operational costs would have on the NPV of option 2, a number of sensitivities have been performed. No adjustments have been made to the operational costs for option 1 and option 3, they are provided for comparison purposes only.

Table 22: Operational costs sensitivity (\$ thousands)

	Option 1	Option 2	Option 3
Operating costs + 10%	110,473.97	199,868.61	195,737.09
Operating costs + 5%	110,473.97	197,452.58	195,737.09
Base case – NPV	110,473.97	195,036.54	195,737.09
Operating costs - 5%	110,473.97	192,620.50	195,737.09
Operating costs - 10%	110,473.97	190,204.47	195,737.09

From the sensitivity analysis performed above it is clear that option 2 is somewhat sensitive to the operating costs. A 10% reduction in the operating costs is estimated to reduce the total NPV of the option by 2.5%.

7. Conclusion

Deloitte considered both qualitative and a quantitative factors in assessing each of the three options under consideration. The quantitative analysis shows that option 1 is the least expensive option available to RPL; however, this is to be expected as the gross floor area of the Central Library is not increased under this option. For both option 2 and option 3 the foot print of the Central Library will be increased to 150,000 square feet and this is reflected in the costing. Options 2 and 3 have similar capital costs; however, option 3 represents a completely new building, while option 2 retains the current building and expands by adding new floors on top of the existing Central Library.

The results of the qualitative assessment revealed that option 3 is the option which is likely to provide the community with the most benefits; however, from a financial perspective, this option also represents the most expensive option available to RPL. From the analysis contained in this report it is clear that RPL should consider both the benefit assessment and the quantitative analysis in deciding which option to move forward. RPL should also take into account the potential cost implications of maintaining the existing building until it decides the future course of action for the Central Library.

Appendix A: Project capital costing

Option 1

PROGRAM AREA (m ²)	EXISTING	NEW	LEASE	Total
Existing Library	6,676		6,676	13,352
	0	0	0	0
	0		0	0
TOTAL :	6,676	0	6,676	13,352

CAPITAL COST

A Land				
Land Purchase	0.0 ac	\$1,000,000		\$0
Site Servicing	1.0 sm	\$350,000		\$350,000
Planning			0.5%	\$156,292
A Land Net :				\$506,292

B Project Administration				
Project Management Fees			1.5%	\$468,875
Legal & Accounting Fees			2.0%	\$625,166
Warranty & Insurance Fees			1.0%	\$312,583
Permits			1.0%	\$312,583
B Project Administration Net :				\$1,719,208

C. Construction Costs				
I) Demolition	0.0 m ²	\$175.00		\$0
II) Renovation	6676.0 m ²	\$3,934.92		\$26,269,521
Architectural	\$1,856.0 \$/m ²	\$12,390,656.00		
Structural	\$242.0 \$/m ²	\$1,615,592.00		
Mechanical	\$790.0 \$/m ²	\$5,274,040.00		
Electrical	\$395.0 \$/m ²	\$2,637,020.00		
Site	\$62.5 \$/m ²	\$417,250.00		
General Requirements	\$341.7 \$/m ²	\$2,281,149.81		
Allowances	\$247.7 \$/m ²	\$1,653,812.72		
III) New Construction	0.0 m ²	\$4,824.83		\$0
Architectural	\$1,781.5 \$/m ²	\$0		
Structural	\$1,030.0 \$/m ²	\$0		
Mechanical	\$790.0 \$/m ²	\$0		
Electrical	\$395.0 \$/m ²	\$0		
Site	\$125.0 \$/m ²	\$0		
General Requirements	\$455.6 \$/m ²	\$0		
Allowances	\$247.7 \$/m ²	\$0		
III) Abatement / Remediation	6676.0 al	\$50.00		\$333,800
C Construction Net :				\$26,603,321

PROGRAM AREA (m ²)	EXISTING	NEW	LEASE	Total
Existing Library	6,676		6,676	13,352
	0	0	0	0
	0		0	0
TOTAL :	6,676	0	6,676	13,352

CAPITAL COST

D Contingencies				
Design/Project Contingency		7.5%	\$1,995,000	
Construction Change Order Contingency		10.0%	\$2,660,000	
Escalation Contingency			\$0	
Phasing Premium		0.0%	\$0	
D Contingencies Net :			\$4,655,000	
E Design & Soft Costs				
Prime Consulting Fees		12.0%	\$3,750,998	
Bridging Consulting Fees		0.0%	\$0	
Commissioning		0.5%	\$156,292	
Disbursements		2.0%	\$625,166	
Specialist Studies		1.0%	\$312,583	
LEED Documentation			\$300,000	
E Design & Soft Costs Net :			\$5,145,040	
F Development & Management				
Marketing Fees		0.0%	\$0	
Development & Management Fees		0.0%	\$0	
Financing & Carrying Costs		0.0%	\$0	
F Development & Management Net :			\$0	
G Other Costs				
Furniture		5.0%	\$1,562,916	
Equipment		5.0%	\$1,562,916	
IT		3.0%	\$937,750	
Leased Space - 2 Years	6676.0 m ²	\$430.56	2	\$5,748,837
Decanting / Moving				\$1,000,000
Parking				\$10,000,000
G Other Net :				\$20,812,419
H Taxes				
Net Sub-total :				\$59,441,278
PST		6.0%	\$3,566,477	
GST		0.0%	\$0	
H Taxes Net :				\$3,566,477
CAPITAL COST TOTAL (End Cost)			\$63,007,755	
\$ of GFA (m²)			\$ 4,718.98	

Option 2

PROGRAM AREA (m ²)	EXISTING	NEW	LEASE	Total
Existing Library	6,676		6,676	13,352
Library	0	8,472	0	8,472
	0		0	0
TOTAL :	6,676	8,472	6,676	21,824

CAPITAL COST

A Land

Land Purchase	0.0 ac	\$1,000,000		\$0
Site Servicing	1.0 sm	\$750,000		\$750,000
Planning			0.5%	\$388,006
A Land Net :				\$1,138,006

B Project Administration

Project Management Fees			1.5%	\$1,164,019
Legal & Accounting Fees			2.0%	\$1,552,026
Warranty & Insurance Fees			1.0%	\$776,013
Permits			1.0%	\$776,013
B Project Administration Net :				\$4,268,071

C. Construction Costs

I) Demolition		0.0 m ²	\$175.00		\$0
II) Renovation		6676.0 m ²	\$3,934.92		\$26,269,521
	Architectural	\$1,856.0 \$/m ²	\$12,390,656.00		
	Structural	\$242.0 \$/m ²	\$1,615,592.00		
	Mechanical	\$790.0 \$/m ²	\$5,274,040.00		
	Electrical	\$395.0 \$/m ²	\$2,637,020.00		
	Site	\$62.5 \$/m ²	\$417,250.00		
	General Requirements	\$341.7 \$/m ²	\$2,281,149.81		
	Allowances	\$247.7 \$/m ²	\$1,653,812.72		
III) New Construction		8472.0 m ²	\$4,824.83		\$40,875,974
	Architectural	\$1,781.5 \$/m ²	\$15,092,991		
	Structural	\$1,030.0 \$/m ²	\$8,726,160		
	Mechanical	\$790.0 \$/m ²	\$6,692,880		
	Electrical	\$395.0 \$/m ²	\$3,346,440		
	Site	\$125.0 \$/m ²	\$1,059,000		
	General Requirements	\$455.6 \$/m ²	\$3,859,777		
	Allowances	\$247.7 \$/m ²	\$2,098,727		
III) Abatement / Remediation		6676.0 al	\$50.00		\$333,800
C Construction Net :				\$67,479,295	



Option 2 - Renovate existing Library and Expansion

PROGRAM AREA (m ²)	EXISTING	NEW	LEASE	Total
Existing Library	6,676		6,676	13,352
Library	0	8,472	0	8,472
	0		0	0
TOTAL :	6,676	8,472	6,676	21,824

CAPITAL COST

D Contingencies

Design/Project Contingency	7.5%	\$5,061,000
Construction Change Order Contingency	7.5%	\$5,061,000
Escalation Contingency		\$0
Phasing Premium	0.0%	\$0
D Contingencies Net :		\$10,122,000

E Design & Soft Costs

Prime Consulting Fees	11.0%	\$8,536,142
Bridging Consulting Fees	0.0%	\$0
Commissioning	0.5%	\$388,006
Disbursements	2.0%	\$1,552,026
Specialist Studies	1.0%	\$776,013
LEED Documentation		\$300,000
E Design & Soft Costs Net :		\$11,552,188

F Development & Management

Marketing Fees	0.0%	\$0
Development & Management Fees	0.0%	\$0
Financing & Carrying Costs	0.0%	\$0
F Development & Management Net :		\$0

G Other Costs

Furniture	5.0%	\$3,880,065		
Equipment	5.0%	\$3,880,065		
IT	3.0%	\$2,328,039		
Leased Space - 4 Years	6676.0 m ²	\$430.56	4	\$11,497,674
Decanting / Moving				\$1,000,000
Parking				\$10,000,000
G Other Net :				\$32,585,843

H Taxes

Net Sub-total :		\$127,145,403
PST	6.0%	\$7,628,724
GST	0.0%	\$0
H Taxes Net :		\$7,628,724

CAPITAL COST TOTAL (End Cost) \$134,774,127

\$ of GFA (m²) \$ 6,175.50



Option 3

PROGRAM AREA (m ²)	EXISTING	NEW	LEASE	Total
Existing Library	6,676		3,338	
Library	0	15,148	0	15,148
	0		0	0
TOTAL :	6,676	15,148	3,338	15,148

CAPITAL COST

A Land

Land Purchase	0.0 ac	\$0	\$0
Site Servicing	1.0 sm	\$750,000	\$750,000
Planning			0.5% \$419,558
A Land Net :			\$1,169,558

B Project Administration

Project Management Fees	1.5%	\$1,258,675
Legal & Accounting Fees	2.0%	\$1,678,233
Warranty & Insurance Fees	1.0%	\$839,117
Permits	1.0%	\$839,117
B Project Administration Net :		\$4,615,141

C. Construction Costs

i) Demolition	6676.0 m ²	\$175.00	\$1,168,300
ii) Renovation			\$0
Architectural	\$1,856.0 \$/m ²	\$0.00	
Structural	\$242.0 \$/m ²	\$0.00	
Mechanical	\$790.0 \$/m ²	\$0.00	
Electrical	\$395.0 \$/m ²	\$0.00	
Site	\$62.5 \$/m ²	\$0.00	
General Requirements	\$341.7 \$/m ²	\$0.00	
Allowances	\$247.7 \$/m ²	\$0.00	
iii) New Construction	15148.0 m ²	\$4,824.83	\$73,086,550
Architectural	\$1,781.5 \$/m ²	\$26,986,381	
Structural	\$1,030.0 \$/m ²	\$15,602,440	
Mechanical	\$790.0 \$/m ²	\$11,966,920	
Electrical	\$395.0 \$/m ²	\$5,983,460	
Site	\$125.0 \$/m ²	\$1,893,500	
General Requirements	\$455.6 \$/m ²	\$6,901,310	
Allowances	\$247.7 \$/m ²	\$3,752,540	
iii) Abatement / Remediation	6676.0 al	\$50.00	\$333,800
C Construction Net :			\$74,588,650



PROGRAM AREA (m²)	EXISTING	NEW	LEASE	Total
Existing Library	6,676		3,338	
Library	0	15,148	0	15,148
	0		0	0
TOTAL :	6,676	15,148	3,338	15,148

CAPITAL COST	
D Contingencies	
Design/Project Contingency	7.5% \$5,594,000
Construction Change Order Contingency	5.0% \$3,729,000
Escalation Contingency	0.0% \$0
Phasing Premium	0.0% \$0
D Contingencies Net :	\$9,323,000
E Design & Soft Costs	
Prime Consulting Fees	10.0% \$8,391,165
Bridging Consulting Fees	0.0% \$0
Commissioning	0.5% \$419,558
Disbursements	2.0% \$1,678,233
Specialist Studies	1.0% \$839,117
LEED Documentation	\$300,000
E Design & Soft Costs Net :	\$11,628,073
F Development & Management	
Marketing Fees	0.0% \$0
Development & Management Fees	0.0% \$0
Financing & Carrying Costs	0.0% \$0
F Development & Management Net :	\$0
G Other Costs	
Furniture	5.0% \$4,195,583
Equipment	5.0% \$4,195,583
IT	3.0% \$2,517,350
Leased Space - 3 Years	3338.0 m² \$430.56 3 \$4,311,628
Decanting / Moving	\$1,000,000
Parking	\$10,000,000
G Other Net :	\$26,220,142
H Taxes	
Net Sub-total :	\$127,544,565
PST	6.0% \$7,652,674
GST	0.0% \$0
H Taxes Net :	\$7,652,674
CAPITAL COST TOTAL (End Cost)	
	\$135,197,239
\$ of GFA (m²)	\$ 8,925.09



Appendix B – Project lifecycle maintenance and operating costs

Project lifecycle costs

The project lifecycle maintenance costs applied in the financial analysis has been based on the DBB’s major maintenance cost estimates as applied in the 2012 RPL Central Library Procurement Model Business Case.

Figure 2: Project lifecycle maintenance costs

	DBB	DBFM		DBB	DBFM
Year 1	-	-	Year 16	0.02	0.02
Year 2	-	-	Year 17	-	-
Year 3	-	-	Year 18	-	-
Year 4	-	-	Year 19	-	-
Year 5	0.4	0.4	Year 20	3.8	3.0
Year 6	-	-	Year 21	-	-
Year 7	-	-	Year 22	-	-
Year 8	0.02	0.02	Year 23	-	-
Year 9	-	-	Year 24	0.02	0.02
Year 10	1.8	1.4	Year 25	9.7	8.7
Year 11	-	-	Year 26	-	-
Year 12	-	-	Year 27	-	-
Year 13	-	-	Year 28	-	-
Year 14	-	-	Year 29	15.3	13.0
Year 15	1.4	1.0	Year 30	-	-
			TOTAL	32.4	27.6

Building operating costs

The building operating costs have been provided by RPL and are shown in the figure below. For the purpose of this financial analysis the 2016 figures have been used and escalated (at 2% per annum) to arrive at 2017 figures.

Figure 3: Regina Public Library building operating costs

Regina Public Library							
				Corporate Services		Dept: 11 to 11	
				Physical Plant		Unit: 20 to 20	
						Project: to ZZZ	
Revenue and Expense Statement							
2014-2016							
				Actual	Actual	Actual	
				2016	2015	2014	
Expenses:							
Operating Expenses:							
Wages, Benefits and Honoraria:							
5000			Salaries Full Time PP	535,877	553,568	514,168	
5030			Benefits Full Time PP	111,611	111,406	100,326	
				647,488	664,974	614,494	
Administration Costs:							
5120			Postage Shipping Deliv. Cour. PP	6	4	467	
5130			Telephone PP	5,985	4,680	5,936	
5140			Supplies Office PP	644	179	1,703	
5180			Meeting Costs PP	71	-	-	
5190			Transportation Local PP	1,077	515	563	
5205			Interest Finance Charges PP	29	1	-	
5210			Insurance PP	10,984	10,601	10,207	
5235			Consulting Fees PP	3,253	14,823	79,470	
5237			Temporary Employment Services PP	360	-	-	
5270			Memberships PP	175	600	131	
5275			Sundry PP	-	128	-	
				22,584	31,531	98,477	
Client Services:							
5365			Supplies Operating	4,024	11,142	8,892	
5403			Maintenance Equipment PP and Auto	23,133	33,621	29,781	
5417			Rental Equipment PP	1,008	1,607	2,380	
				28,165	46,370	41,053	
Building Costs:							
5500	01		Utility Electricity CE	168,673	166,063	152,593	
5500	02		Utility Gas CE	58,322	51,456	109,097	
5500	03		Utility Water CE	22,959	24,220	20,956	
5530	01		Service Contracts Cleaning CE	84,817	89,720	92,873	
5530	02		Service Contracts CE	59,841	54,355	51,392	
5600			Repair & Maintenance CE	80,024	90,929	125,349	
5602			Repair & Maintenance Major Proj. CE	229,660	33,317	37,888	
5640			Maintenance Grounds CE	7,154	7,402	12,626	
5650			Security CE	76,336	84,217	85,979	
5660			Supplies CE	64,707	61,038	55,654	
5680			Taxes and Licenses CE	2,041	1,821	1,801	
				854,534	664,538	746,208	
Total Expenses:				1,552,771	1,407,413	1,500,232	

Appendix C: Risk matrix - option 1

Risk Matrix Inputs - Regina Public Library				Option 1									
#	Risk	Description	Value	Impact			Probability	Impact			Total	Rank	
				Min	ML	Max	(%)	Min	ML	Max			
1.00	Environmental Assessment Approvals (Incl related)												
#	Risk	Description											
1.01	Delay in Approvals	The risk that approvals and related operating permits are delayed, or are awarded based on conditions being imposed on RPL which impact the project schedule, delaying the time to reach financial close. Delaying the process could result in costs to RPL (e.g. construction price inflation during the period of delay).	Construction escalation	\$2,919,149	0%	3%	5%	70%	\$0	\$72,979	\$145,957	\$51,085	12
2.00	Property Acquisition, Approvals and Site Condition												
#	Risk	Description											
2.01	Utility Relocations and Upgrades or Modifications	The risks associated with utility relocations and upgrades or modifications at the site, including cost increases as well as unforeseen utility relocations, e.g. the utility did not appear on subsurface maps.	Site servicing	\$361,459	0%	25%	50%	15%	\$0	\$90,365	\$180,730	\$13,555	20
2.02	Pre-Existing Environmental Conditions on Site	The risk of pre-existing (a known unknown) environmental contamination at the site (e.g. asbestos), which requires mitigation and/or remediation and which could delay the works or make them more complex to execute.	Design & Construction costs	\$41,582,787	1%	1%	3%	100%	\$311,871	\$519,785	\$1,039,570	\$643,647	3
2.03	Construction Activity Results in Contamination	The risk that construction activity results in contamination of the site. This could result in temporary closure of the site and delay in commissioning.	Design & Construction costs	\$41,582,787	0%	2%	5%	5%	\$0	\$831,656	\$2,079,139	\$49,820	13
2.04	Unknown On-site restrictions	The risk of any unknown on-site restrictions, such as on-site easement etc. that could cause a delay in the process and/or lead to increased costs (e.g. due to remediation efforts required).	Construction escalation	\$2,919,149	0%	1%	3%	10%	\$0	\$29,191	\$72,979	\$3,497	24
2.05	Approvals & Permits (Other than EA and related Operating Permits)	The risk that the project approvals and expenditure authorities with respect to permits and other authorizations delay the beginning of construction and any eventual operation.	Construction escalation	\$2,919,149	0%	3%	5%	25%	\$0	\$87,574	\$145,957	\$19,002	19
3.00	Design Risks												
#	Risk	Description											
3.01	Stakeholder Consultation	The risk that consultation with stakeholder groups identifies mitigation measures that attempt to revise or impact the design of the facility (external elements) causing delays in the Project.	Construction escalation	\$2,919,149	0%	3%	5%	60%	\$0	\$87,574	\$145,957	\$45,606	15
3.02	Requirements (Discovered Prior to Commissioning)	The risk that the design of the facility fails to deliver services at the required levels of performance, heritage protection, capacity, and quality, caused by a failure to translate performance into the design, leading to additional design and development costs.	Design & Construction costs	\$41,582,787	0%	5%	10%	15%	\$0	\$2,079,139	\$4,158,279	\$311,871	9
3.03	Change in Design Specifications	The risk that changes to the design are required, caused by legislative, regulatory, or policy changes. This can lead to additional design costs.	Design Contingency	\$2,060,317	0%	1%	2%	10%	\$0	\$20,603	\$41,206	\$2,060	26
4.00	Construction risks												
#	Risk	Description											
4.01	Construction Scheduling, Coordination and Management	The risks associated with scheduling, coordinating, and managing construction activities, such as coordinating the work of sub-contractors and the procurement of equipment and materials. Scheduling and co-ordination issues can lead to delay, additional costs (subcontractor claims), or disruption. Contract such as 'Impacts with Inaccurate information from Demolition Stage'	Construction escalation	\$2,919,149	0%	1%	5%	50%	\$0	\$29,191	\$145,957	\$32,047	18
4.02	Cost Estimation Range	Cost estimates as developed have an embedded estimation range. These could increase or decrease costs.	Design & Construction costs	\$41,582,787	0%	5%	10%	25%	\$0	\$2,079,139	\$4,158,279	\$519,785	5
4.03	Condition of the existing building	Unforeseen condition of the existing building, could lead to additional work, increase in cost, and delay the completion of the Project	Design & Construction costs	\$41,582,787	0%	5%	10%	20%	\$0	\$2,079,139	\$4,158,279	\$415,828	7
4.04	Deficiencies (on new construction)	The risk that defects are discovered during the construction of the Project, which may result in increased costs to the construction contractor if it must rectify the defects (alternatively a sub-trade may be required to rectify the work). In any case, defects will result in delay and disruption to the construction schedule.	Design & Construction costs	\$41,582,787	0%	3%	5%	10%	\$0	\$1,247,484	\$2,079,139	\$108,274	10
4.05	Construction Equipment Availability	The risk that special pieces of equipment are not available when required for construction works, resulting in delay and increased costs.	Construction escalation	\$2,919,149	0%	0%	0%	0%	\$0	\$0	\$0	\$0	29
4.06	Construction Contractor Default (or sub)	The risk that the construction contractor defaults and must be replaced, resulting in delay and additional costs.	Temporary accommodation	\$3,149,254	0%	3%	5%	3%	\$0	\$78,731	\$157,463	\$2,362	25
4.07	Scope Changes by RPL – During Construction	The risks associated with RPL changing the performance specifications during the construction period through issuing change orders.	Design & Construction costs	\$41,582,787	0%	2%	4%	60%	\$0	\$831,656	\$1,663,311	\$498,993	6
4.08	Design Coordination Issues	The risk that change orders are requested by the contractor during construction due to design coordination issues, design completion and/or design gaps.	Design & Construction costs	\$41,582,787	0%	3%	5%	80%	\$0	\$1,039,570	\$2,079,139	\$831,656	2
4.09	Inflation Risk	The risk that construction price inflation (including prices of labour, materials, and other cost drivers) will increase at a rate that is greater than that estimated by the construction contractor.	Construction escalation	\$2,919,149	-1%	1%	1%	10%	-\$14,596	\$14,596	\$29,191	\$881	28
4.10	Weather	The risk that weather conditions result in delays to construction and increased costs.	Construction escalation	\$2,919,149	0%	1%	3%	25%	\$0	\$29,191	\$72,979	\$8,744	23
4.11	Utility Coordination	Coordination between RPL and/or the contractor and the utility provider does not happen in a timely fashion resulting in delays and increased costs.	Construction escalation	\$2,919,149	0%	1%	2%	5%	\$0	\$14,596	\$58,383	\$1,310	27
4.12	Commissioning Delays - Deficiencies	The risk that there are delays in the commissioning process due to a poorly defined commissioning process and/or due to RP not appropriately carrying out its role in the commissioning process, which result in a delay in the date of facility commercial operations. Delays will result in additional costs for the contractor.	Temporary accommodation	\$3,149,254	0%	5%	10%	30%	\$0	\$157,463	\$314,925	\$47,239	14
5.00	Operations Risk												
#	Risk	Description											
Operating Costs and Regulatory Compliance													
5.01	Labour Costs	Risk that labour costs for facility operator staff will be higher than anticipated (wages rise faster than anticipated).	Salaries, Benefits & Honoraria	\$29,435,572	-1%	1%	1%	15%	-\$147,178	\$147,178	\$294,356	\$13,320	21
5.02	Input Costs - Other Inputs	Risk that non-labour costs for facility will be higher than anticipated.	Other operating expenses	\$41,155,238	0%	4%	7%	75%	\$0	\$1,646,210	\$2,880,867	\$1,112,407	1
Customer Service													
5.03	User Satisfaction	The risk or inability to meet user expectations and/ or a general lack of attention to specifics of the facility and related service requirements.	Design & Construction costs	\$41,582,787	0%	3%	5%	60%	\$0	\$1,039,570	\$2,079,139	\$623,742	4
6.00	Maintenance Risk												
#	Risk	Description											
Major Capital Repair													
6.01	Lifecycle Maintenance Performance (Maintenance Schedule)	The risk that major capital repair/lifecycle maintenance for the Project is not performed when required. This includes the risks associated with deferred maintenance, and/or scheduled maintenance not performed close to the end of a contractual term. Deferred maintenance can result in reduced asset quality, and/or higher costs of maintenance and capital repair in the future.	Lifecycle costs	\$27,952,586	0%	2%	3%	10%	\$0	\$419,289	\$838,578	\$41,929	16
6.02	Design and Construction Defects - Poor workmanship	The risks associated with design errors, construction deficiencies, or substandard work and materials which emerge during the operations period, as related to the existing structures. Deficiencies which emerge during the operations period cause unexpected problems and result in increased costs in order to rectify or mitigate problems.	Design & Construction costs	\$41,582,787	0%	2%	6%	5%	\$0	\$831,656	\$2,494,967	\$58,077	11
6.03	Unanticipated Maintenance	The risk that unplanned maintenance that affects the life, safety & immediate operation of the Project is required.	Lifecycle costs	\$27,952,586	0%	1%	1%	8%	\$0	\$139,763	\$279,526	\$10,482	22
6.04	Major Reconfiguration and Improvements	The risk of required improvements, expansion, and any other changes required by RPL	Design & Construction costs	\$41,582,787	0%	1%	3%	70%	\$0	\$207,914	\$1,247,484	\$378,015	8
6.05	Lifecycle Maintenance Costs	The risk that life cycle maintenance costs are higher than projected. This includes the risk that the components or assets identified for lifecycle maintenance would require higher renewal costs or sooner than estimated or fail early.	Lifecycle costs	\$27,952,586	0%	1%	2%	15%	\$0	\$279,526	\$559,052	\$41,929	16

Appendix D: Risk matrix - option 2

Risk Matrix Inputs - Regina Public Library				Option 2								
#	Risk	Description	Value	Impact			Probability			Total		
				Min	ML	Max	(%)	Min	ML		Max	
1.00	Environmental Assessment Approvals (Incl related)											
#	Risk	Description										
1.01	Delay in Approvals	The risk that approvals and related operating permits are delayed, or are awarded based on conditions being imposed on RPL which impact the project schedule, delaying the time to reach financial close. Delaying the process could result in costs to RPL (e.g. construction price inflation during the period of delay).	Construction escalation	\$6,861,829	0%	3%	5%	70%	\$0	\$171,546	\$343,091	\$120,082
2.00	Property Acquisition, Approvals and Site Condition											
#	Risk	Description										
2.01	Utility Relocations and Upgrades or Modifications	The risks associated with utility relocations and upgrades or modifications at the site, including cost increases as well as unforeseen utility relocations, e.g. the utility did not appear on subsurface maps.	Site servicing	\$774,555	0%	10%	25%	15%	\$0	\$77,456	\$193,639	\$13,920
2.02	Pre-Existing Environmental Conditions on Site	The risk of pre-existing (a known unknown) environmental contamination at the site (e.g. asbestos), which requires mitigation and/or remediation and which could delay the works or make them more complex to execute.	Design & Construction costs	\$78,490,726	1%	1%	3%	100%	\$588,680	\$981,134	\$1,962,268	\$1,214,933
2.03	Construction Activity Results in Contamination	The risk that construction activity results in contamination of the site. This could result in temporary closure of the site and delay in commissioning.	Design & Construction costs	\$78,490,726	0%	2%	5%	5%	\$0	\$1,569,815	\$3,924,536	\$94,039
2.04	Unknown On-site restrictions	The risk of any unknown on-site restrictions, such as on-site easement etc. that could cause a delay in the process and/or lead to increased costs (e.g. due to remediation efforts required).	Construction escalation	\$6,861,829	0%	1%	3%	10%	\$0	\$68,618	\$171,546	\$8,221
2.05	Approvals & Permits (Other than EA and related Operating Permits)	The risk that the project approvals and expenditure authorities with respect to permits and other authorizations delay the beginning of construction and any eventual operation.	Construction escalation	\$6,861,829	0%	5%	10%	35%	\$0	\$343,091	\$686,183	\$120,082
3.00	Design Risks											
#	Risk	Description										
3.01	Stakeholder Consultation	The risk that consultation with stakeholder groups identifies mitigation measures that attempt to revise or impact the design of the facility (external elements) causing delays in the Project.	Construction escalation	\$6,861,829	0%	5%	10%	40%	\$0	\$343,091	\$686,183	\$137,237
3.02	Requirements (Discovered Prior to Commissioning)	The risk that the design of the facility fails to deliver services at the required levels of performance, heritage protection, capacity, and quality, caused by a failure to translate performance into the design, leading to additional design and development costs.	Design & Construction costs	\$78,490,726	0%	5%	15%	15%	\$0	\$3,924,536	\$11,773,609	\$822,181
3.03	Change in Design Specifications	The risk that changes to the design are required, caused by legislative, regulatory, or policy changes. This can lead to additional design costs.	Design Contingency	\$4,821,048	0%	1%	2%	10%	\$0	\$48,210	\$96,421	\$4,821
4.00	Construction risks											
#	Risk	Description										
4.01	Construction Scheduling, Coordination and Management	The risks associated with scheduling, coordinating, and managing construction activities, such as coordinating the work of sub-contractors and the procurement of equipment and materials. Scheduling and co-ordination issues can lead to delay, additional costs (subcontractor claims), or disruption. Contract such as 'Impacts with Inaccurate information from Demolition Stage'	Construction escalation	\$6,861,829	0%	1%	5%	50%	\$0	\$68,618	\$343,091	\$75,331
4.02	Cost Estimation Range	Cost estimates as developed have an embedded estimation range. These could increase or decrease costs.	Design & Construction costs	\$78,490,726	0%	5%	10%	25%	\$0	\$3,924,536	\$7,849,073	\$981,134
4.03	Condition of the existing building	Unforeseen condition of the existing building, could lead to additional work, increase in cost, and delay the completion of the Project	Design & Construction costs	\$78,490,726	0%	5%	10%	20%	\$0	\$3,924,536	\$7,849,073	\$784,907
4.04	Deficiencies (on new construction)	The risk that defects are discovered during the construction of the Project, which may result in increased costs to the construction contractor if it must rectify the defects (alternatively a sub-trade may be required to rectify the work). In any case, defects will result in delay and disruption to the construction schedule.	Design & Construction costs	\$78,490,726	0%	3%	5%	10%	\$0	\$2,354,722	\$3,924,536	\$204,375
4.05	Construction Equipment Availability	The risk that special pieces of equipment are not available when required for construction works, resulting in delay and increased costs.	Construction escalation	\$6,861,829	0%	0%	0%	0%	\$0	\$0	\$0	\$0
4.06	Construction Contractor Default (or sub)	The risk that the construction contractor defaults and must be replaced, resulting in delay and additional costs.	Temporary accommodation	\$3,166,459	0%	3%	5%	3%	\$0	\$79,161	\$158,323	\$2,375
4.07	Scope Changes by RPL – During Construction	The risks associated with RPL changing the performance specifications during the construction period through issuing change orders.	Design & Construction costs	\$78,490,726	0%	2%	4%	40%	\$0	\$1,569,815	\$3,139,629	\$627,926
4.08	Design Coordination Issues	The risk that change orders are requested by the contractor during construction due to design coordination issues, design completion and/or design gaps.	Design & Construction costs	\$78,490,726	0%	3%	5%	80%	\$0	\$1,962,268	\$3,924,536	\$1,569,815
4.09	Inflation Risk	The risk that construction price inflation (including prices of labour, materials, and other cost drivers) will increase at a rate that is greater than that estimated by the construction contractor.	Construction escalation	\$6,861,829	-1%	1%	1%	10%	-\$34,309	\$34,309	\$68,618	\$2,070
4.10	Weather	The risk that weather conditions result in delays to construction and increased costs.	Construction escalation	\$6,861,829	0%	1%	4%	25%	\$0	\$68,618	\$240,164	\$27,374
4.11	Utility Coordination	Coordination between RPL and/or the contractor and the utility provider does not happen in a timely fashion resulting in delays and increased costs.	Construction escalation	\$6,861,829	0%	1%	2%	5%	\$0	\$34,309	\$137,237	\$3,080
4.12	Commissioning Delays - Deficiencies	The risk that there are delays in the commissioning process due to a poorly defined commissioning process and/or due to RP not appropriately carrying out its role in the commissioning process, which result in a delay in the date of facility commercial operations. Delays will result in additional costs for the contractor.	Temporary accommodation	\$3,166,459	0%	5%	10%	30%	\$0	\$158,323	\$316,646	\$47,497
5.00	Operations Risk											
#	Risk	Description										
Operating Costs and Regulatory Compliance												
5.01	Labour Costs	Risk that labour costs for facility operator staff will be higher than anticipated (wages rise faster than anticipated).	Salaries, Benefits & Honoraria	\$41,343,438	-1%	1%	1%	15%	-\$206,717	\$206,717	\$413,434	\$18,708
5.02	Input Costs - Other Inputs	Risk that non-labour costs for facility will be higher than anticipated.	Other operating expenses	\$61,765,517	0%	3%	5%	75%	\$0	\$1,544,138	\$3,088,276	\$1,158,103
Customer Service												
5.03	User Satisfaction	The risk or inability to meet user expectations and/ or a general lack of attention to specifics of the facility and related service requirements.	Design & Construction costs	\$78,490,726	0%	2%	4%	40%	\$0	\$1,569,815	\$3,139,629	\$627,926
6.00	Maintenance Risk											
#	Risk	Description										
Major Capital Repair												
6.01	Lifecycle Maintenance Performance (Maintenance Schedule)	The risk that major capital repair/lifecycle maintenance for the Project is not performed when required. This includes the risks associated with deferred maintenance, and/or scheduled maintenance not performed close to the end of a contractual term. Deferred maintenance can result in reduced asset quality, and/or higher costs of maintenance and capital repair in the future.	Lifecycle costs	\$60,705,312	0%	2%	3%	10%	\$0	\$910,580	\$1,821,159	\$91,058
6.02	Design and Construction Defects - Poor workmanship	The risks associated with design errors, construction deficiencies, or substandard work and materials which emerge during the operations period, as related to the existing structures. Deficiencies which emerge during the operations period cause unexpected problems and result in increased costs in order to rectify or mitigate problems.	Design & Construction costs	\$78,490,726	0%	2%	6%	5%	\$0	\$1,569,815	\$4,709,444	\$109,624
6.03	Unanticipated Maintenance	The risk that unplanned maintenance that affects the life, safety & immediate operation of the Project is required.	Lifecycle costs	\$60,705,312	0%	1%	1%	8%	\$0	\$303,527	\$607,053	\$22,764
6.04	Major Reconfiguration and Improvements	The risk of required improvements, expansion, and any other changes required by RPL	Design & Construction costs	\$78,490,726	0%	1%	3%	40%	\$0	\$392,454	\$2,354,722	\$407,732
6.05	Lifecycle Maintenance Costs	The risk that life cycle maintenance costs are higher than projected. This includes the risk that the components or assets identified for lifecycle maintenance would require higher renewal costs or sooner than estimated or fail early.	Lifecycle costs	\$60,705,312	0%	1%	2%	15%	\$0	\$607,053	\$1,214,106	\$91,058

Appendix E: Risk matrix - option 3

Risk Matrix Inputs - Regina Public Library				Option 3								
#	Risk	Description	Value	Impact			Probability	Total				
				Min	ML	Max	(%)	Min	ML	Max		
1.00	Environmental Assessment Approvals (Incl related)											
1.01	Delay in Approvals	The risk that approvals and related operating permits are delayed, or are awarded based on conditions being imposed on RPL which impact the project schedule, delaying the time to reach financial close. Delaying the process could result in costs to RPL (e.g. construction price inflation during the period of delay).	Construction escalation	\$7,028,539	0%	3%	5%	70%	\$0	\$175,713	\$351,427	\$122,999
2.00	Property Acquisition, Approvals and Site Condition											
2.01	Utility Relocations and Upgrades or Modifications	The risks associated with utility relocations and upgrades or modifications at the site, including cost increases as well as unforeseen utility relocations, e.g. the utility did not appear on subsurface maps.	Site servicing	\$774,555	0%	10%	20%	50%	\$0	\$77,456	\$154,911	\$38,728
2.02	Pre-Existing Environmental Conditions on Site	The risk of pre-existing (a known unknown) environmental contamination at the site (e.g. asbestos), which requires mitigation and/or remediation and which could delay the works or make them more complex to execute.	Design & Construction costs	\$84,598,492	2%	4%	8%	50%	\$1,268,977	\$2,960,947	\$6,344,887	\$1,816,034
2.03	Construction Activity Results in Contamination	The risk that construction activity results in contamination of the site. This could result in temporary closure of the site and delay in commissioning.	Design & Construction costs	\$84,598,492	0%	2%	5%	5%	\$0	\$1,691,970	\$4,229,925	\$101,357
2.04	Unknown On-site restrictions	The risk of any unknown on-site restrictions, such as on-site easement etc. that could cause a delay in the process and/or lead to increased costs (e.g. due to remediation efforts required).	Construction escalation	\$7,028,539	0%	2%	5%	20%	\$0	\$140,571	\$351,427	\$33,683
2.05	Approvals & Permits (Other than EA and related Operating Permits)	The risk that the project approvals and expenditure authorities with respect to permits and other authorizations delay the beginning of construction and any eventual operation.	Construction escalation	\$7,028,539	0%	1%	3%	35%	\$0	\$70,285	\$175,713	\$29,473
3.00	Design Risks											
3.01	Stakeholder Consultation	The risk that consultation with stakeholder groups identifies mitigation measures that attempt to revise or impact the design of the facility (external elements) causing delays in the Project.	Construction escalation	\$7,028,539	0%	5%	10%	20%	\$0	\$351,427	\$702,854	\$70,285
3.02	Requirements (Discovered Prior to Commissioning)	The risk that the design of the facility fails to deliver services at the required levels of performance, heritage protection, capacity, and quality, caused by a failure to translate performance into the design, leading to additional design and development costs.	Design & Construction costs	\$84,598,492	0%	5%	15%	15%	\$0	\$4,229,925	\$12,689,774	\$886,159
3.03	Change in Design Specifications	The risk that changes to the design are required, caused by legislative, regulatory, or policy changes. This can lead to additional design costs.	Design Contingency	\$5,376,993	0%	1%	2%	10%	\$0	\$53,770	\$107,540	\$5,377
4.00	Construction risks											
4.01	Construction Scheduling, Coordination and Management	The risks associated with scheduling, coordinating, and managing construction activities, such as coordinating the work of sub-contractors and the procurement of equipment and materials. Scheduling and co-ordination issues can lead to delay, additional costs (subcontractor claims), or disruption. Contract such as 'Impacts with Inaccurate information from Demolition Stage'	Construction escalation	\$7,028,539	0%	1%	1%	50%	\$0	\$35,143	\$70,285	\$17,571
4.02	Cost Estimation Range	Cost estimates as developed have an embedded estimation range. These could increase or decrease costs.	Design & Construction costs	\$84,598,492	0%	3%	5%	25%	\$0	\$2,114,962	\$4,229,925	\$528,741
4.03	Condition of the existing building	Unforeseen condition of the existing building, could lead to additional work, increase in cost, and delay the completion of the Project	Design & Construction costs	\$84,598,492	0%	0%	0%	3%	\$0	\$0	\$0	\$0
4.04	Deficiencies (on new construction)	The risk that defects are discovered during the construction of the Project, which may result in increased costs to the construction contractor if it must rectify the defects (alternatively a sub-trade may be required to rectify the work). In any case, defects will result in delay and disruption to the construction schedule.	Design & Construction costs	\$84,598,492	0%	3%	5%	10%	\$0	\$2,537,955	\$4,229,925	\$220,279
4.05	Construction Equipment Availability	The risk that special pieces of equipment are not available when required for construction works, resulting in delay and increased costs.	Construction escalation	\$7,028,539	0%	0%	0%	0%	\$0	\$0	\$0	\$0
4.06	Construction Contractor Default (or sub)	The risk that the construction contractor defaults and must be replaced, resulting in delay and additional costs.	Temporary accommodation	\$9,404,601	0%	3%	5%	3%	\$0	\$235,115	\$470,230	\$7,053
4.07	Scope Changes by RPL – During Construction	The risks associated with RPL changing the performance specifications during the construction period through issuing change orders.	Design & Construction costs	\$84,598,492	0%	2%	4%	20%	\$0	\$1,691,970	\$3,383,940	\$338,394
4.08	Design Coordination Issues	The risk that change orders are requested by the contractor during construction due to design coordination issues, design completion and/or design gaps.	Design & Construction costs	\$84,598,492	0%	3%	5%	60%	\$0	\$2,114,962	\$4,229,925	\$1,268,977
4.09	Inflation Risk	The risk that construction price inflation (including prices of labour, materials, and other cost drivers) will increase at a rate that is greater than that estimated by the construction contractor.	Construction escalation	\$7,028,539	-1%	1%	1%	10%	-\$35,143	\$35,143	\$70,285	\$2,120
4.10	Weather	The risk that weather conditions result in delays to construction and increased costs.	Construction escalation	\$7,028,539	0%	1%	5%	25%	\$0	\$70,285	\$316,284	\$35,060
4.11	Utility Coordination	Coordination between RPL and/or the contractor and the utility provider does not happen in a timely fashion resulting in delays and increased costs.	Construction escalation	\$7,028,539	0%	1%	2%	10%	\$0	\$35,143	\$140,571	\$6,309
4.12	Commissioning Delays - Deficiencies	The risk that there are delays in the commissioning process due to a poorly defined commissioning process and/or due to RP not appropriately carrying out its role in the commissioning process, which result in a delay in the date of facility commercial operations. Delays will result in additional costs for the contractor.	Temporary accommodation	\$9,404,601	0%	5%	10%	30%	\$0	\$470,230	\$940,460	\$141,069
5.00	Operations Risk											
5.01	Labour Costs	Risk that labour costs for facility operator staff will be higher than anticipated (wages rise faster than anticipated).	Salaries, Benefits & Honoraria	\$37,530,354	-1%	1%	1%	15%	-\$187,652	\$187,652	\$375,304	\$16,983
5.02	Input Costs - Other Inputs	Risk that non-labour costs for facility will be higher than anticipated.	Other operating expenses	\$54,414,762	0%	3%	5%	75%	\$0	\$1,360,369	\$2,720,738	\$1,020,277
5.03	User Satisfaction	The risk or inability to meet user expectations and/ or a general lack of attention to specifics of the facility and related service requirements.	Design & Construction costs	\$84,598,492	0%	2%	3%	20%	\$0	\$1,268,977	\$2,537,955	\$253,795
6.00	Maintenance Risk											
6.01	Lifecycle Maintenance Performance (Maintenance Schedule)	The risk that major capital repair/lifecycle maintenance for the Project is not performed when required. This includes the risks associated with deferred maintenance, and/or scheduled maintenance not performed close to the end of a contractual term. Deferred maintenance can result in reduced asset quality, and/or higher costs of maintenance and capital repair in the future.	Lifecycle costs	\$59,515,012	0%	2%	3%	10%	\$0	\$892,725	\$1,785,450	\$89,273
6.02	Design and Construction Defects - Poor workmanship	The risks associated with design errors, construction deficiencies, or substandard work and materials which emerge during the operations period, as related to the existing structures. Deficiencies which emerge during the operations period cause unexpected problems and result in increased costs in order to rectify or mitigate problems.	Design & Construction costs	\$84,598,492	0%	2%	6%	5%	\$0	\$1,691,970	\$5,075,909	\$118,155
6.03	Unanticipated Maintenance	The risk that unplanned maintenance that affects the life, safety & immediate operation of the Project is required.	Lifecycle costs	\$59,515,012	0%	1%	1%	5%	\$0	\$297,575	\$595,150	\$14,879
6.04	Major Reconfiguration and Improvements	The risk of required improvements, expansion, and any other changes required by RPL	Design & Construction costs	\$84,598,492	0%	1%	3%	30%	\$0	\$422,992	\$2,537,955	\$329,595
6.05	Lifecycle Maintenance Costs	The risk that life cycle maintenance costs are higher than projected. This includes the risk that the components or assets identified for lifecycle maintenance would require higher renewal costs or sooner than estimated or fail early.	Lifecycle costs	\$59,515,012	0%	1%	2%	10%	\$0	\$595,150	\$1,190,300	\$59,515

Appendix F: Key issues

Items	Item description	Current issues
Architectural		
Site considerations	Landscaping –West Courtyard	Currently under-utilized and require some general maintenance, Vegetation is lacking, has been issues in the past with keeping vegetation alive or growing.
	Building Perimeter/Site Grading	Some paving at building perimeter has shifted and has sloped towards building and is in need of repairs.
Building code requirements	Building Classification / Construction Requirements	As required by NBC 2010, a building of this size and configuration is required to be sprinkle red.
	Occupant Load & Health Requirements	Number and location of WCs.
	Barrier Free Accessibility - Exterior Ramp	Ramp slope, handrails & guards do not meet current code requirements
	Barrier Free Accessibility - Interior Ramp	Ramp slope does not meet current code requirements
	Barrier Free Accessibility - Plumbing Facilities	None- WCs recently upgraded for accessibility
	Exiting, Egress, and Travel Distance - Travel distance	Allowable travel distances in several areas exceeded
	Exiting, Egress, and Travel Distance – Exit Signs	Stair 'S4' is labelled as 'Exit' but does not lead directly to exterior
	Stairs- All Levels	Guards, handrails and tactile clues on stair treads in some locations do not meet current code requirements
	Fire Separations - Separation of the Lobby, Exterior Wall Exposed to Another Wall	Existing glazing pane sizes and aluminum framing does not meet code requirements
	Fire Separations - Mezzanine	By current building code standards, the Mezzanine is required to be separated from the main floor area by a 1 hour fire separation located at the perimeter.
	Fire Separations - Areas of Refuge	Any floor area that provides barrier free access and is not sprinkle red must provide a fire rated area or smoke control zone adjacent to an exit where one can remain temporary until rescued.
Fire Separations - Combustible Refuge Storage	Any area that is used for the temporary storage of combustible refuse such as garbage or waste paper must be separated from the rest of the building by a 1 hour fire separation and must be sprinkle red.	
Building envelope	Roof	Original Roof from 1962, significant ponding on roof and roof drains not working, low insulation value.
	Roof Soffit	Thermal bridging via concrete roof slab through exterior wall.

Items	Item description	Current issues
	Exterior Windows	Non thermal broken aluminum framed, double glazed windows from 1962.
	Exterior Doors	Non thermal broken aluminum and (or) steel framed doors from 1962.
	Wall Construction	Low R value and no Air Barrier at drainage plane in existing wall construction.
	Curtain Wall	Non- thermally broken aluminum framed Kavner curtain wall from 1962.
	Art Gallery Exterior Wall/ Support for Special Environments	Low R value and no Air Barrier at drainage plane in existing wall construction - gallery cannot have class A shows due to poor interior environmental conditions. Storage of rare or significant collections require temperature and humidity control.
	Stone/ Granite Cladding	Some granite cladding panels have fallen off the building. Supports are identified as steel without protection meaning potential corrosion of stone cladding support is suspected. Removal of some of the stone panels will be required to completely assess the situation.
	Aluminum Screen	Generally in good condition, some louvres near the bottom are bent and are in need of repair.
Elevator/conveyance systems	Elevator	None- have recently upgraded / retrofitted to meet current standards
	Escalator	Original to building. Some parts no longer available, must be custom manufactured, concerns of intrusive noise, and child safety.
Interior upgrades	Floor Finishes	Condition varies, from original flooring to recently replaced
	Wall Finishes	Condition varies, from original partitions to recently constructed and painted areas.
	Millwork	Condition varies, from original cabinetry to recently replaced
	Window Coverings / Sun Control	Current window coverings serve their function, but are not well utilized
	Ceiling Finishes	Condition varies, from original ceilings and ceiling finishes to recently replaced
Demolition	Asbestos	Previous building surveys and Inspection reports indicate asbestos in various locations.
Structural		
Substructure	Foundation	Elements that were exposed did not show any evidence of distress or deterioration
Superstructure	Main Floor/Mezzanine	Structural systems making up the main and upper floors of the building function as intended under the present loading conditions.
	Roof Slab	Standing water was noted on the roof surface. Roof systems that are low slope can be prone to permanent deflections when water is not immediately directed off the roof and instead allowed to pool.

Items	Item description	Current issues
	Fall Protection	Currently no provisions on the roof for fall arrest.
	Exterior Components	The front entrance exterior ramp has an imbedded steel edge that is rusting
Mechanical		
Site services	Sewer, water and gas	Beyond rated service life
Ventilation system	Air Handlers	Beyond rated service life
	Humidification	Not stand-alone system and not designed for Class A Gallery Space
	Distribution	Not maintained in accordance with best practice and would need to be resized to suit the load for medium and long term
	End Devices (Currently not installed)	Not maintained in accordance with best practice and would need to be resized/re-routed to suit the long term
	Heat Recovery (Currently not installed)	Required for long term measures
Heating system	Boilers	Beyond rated service life, inefficient
	Heat Exchangers	Beyond rated service life and not required for medium/long term measures when boilers are replaced to hydronic.
	Circulation Pumps	Beyond rated service life and would require replacement to suite new boiler system for medium & long term.
	Accessories (Tanks, valves etc.)	Beyond rated service life and would require replacement to suite new boiler system for medium & long term.
	Distribution	Replacement required in medium to long term to suit new boiler system.
	End Devices (e.g. perimeter radiation)	Beyond rated service life, would be re-sized to match load for medium/long term.
Chilled water system	Chiller	Past maintenance not conducted in accordance with best practices, would potentially need to be resized and replaced to meet new load for medium/long term.
	Cooling Tower	Past maintenance not conducted in accordance with best practices, pH level too low resulting in acidic attack of equipment.
	Circulation Pumps	None in short term, would need to be replaced to match new chiller & tower
	Accessories (Tanks, valves etc.)	None in short term, would need to be replaced to match new chiller & tower
	Distribution	None in short term, would need to be replaced to match new cooling load for medium/long term
	End Devices (Currently not installed)	None, would need new end devices installed for long term
Fire protection system	Fire Extinguishers, Hose Cabinets	None in short term, would need to be re-zoned in more prominent locations for medium/long term
	Distribution	Safety danger to people in the room if discharged

Items	Item description	Current issues
	Main Service & Alarm Valve	Beyond rated service life, replace for medium/long term
	Automatic Sprinkler System (Currently not installed)	Would need to be installed for medium/long term
Plumbing system	Main Service & Backflow Preventer	Beyond rated service life, replace for medium/long term
	Water Softener	Softeners do not have a long life span due to poor water quality locally. Anticipate replacement in medium term.
	Water Heater	Heaters do not have a long life span due to poor water quality locally. Anticipate replacement in medium term.
	Distribution - water, sanitary, storm	Beyond rated service life, replace for medium/long term
	Fixtures	None for short term, recommend replacement in medium/long term
Control system	Ventilation, Heating, Chilled Water	Pneumatic system is obsolete with very limited control
Electrical		
Electrical distribution	Main Distribution	Age of equipment and loading of service
	Generator	Only has IT loads, no heating, Conduct separate assessment on future needs
	UPS	One Unit, Approx. 10 years old, Conduct Separate assessment on future needs
	Motor Control	Splitter/ separate starters
	120/208 Volt Panels	Panels are in deteriorated shape
	120/208 Volt Distribution	Age of equipment, look for deterioration in insulation
Lighting	Theatre Lights	None - recently upgraded
	Exit Lights	Not all areas upgraded
	Emergency Lights	Some malfunctioning, insufficient coverage in some areas.
Misc. system	Fire Alarm System	Panels are new, but devices are older.
	Theatre Sound System	None - recently upgraded
Canadian electrical code issues	Access to Transfer Switch	Insufficient clearance
	Panels without space covers	Live bussing exposed
	Bent conduit	Bent conduit has damaged panel
	Conduit on roof	Broken, ran flat across roof
	Entry into electrical room	Improper egress path
	Labeling	Improper labeling
	Fire alarm panel conduit	Unsupported
	Main CDP Spaces	Exposed bussing
	Electrical rom penetrations	Not sealed

Items	Item description	Current issues
	Main telephone service	Very unorganized
	Fire alarm panel junction box	Marettes used
	Conduit Drops	Unsupported
	Intercom Conduit	Rusty, improper support

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