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July 9, 2015

Via Email
Original via Mail

British Columbia Utilities Commission
6th Floor, 900 Howe Street
Vancouver, BC
V6Z 2N3

Attention: Ms. Erica M. Hamilton, Commission Secretary

Dear Ms. Hamilton:

Re: FortisBC Inc. (FBC or the Company)

Application for a Certificate of Public Convenience and Necessity (CPCN) for the Kootenay Operations Centre (the Application)

FBC hereby applies to the British Columbia Utilities Commission (the Commission) pursuant to Sections 45 and 46 of the *Utilities Commission Act* (the Act) for a CPCN for the construction of a new operations centre facility in the Kootenay region, referred to as the Kootenay Operations Centre (KOC, the Project or the KOC Project) as described in the Application.

FBC is also seeking Commission approval, pursuant to Section 56 of the Act for a depreciation rate of 1.9 percent that would be applicable to this new KOC facility.

FBC has evaluated several alternatives to address the immediate and longer term concerns described for the facilities, as discussed in the Application, and believes that the construction of a new, centralized regional facility (the Kootenay Operations Centre) to be the most cost-effective solution which addresses all objectives set forth by the Company. Once completed, the Kootenay Operations Centre will provide FBC with a cost-effective solution to replace the facilities that are at end-of-life, address health, safety, and code compliance concerns, space limitations and improve operational efficiency and emergency preparedness within the Kootenay region.

The Project includes construction of a new facility on a site acquired by FBC and centrally located in the Ootischenia area of Castlegar. This facility will include a combined Office and

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District Stores Warehouse building for material and equipment storage and a yard compound.

The estimated capital cost for the Project in as spent dollars, including Allowance for Funds Used During Construction (AFUDC) and abandonment/demolition costs, is $20.651 million[1] with construction scheduled to begin Q2, 2016 and occupancy scheduled for the end of 2017.

Request for Confidential Treatment of Certain Information

Due to the sensitive and confidential nature of some of the information in the Application, concurrent with filing of the Application, FBC is also filing a portion of the Application on a confidential basis (the Confidential Application) as it contains operationally sensitive information, including detailed information that, if disclosed, could impede FBC's ability to safely and reliably operate its electric system assets and could risk the safety of both its workers and the public. As well, the Application contains market sensitive information that the Company believes should be kept confidential in order to allow for a competitive bidding process for the construction and acquisition of equipment and services for the Project.

The Company has structured and filed the Application in two parts:

- Part 1 – the Kootenay Operations Centre CPCN Application (Primary Application) which is the public, non-confidential portion; and
- Part 2 – the Kootenay Operations Centre CPCN CONFIDENTIAL Application (the Confidential Application), which contains information on FBC's System Control Centre (SCC) and Back-up Control Centre (BCC).

The Confidential Application (which includes several confidential appendices) is being filed in accordance with the Practice Directive of the British Columbia Utilities Commission regarding Confidential Filings (the Confidential Filings Practice Directive). FBC requests that access to any confidential information be subject to the Confidential Filing Practice Directive, and that parties seeking access to any confidential information provide an executed Undertaking of Confidentiality, a copy of which is provided in Appendix O-3 to the Application.

The following is a list of the confidential appendices in the Application, followed by FBC's reasons to support its confidentiality request.

<u>List of Confidential Appendices to the Primary Application:</u>

Appendix D – Building Space Program

- D-1-1: Building Space Program – Alternative 2 – Repair/Renovate – SCC
- D-1-2: Building Space Program – Alternative 2 – Repair/Renovate – BCC
- D-2-2: Building Space Program – Alternative 3 – Replace – SCC
- D-2-3: Building Space Program – Alternative 3 – Replace – BCC

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[1] $19.077 million of capital costs plus $1.128 million of AFUDC would be charged to the Electric Plant in Service; $0.446 million of demolition and removal of hazardous materials would be charged to Accumulated Depreciation.

- D-3-1: Building Space Program – Alternative 5 Space Program

Appendix G – Financial Information

- G-1: Capital Cost Summary
- G-2: Financial Schedules
- G-3: O&M Savings

Appendix L – Project Cost Estimate

List of Confidential Appendices to the Confidential Application:

- Appendix P – SCC Business Impact Assessment Study
- Appendix Q – Robert E. Lamb Inc. SCC Site Location Report
- Appendix R – Interagency Paper on Sound Practices to Strengthen the Resilience of the U.S. Financial System

In addition, certain portions of Appendix M-1: Public Consultation Log and M-2-1: Public Open House Feedback have been redacted to remove personal information.

FBC respectfully requests that the Commission hold the above listed documents confidential, and believes that such information should remain confidential even after the regulatory process for this Application is completed.

Certain Confidential Appendices contain Restricted Information related to critical infrastructure layout, detailed building designs and security configuration, network or communication topology and similar critical infrastructure diagrams, and information related to detailed infrastructure vulnerabilities. Certain information regarding FBC's Critical Assets[2] and Critical Cyber Assets[3] contains Restricted Information that must be controlled under the BC Mandatory Reliability Standards (MRS) regarding Critical Infrastructure Protection (CIP). It requires a higher level of protection because disclosure of such information could pose a potential threat to FBC's operations, including methods to protect against potential vulnerability, and could create or increase the risk of a debilitating impact on the safe and reliable operation of FBC's system and thus public safety.

This Restricted Information has been redacted or generalized to allow the Confidential Appendices to be filed and reviewed in accordance with the Confidential Filing Practice Directive. If the Commission requires the review of the Restricted Information to support a determination on the merits of the Application, and it thus becomes necessary to file Restricted Information, FBC requests that access to and treatment of certain highly sensitive Restricted Information during and after the Commission hearing be subject to the process outlined in the proposed FBC Restricted Information Proposed Protocol included in Appendix A to the Application.

[2] Defined in the Glossary of Terms Used in NERC Reliability Standards as "Facilities, systems, and equipment which, if destroyed, degraded, or otherwise rendered unavailable, would affect the reliability or operability of the Bulk Electric System."

[3] Defined in the Glossary of Terms Used in NERC Reliability Standards as "Cyber Assets essential to the reliable operation of Critical Assets."

The Appendices which have been redacted or generalized are:

1. Appendix J – KOC Building Plans
2. Appendix L – Project Cost Estimate (Telecommunications Details)
3. Confidential Application, Appendix P – SCC Business Impact Assessment Study
4. Confidential Application, Appendix Q – Robert E. Lamb Inc. SCC Site Location Report

Reasons for Confidentiality Request

Appendices D-1-1, D-1-2, D-2-2, D-2-3, and D-3-1

Building Space Programs, the SCC Business Impact Assessment Study, and the SCC Site Location Report contain information related to the SCC and BCC which should be kept confidential on the basis that they contain sensitive technical information and information pertaining to the Company's assets, including Critical Assets. In particular, they identify vulnerable points related to the Company's electric system. FBC believes that there is a reasonable expectation that the release of such information could potentially jeopardize the safety and security of the Company's system.

Appendices G-1, G-2 and G-3

The financial schedules contain the cost estimates for the Project and other alternatives. These appendices should be kept confidential on the basis that they contain capital cost estimates for the Projects, and FBC will be going to the market for competitive bids for the materials and construction work. If the estimated costs for the material and construction work are disclosed, it can be reasonably expected that FBC's negotiating position would be prejudiced. For instance, the bidding parties with knowledge about the estimated costs may use the estimated costs as a reference for their bidding. Because there are limited contractors due to high demand in the market in recent years, FBC's negotiating position may be further prejudiced if the bidders know about the Company's estimated costs for materials and construction work.

Appendix L

The Cost Estimates should be kept confidential on the basis that they contain capital cost estimates for the Projects, and FBC will be going to the market for competitive bids for the materials and construction work. If the estimated costs for the material and construction work are disclosed, it can be reasonably expected that FBC's negotiating position may be prejudiced. For instance, the bidding parties with knowledge about the estimated costs may use the estimated costs as a reference for their bidding. Because there are limited contractors due to high demand in the market in recent years, FBC's negotiating position may be further prejudiced if the bidders know about the Company's estimated costs for materials and construction work.

In addition, the Cost Estimates contain information related to the SCC telecommunications and other equipment which should be kept confidential on the basis it contains sensitive technical information and information pertaining to the Company's Critical Assets.

Undertaking of Confidentiality

Should parties that choose to register in the review of this Application require access to some or all of the information filed confidentially, FBC has provided in Appendix O-3 the Undertaking of Confidentiality to be executed before confidential information may be released to registered parties under the strict terms of the undertaking. FBC has no objection to providing confidential information on these terms to its customary and routine intervener groups representing customer interests. If access to confidential information is sought by any other registered party, FBC requests that it be given the opportunity to file comment.

In addition, in accordance with the FBC Restricted Information Proposed Protocol included as Appendix A, FBC requests that all access to any Restricted Information as identified by FBC during the regulatory review process follow the process outlined in the FBC Restricted Information Protocol. Should the Commission require Restricted Information to be filed, FBC requests that its distribution should be limited to the Commission. Should any registered party request access to Restricted Information, FBC requests the opportunity to comment on such access requests, and upon a determination by the Commission, if access is granted, the party must execute the Undertaking of Confidentiality for Restricted Information included as Appendix O-4, which contains specific information about handling and managing Restricted Information, and is intended to be used in conjunction with the FBC Restricted Information Proposed Protocol for accessing Restricted Information.

Information Requests

FBC proposes that information requests relating to these confidential appendices be filed separately from other information requests, with a copy circulated only to FBC and other parties that have signed Undertakings of Confidentiality. Similarly, final submissions which refer to material in any confidential evidence should be filed on a confidential basis as a separate set of submissions. This process will ensure that confidential information is not inadvertently disclosed.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC INC.

Original signed:

Diane Roy

Attachments

cc (email only): BCOAPO, BCMEU, BCSEA, CEC, COPE, Mr. Gabana, ICG, and IRG.

FORTISBC INC.

Application for a Certificate of Public Convenience and Necessity for Construction of the Kootenay Operations Centre

Volume 1 - Application

July 9, 2015

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List of Appendices

Index of Tables and Figures

1. APPROVAL SOUGHT AND EXECUTIVE SUMMARY

1.1 *SUMMARY OF APPROVALS SOUGHT*

FortisBC Inc. (FBC or the Company) hereby applies (the Application or KOC Application) to the British Columbia Utilities Commission (BCUC or Commission), pursuant to Sections 45 and 46 of the *Utilities Commission Act* (UCA or the Act), for a Certificate of Public Convenience and Necessity (CPCN) for construction of a new operations centre (the Kootenay Operations Centre or KOC) for the Company (the Project or the KOC Project) as described in the Application. The estimated capital cost for the Project in as-spent dollars, including Allowance for Funds Used During Construction (AFUDC) and abandonment/demolition costs, is $20.651 million[1] with construction scheduled to begin Q2, 2016 and occupancy scheduled for the end of 2017.

FBC is also seeking Commission approval pursuant to Section 56 of the UCA for a depreciation rate of 1.9% that would be applicable to this new facility.

1.2 *CONFIDENTIAL AND RESTRICTED INFORMATION FILINGS REQUEST*

The Application contains operationally sensitive information, including detailed information that, if disclosed, could impede FBC's ability to safely and reliably operate its electric system assets and could risk the safety of both its workers and the public. Certain information regarding FBC's Critical Assets[2] and Critical Cyber Assets[3] is considered Restricted Information as it is subject to Critical Infrastructure Protection (CIP) standards under the BC Mandatory Reliability Standards (MRS). The Restricted Information requires a higher level of protection because disclosure of such information could pose a potential threat to FBC's operations, including methods to protect against potential vulnerability, and could create or increase the risk of a debilitating impact on the safe and reliable operation of FBC's system and thus on public safety. As well, the Application contains market sensitive information that the Company believes should be kept confidential in order to allow for a competitive bidding process for the construction and acquisition of equipment and services for the Project.

More specifically, the Application refers to three classes of information based on the level of access that may be required:

> **Public Information –** This type of information is regularly placed in the public domain and can be accessed by the public. Disclosure will not adversely impact FBC's

[1] $19.077 million of capital costs plus $1.128 million of AFUDC would be charged to the Electric Plant in Service; $0.446 million of demolition and removal of hazardous materials would be charged to Accumulated Depreciation.

[2] Defined in the Glossary of Terms Used in NERC Reliability Standards as "Facilities, systems, and equipment which, if destroyed, degraded, or otherwise rendered unavailable, would affect the reliability or operability of the Bulk Electric System."

[3] Defined in the Glossary of Terms Used in NERC Reliability Standards as "Cyber Assets essential to the reliable operation of Critical Assets."

operations. The treatment of such information will follow the usual process adopted by the Commission.

Confidential Information – This type of information usually covers sensitive financial, commercial, scientific or technical information, and the disclosure of such information can result in undue financial harm or prejudice to FBC. In this Application, Confidential Information includes detailed information related to the System Control Centre (SCC) and Back-Up Control Centre (BCC), the public disclosure of which could impede FBC's ability to safely and reliably operate its electric system assets and could risk the safety of both its workers and the public. Some of the Confidential Information may contain redactions of Restricted Information which will be discussed below. The treatment of such information will follow the Confidential Filing Practice Directive of the Commission (the Confidential Practice Directive).

Restricted Information – This type of information relates to the security of FBC's critical infrastructure and operations. It requires a higher level of protection because disclosure of such information could pose a potential threat to FBC's operations, including methods to protect against potential vulnerability, and could create or increase the risk of a debilitating impact on the safe and reliable operation of FBC's system and thus public safety. FBC requires restrictions on access, sharing, storage and handling of information identified as Restricted Information.

While the initial Application will not have any Restricted Information filed, if during the course of the regulatory review process, the Commission deems it necessary to obtain Restricted Information, FBC has proposed a protocol for handling and management of Restricted Information. FBC requests that access to Restricted Information follow a process such as that which is outlined in the FBC Restricted Information Proposed Protocol found in Appendix A.

Due to the sensitive and confidential nature of some of the information in the Application, the Company has structured and filed the Application in two parts (collectively referred to as the Application or the KOC Application):

- Part 1 – the Kootenay Operations Centre CPCN Application (Primary Application); and
- Part 2 – the Kootenay Operations Centre CPCN Application CONFIDENTIAL (Confidential Application).

The Primary Application contains all of the information related to the Project, with the exception of Confidential and Restricted Information related to the SCC and BCC.

The Confidential Application includes detailed information related to the SCC and BCC. FBC requests that access to the information included in the Confidential Application and the confidential appendices be subject to the Confidential Filing Practice Directive. If it becomes necessary to file Restricted Information, FBC requests that access to and treatment of certain highly sensitive Restricted Information during and after the Commission hearing be subject to a process such as that which is outlined in the FBC Restricted Information Proposed Protocol included in Appendix A.

Certain appendices contain Restricted Information such as critical infrastructure layout, detailed building designs and security configuration, network or communication topology and similar critical infrastructure diagrams, and information related to detailed infrastructure vulnerabilities. The Restricted Information, however, has been redacted or generalized to allow the appendices to be filed and reviewed in accordance with the Confidential Filing Practice Directive. If the Commission requires the review of the Restricted Information to support a determination on the merits of the Application, thereby requiring FBC to file certain Restricted Information, FBC requests that access to and treatment of certain highly sensitive Restricted Information during and after the Commission hearing be subject to a process such as that which is outlined in the proposed FBC Restricted Information Proposed Protocol included in Appendix A to the Application. The appendices which have been redacted or generalized to eliminate restricted information are:

1. Appendix J – KOC Building Plans
2. Appendix L – Project Cost Estimate (Telecommunications Details) **CONFIDENTIAL**

FBC will mark all confidential information, as such, where applicable.

In accordance with the Confidential Filings Practice Directive, FBC requests that interveners requesting access to confidential information execute an Undertaking of Confidentiality. A sample of the Undertaking of Confidentiality is included in Appendix O-3.

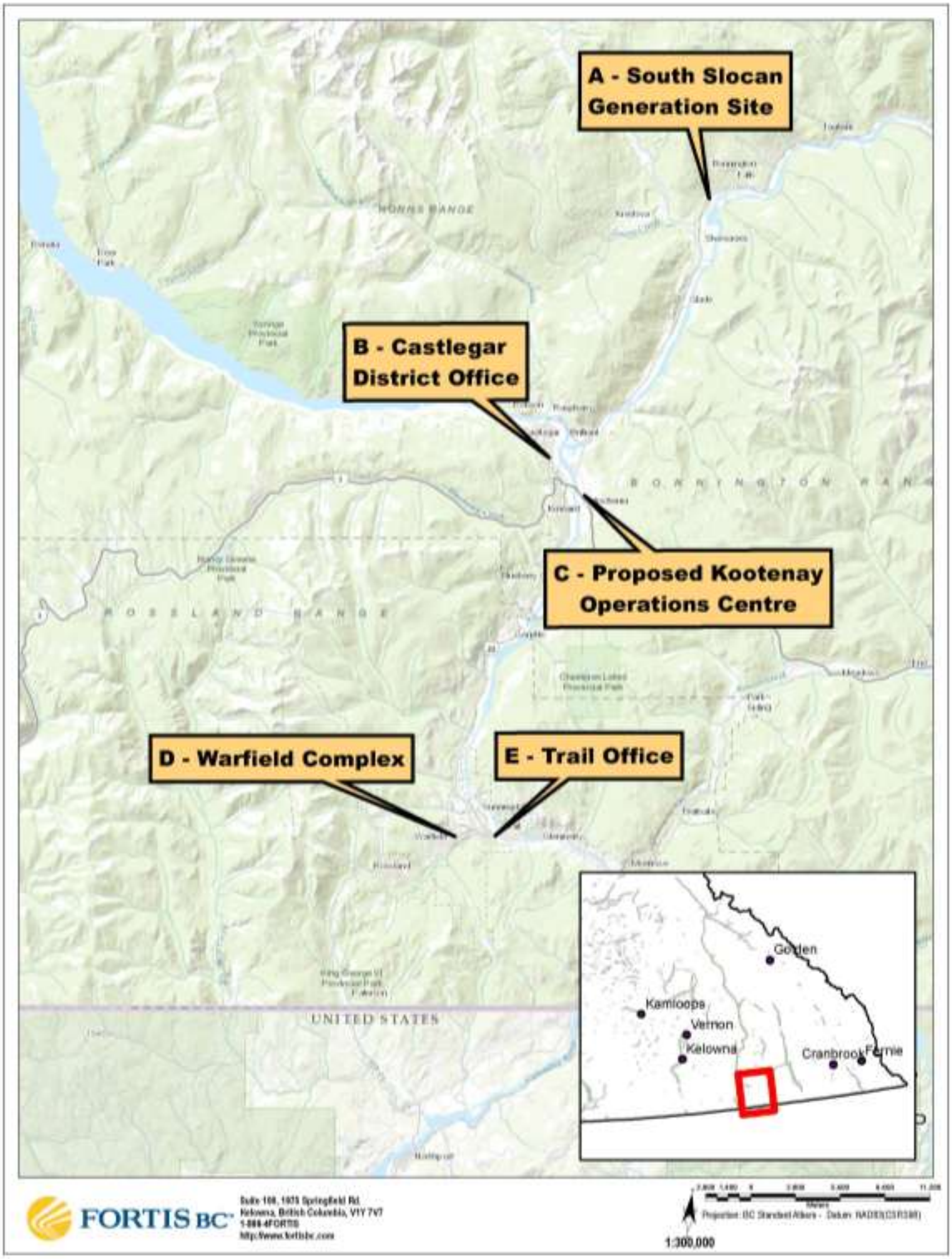
In addition, FBC requests that all access by the Commission, if necessary, to any information identified by FBC as Restricted Information, follows a process such as that outlined in Appendix A. FBC requests that Restricted Information be limited to the Commission only, upon execution of the Undertaking of Confidentiality for Restricted Information, a sample of which is included in Appendix O-4. However, should a registered party request access to Restricted Information that has been filed pursuant to the Commission's request, FBC requests the opportunity to comment on the access request prior to the Commission making a determination for access.

1.3 *EXECUTIVE SUMMARY*

1.3.1 Introduction

There are four main facilities that support operational requirements for both the Kootenay region of the FBC service area and the Company as a whole: the South Slocan Generation Site which includes the Administration and Warehouse buildings (the Generation Facilities) located adjacent to the South Slocan Generating Plant and Powerhouse; the Warfield Complex; the Trail Office Building; and the Castlegar District Office. These facilities, represented geographically in Figure 1-1, are critical to FBC's ongoing ability to safely and reliably deliver electricity to its customers. The area served by these facilities encompasses over 11,000 km^2 and includes approximately 37,000 of FBC's approximately 131,000 direct customers.

1 **Figure 1-1: Key Site Locations**



2

The Trail Office Building provides office functions such as the Customer Contact Centre, and the Engineering and Information Systems departments. The three other facilities support primarily Operations and Generation field functions tasked with maintaining and upgrading FBC's transmission and distribution lines and feeders, substations and generating plants.

1.3.2 Need for Repair or Replacement of the Generation Facilities

FBC owns and operates four hydroelectric generating plants with an aggregate capacity of 225 megawatts in the Kootenay region. In addition, under third-party operating agreements, FBC generation personnel operate five hydroelectric facilities totaling approximately 1300 megawatts for various owners. The primary purpose of FBC's South Slocan Generation Site, located in the Kootenay region of British Columbia between Castlegar and Nelson, is to support Generation Operations for the Company. There are multiple structures on the site that support Generation Operations, including the Generation Administration Office and the Warehouse building (together the Generation Facilities). The Powerhouse and Generating Plant at the South Slocan Generating Site are not the subject of this Application.

The Generation Administration Office is also currently the designated Emergency Operation Centre for any of the FBC owned or operated generating plants.

The Generation Administration Office and Warehouse were built in 1926 and 1930, respectively, prior to modern-day building codes coming into effect. FBC has identified two concerns with these buildings that will require their repair or replacement:

1. the age, critical end-of-life condition and health, safety, and code compliance concerns; and
2. the buildings' location and proximity to certain hazards, which could limit FBC's timely and efficient response to emergencies.

1.3.3 Other Project Drivers

In addition to the immediate need to repair or replace the Generation Facilities, FBC has identified other operational requirements in the Kootenay region which require investment in the short and long term to address concerns related to the condition and practical limitations of facilities currently in use: the SCC, the BCC and the yard at the Castlegar District Office. A further requirement is that the Company realize potential efficiencies and cost savings where feasible, and the Project provides an opportunity to do so for the Kootenay Station Services group.

Requirement 1: Address SCC and BCC space constraints, functional challenges and hazards

There are three main concerns related to the SCC and BCC including space constraints, functional challenges and proximity to certain hazards. Space constraints limit SCC and BCC distribution desk operational capabilities, the SCC operational support function, and control centre training capability. The current BCC is only configured to provide minimal required back-up for the generation and transmission system and there is no capability to provide back-up for the distribution system. Functional challenges at the SCC and BCC interfere with providing a productive and healthy working environment. As well, there are potential building code compliance concerns should any modifications of certain components of the SCC be undertaken. Local hazards in close proximity to both the SCC and BCC pose a risk that both control centres could be disabled simultaneously. If any single event were to affect both the SCC and BCC, the Company would have to manually monitor and control the electric system, which is impractical and unsustainable.

Requirement 2: Provide a centralized and dedicated EOC for generation and transmission & distribution operations

The Kootenay region does not currently have a centralized and dedicated Emergency Operations Centre (EOC) to manage all transmission, distribution and generation emergency events, and this presents certain challenges associated with emergency response communications and situational awareness. FBC has identified concerns related to the EOC functionality including space constraints, configuration limitations, and risks associated with the location of the currently designated EOC at the Generation Administration Office. FBC seeks to align with best practices and achieve communications and situational awareness benefits through a centralized and dedicated EOC.

Requirement 3: Address yard space limitations for efficiency and cost savings

The Castlegar District Office building is estimated to be nearing its end-of-life within five years. While FBC recognizes it will need to address this concern over the longer term, it has determined that this building does not require immediate investment, with the exception of some yard storage challenges that need be addressed. The yard space is congested, difficult to access, and currently inadequate to stage standardized operational material and equipment such as poles and trailers and the large operations vehicles used by FBC. As a result of these issues, FBC cannot store poles within the yard at the Castlegar District Office where crews are dispatched, and has to instead store them approximately 25 minutes away at the South Slocan Generating Site. FBC seeks to improve efficiency and create cost savings by permanently relocating the pole yard closer to the crews dispatch location.

Requirement 4: Centralize field operations for efficiency

The Warfield Complex houses FBC's Kootenay Station Services group, which maintains the distribution and transmission electrical substations in the Boundary and West Kootenay areas. While there are no building concerns within the group's space footprint, FBC seeks to centrally locate this group within their worksite territory, which would improve operating efficiency with resulting cost savings.

1.3.4 The Recommended Solution

FBC has evaluated several alternatives to address the immediate and longer term concerns for the facilities identified above and believes the construction of a new, centralized regional facility (the Kootenay Operations Centre) to be the most cost effective solution which addresses all objectives. Once completed, the Kootenay Operations Centre will provide FBC with a cost effective solution to replace the Generation Facilities at the South Slocan Generation Site which are at end-of-life and mitigate health, safety and code compliance concerns and space limitations and improve operational efficiency and emergency preparedness within the Kootenay region.

In addition to addressing the immediate needs of the Kootenay region, the KOC will also provide FBC an opportunity to consider future requirements of the Castlegar District Office, even though the condition and requirements of the Castlegar District Office (apart from the yard storage issue) are not part of this Application.

Specifically, the KOC Project provides a cost effective solution that will:

- Replace the Generation Facilities which are at the end-of-life;
- Address space constraints and functional challenges at the SCC and BCC;
- Eliminate risks associated with the proximity of both the SCC and BCC to certain hazards, which poses an unacceptable long term risk to the reliability of FBC operations;
- Provide full redundancy and back-up of the SCC to support continued safe and reliable operations of the FBC distribution system and to sustain business continuity of the electrical system;
- Relocate the EOC away from risks associated with its current location to an appropriately sized and central space with dedicated equipment to improve the timely and effective response to emergencies;
- Centrally locate the Kootenay Station Services group resulting in operational efficiencies and cost savings;
- Provide permanent storage for the poles and pole trailers (currently stored at the South Slocan Generating Site)[4] in close proximity to the dispatch location; and
- Provide an opportunity for FBC to consider the condition of and potential requirements for the Castlegar District Office.

The Project includes construction of a new facility located on FBC owned property centrally located in the Ootischenia area of Castlegar. This facility will include a combined office and material district stores building for material and equipment storage and a yard compound. The new KOC will:

- Replace the Generation Administration Office and the Warehouse;

[4] FBC is in the process of performing site improvements that will allow for temporary relocation of the poles and pole trailers until permanent storage is completed as part of the KOC Project scope. As further discussed in Section 6.2, permanent pole storage at the KOC Project site is contingent on the construction of the KOC Project.

- Provide a central and dedicated EOC for the Kootenay region;
- Provide storage for poles and pole trailers currently housed at the South Slocan Generation Site for Network Operations dispatched out of the Castlegar District Office; and
- Provide a central location to house the Kootenay Station Services group.

The Project will address space constraints, functional challenges and hazards associated with the SCC and BCC facilities detailed in the Confidential Application.

1.3.5 Project Costs and Rate Impact

The Kootenay Operations Centre is estimated to have a capital cost of approximately $20.651 million, including Allowance for Funds Used During Construction (AFUDC) of $1.128 million and demolition and removal costs charged to Accumulated Depreciation of $0.446 million.

A summary of the total forecast capital costs, and 2018 average cost of service, is as follows:

- Total Capital Cost (as-spent dollars) including AFUDC and abandonment and demolition cost is $20.651 million; and
- The maximum rate impact (2018) due to the KOC Project is 0.7%.

The following table summarizes the total forecast capital costs for the Project:

Table 1-1: Summary of Forecast Capital Costs & Other Financial Measures ($ millions)

Particular	2015$	As-Spent	AFUDC	Total
Total Capital Cost	18.896	19.523	1.128	**20.651**
2018 Incremental Rate Base	**20.459**			
New KOC Building Composite Depreciation Rate	**1.9%**			
Present Value of Incremental Revenue Requirement	**33.912**			
2018 Rate Increase %	**0.7%**			

Table 7-3 in Section 7.4 presents a detailed summary of the Project costs and Table 7-4 provides the financial impacts associated with the completion the KOC Project, as well as a summary of the estimated rate impacts. Both tables are based on detailed schedules set forth in Appendix G-2 Confidential.

1.3.6 Stakeholder and First Nations Consultation

The Company has identified a number of Project stakeholders, including residents, businesses, and government entities. The Company has also identified First Nations in the area of the KOC.

Communications and consultations with the stakeholders with respect to the Project have taken place, and as outlined in Section 9.1 (Public Consultation) FBC continues to consult with stakeholders regarding the scope of the Project and the Project schedule. FBC is committed to continuing consultation with Project stakeholders and will continue to ensure that, as the Project progresses, stakeholders are kept informed and have ways to provide feedback to the Company.

The Project does not impact aboriginal rights or title since the land is within a municipality, zoned for Public and Institutional use (which includes utility use) and was previously the site of a school. Nevertheless, during the preliminary stage of the Project, as further explained in Section 9.2 (First Nations Engagement), the Company informed First Nations about the Company's plan to construct the KOC in Castlegar and conducted additional archeological work which confirmed no archaeological materials or sites observed.

1.3.7 Environmental Impacts

Environmental, archeological and socio-economic assessments have been completed and conclude that the impacts associated with the Project are expected to be minimal and can be mitigated through the implementation of standard best management practices and mitigation measures.

1.3.8 Summary

The Project will address the majority of FBC's identified current and future operational and space requirements in the Kootenay region and is required for continued safe and reliable delivery of electricity to customers. Based on the information summarized above and detailed in the following sections of this Application, FBC believes it has demonstrated that the Project is in the public interest and a CPCN should be granted for the Project.

1.4 *RECOMMENDED REGULATORY REVIEW OF THE CPCN APPLICATION*

The Project was first identified in the FBC 2012-2013 Revenue Requirements, and was discussed in FBC's 2012 Integrated System Plan[5] which was accepted by Commission Order G-110-12. The Project was also described in FBC's Application for Approval of a Multi-Year

[5] Exhibit B-1 – Application, FortisBC Inc. 2012-2013 Revenue Requirements and Review of 2012 Integrated System Plan, Tab 6, pp. 98-100; FortisBC Inc. Final Submissions, FortisBC Inc. 2012-2013 Revenue Requirements and Review of 2012 Integrated System Plan, pp. 168-169.

Performance Based Ratemaking Plan for 2014 through 2018 (PBR Plan Application) as an anticipated CPCN.[6]

As per the criteria set out in Commission Order G-52-05, FBC is required to file a CPCN application for projects in excess of $20 million and for any other projects:

1. Likely to generate significant public concerns;
2. That FBC or the Commission wishes to handle through a CPCN; or
3. That a credible majority of stakeholders believes should involve a CPCN.

CPCN projects are excluded from the formula-driven capital spending envelope under the Company's Performance Based Ratemaking (PBR) Plan for the period 2014 to 2018 (approved by Order G-139-14).[7] Under Order G-139-14, FBC will continue to apply for a CPCN for the years 2014 and 2015 for projects in excess of $20 million in capital expenditures. In Section 5.3.3 (p. 179) of the PBR Plan Application, the adjustments to base capital reflected elimination of major non-recurring types of capital including the Kootenay Long Term Facilities Project.[8]

FBC recognizes the filing of the Application was later than what was anticipated at the time of the PBR Plan Application. More time was required to further evaluate the Project alternatives and scope. As a result, the Application reflects a more thorough evaluation of the Project.

The information presented in this Application accords with the guidelines set out in the Commission's *2015 Certificates of Public Convenience and Necessity Application Guidelines* (the CPCN Guidelines). Draft Procedural and Draft Final Orders are included as Appendix O-1 and Appendix O-2 respectively.

FBC believes that a written hearing process with two rounds of Information Requests from the Commission and interveners provides for an appropriate and efficient review for the Application. The alternatives available to FBC are straightforward and the selected alternative is both the most cost-effective and the only option which addresses all identified issues. The Project will address FBC's current operational and space requirements and is required for continued safe and reliable operation. Construction will be confined to property acquired and owned by FBC. The Application provides information on all areas required by the CPCN Guidelines. Any additional areas of concern in this Application can be adequately addressed through a written process.

[6] Exhibit B-1 – Application, FortisBC Inc. Application for Approval of a Multi-Year Performance Based Ratemaking Plan for 2014 through 2018, pp. 226-230.

[7] Order G-139-14, FortisBC Inc. Application for Approval of a Multi-Year Performance Based Ratemaking Plan for the years 2014 through 2018, pp. 161-162, 175. The current CPCN criteria were approved pending a further process, the FEI FBC PBR Capital Exclusion Criteria 2014-19, currently before the Commission.

[8] The Kootenay Long Term Facilities Project referred to in the 2014-2019 PBR is now described as the KOC Project as described in the Application.

FBC proposes the regulatory timetable set out in Table 1-2 below. FBC respectfully requests a Commission decision on the KOC Project by March 4, 2016 in order to maintain its schedule for tendering and awarding contracts so that construction can begin by late spring 2016 to achieve a 2017 in-service date.

Table 1-2: Proposed Regulatory Timetable

ACTION	DATE (2015)
BCUC Issues Procedural Order	Week of July 13
FEI Publishes Notice by	Week of July 20
Intervener Registration	Wednesday, August 5
Commission Information Request (IR) No. 1	Tuesday, August 11
Intervener IR No. 1	Tuesday, August 18
FBC Response to IRs No. 1	Tuesday, September 22
Commission and Intervener IR No. 2	Tuesday, October 13
FBC Response to IRs No. 2	Friday, November 6
FBC Final Written Submission	Friday, November 20
Intervener Final Written Submission	Wednesday, December 2
FBC Written Reply Submission	Friday, December 11

1.5 ORGANIZATION OF THE APPLICATION

The remainder of the Application is organized into the following sections:

- Section 2 – provides the Company's financial and technical capacity and contact information for the KOC Project;
- Section 3 – provides an overview of the existing facilities and the operational departments in the Kootenay area;
- Section 4 – describes the justification and need for the Project including space and operational limitations of facilities in the Kootenay Region;
- Section 5 – provides a review of the Project objectives and requirements and details the alternatives evaluated;
- Section 6 – provides a detailed description of the proposed Project, including construction, design, resource planning and management, schedule and risk analysis;
- Section 7 – provides the cost estimates, the assumptions upon which the financial analysis is based and the rate impacts;
- Section 8 – provides an overview of the Project environment, including a discussion of the environmental and socio-economic impacts the Project may have and how British Columbia's energy objectives are advanced by the proposed Project; and

- Section 9 – discusses FBC's public consultation and communication efforts regarding the Project.

2. THE APPLICANT

2.1 *NAME, ADDRESS, AND NATURE OF BUSINESS*

FortisBC Inc.
Suite 100, 1975 Springfield Road
Kelowna, BC V1Y 7V7

FBC is an investor-owned utility engaged in the business of generation, transmission, distribution and bulk sale of electricity in the southern interior of British Columbia. It is an integrated utility serving approximately 163,000 customers directly and indirectly. FBC was incorporated in 1897 and is regulated by the Commission pursuant to the UCA.

2.2 *FINANCIAL AND TECHNICAL CAPACITY*

FBC is capable of financing the Project. FBC has credit ratings for senior unsecured debentures from DBRS and Moody's Investors Service of A (low) and Baa1 respectively. The Company has a rate base of approximately $1.3 billion, including four hydroelectric generating plants with an aggregate capacity of 225 megawatts and approximately 7,200 kilometres of transmission and distribution power lines for the delivery of electricity to major load centres and customers in its service area. FBC employs approximately 500 full-time and part-time people.

FBC will provide the necessary resources to manage the design and construction of the KOC Project. FBC has experience in managing the design and construction and renovation of office buildings and operation centres in British Columbia. Specifically, FBC has managed the following facilities construction projects:

- Benvoulin Operations Centre, which involved construction of approximately 25,000 square feet of office, warehouse and fleet space which consolidated Kelowna operating facilities. Construction of the project was approximately 10 months and completed for occupancy in July 2002. The project was completed approximately 3 months behind schedule (due to length of time to obtain approvals from the Agricultural Land Reserve and City of Kelowna) and was under budget.
- Trail Office Building, which involved construction of approximately 55,000 square feet of office space with basement parking garage to replace a leased facility. Construction of the building took approximately 12 months and was completed for occupancy in August 1993, on time and on budget.

FBC also expects to leverage the strengths and expertise of FortisBC Energy Inc. (FEI), which has successfully completed the following recent facility projects:

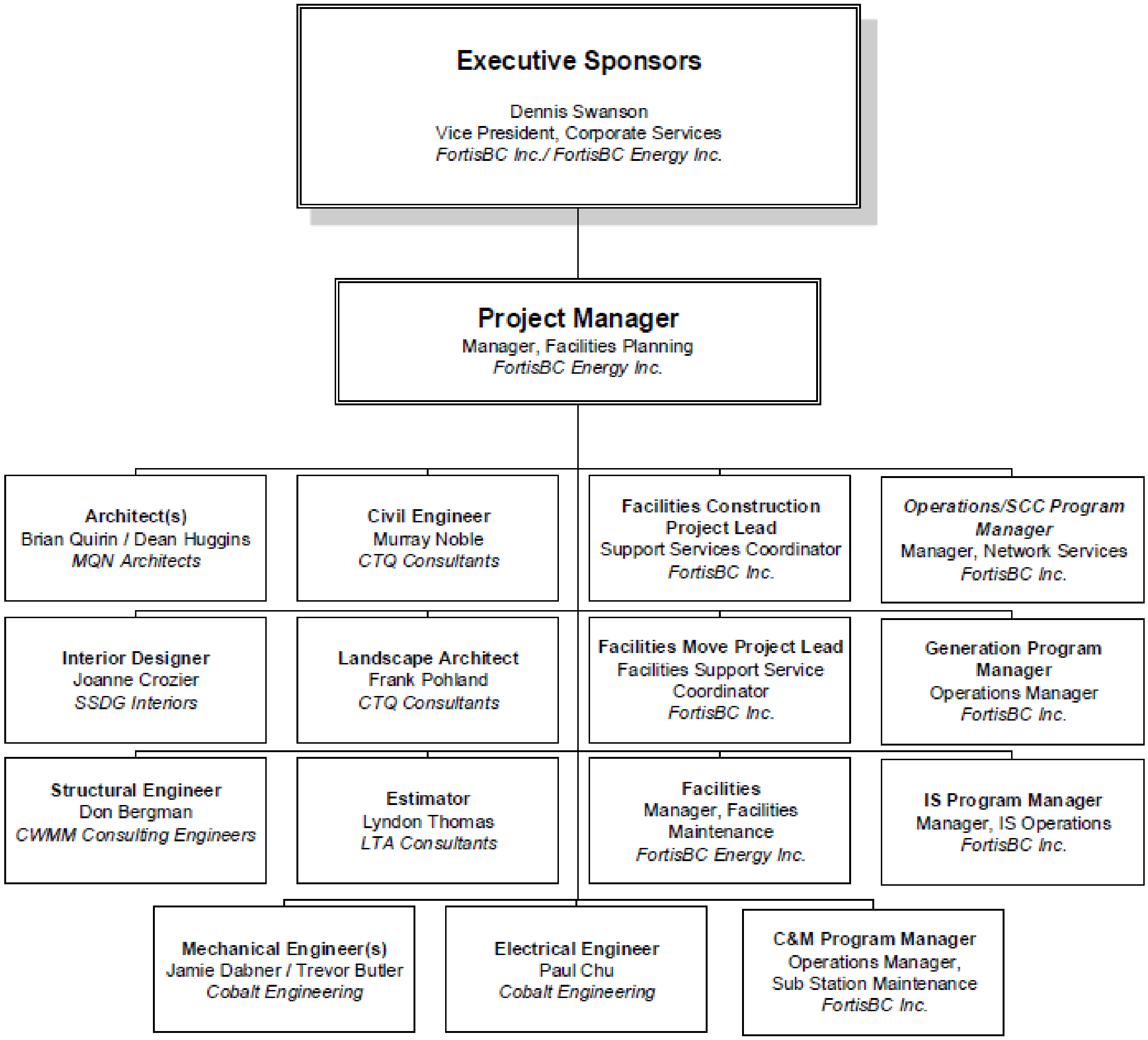
- Victoria Regional Operations Centre, which was a FortisBC Energy (Vancouver Island) Inc. (FEVI) project but was managed by FEI personnel, and involved the acquisition of land and construction of approximately 22,000 square feet Regional Office including office and warehouse space to replace an existing leased facility. The project was completed on schedule in October 2012 and under budget.

- Renovations of the Prince George Contact Centre, which included interior and system demolition of a 25,000 square feet building and installation of new energy efficient systems and finishes. This project was completed in 2011 on time and on budget.
- Tenant improvements for the Burnaby Contact Centre, which consisted of approximately 53,000 square feet of office space improvements which included systems to ensure high reliability for the 24 hour operated facility. The project was completed in June 2012, on time and on budget.

2.3 *PROJECT ORGANIZATION CHART*

For construction of the KOC, FBC has set up a Project design team consisting of both internal and external personnel, as detailed in Figure 2-1 below.

Figure 2-1: Project Organization Chart



The internal team consists of executive sponsors, project managers, and project leads for each of the construction and move phases. The internal team will be responsible for the successful delivery of the Project.

FBC has engaged consultants for the Project with extensive experience in design and construction of utility facilities. The construction contractor is not identified in the chart as the selection process has not been undertaken at this time. Further information on the construction services is provided in Section 6.7.2.

2.4 NAME, TITLE AND ADDRESS OF COMPANY CONTACT

Diane Roy
Director, Regulatory Affairs
FortisBC Inc.
Suite 100, 1975 Springfield Road
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Fax: 866-335-6295
electricity.regulatory.affairs@fortisbc.com

2.5 NAME, TITLE AND ADDRESS OF LEGAL COUNSEL

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3. OVERVIEW OF PROJECT FACILITIES AND OPERATIONAL FUNCTIONALITY

3.1 *PROJECT DESCRIPTION*

The KOC Project involves the construction of a new facility to address the issues and concerns that have been identified in the Kootenay region of the FBC service territory. The new facility will:

- replace the existing Generation Facilities at the South Slocan Generation Site which are at end-of-life;
- provide a solution for concerns related to the space, location and functionality of the SCC and BCC as described in the Confidential Application;
- mitigate risks associated with the current location and provide a centrally located and appropriately sized EOC with dedicated resources and equipment to support more timely and effective response to emergencies;
- provide a cost effective and efficient solution with resulting cost savings by central relocation of the Kootenay Station Services group;
- provide a permanent solution for pole storage; and
- provide an opportunity for FBC to consider the condition of and potential requirements for the Castlegar District Office.

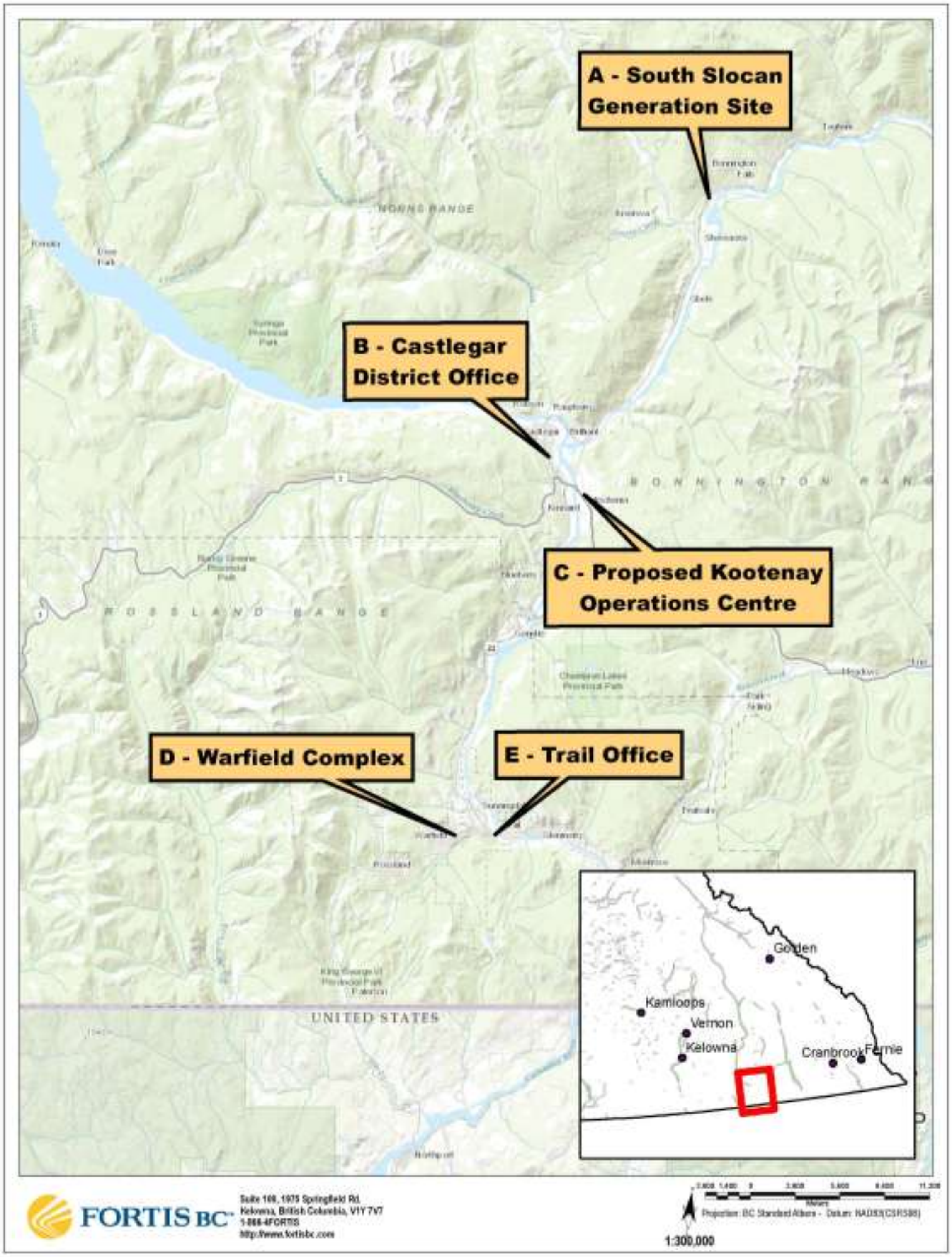
In Section 3.2, the Company provides an overview of the existing Kootenay facilities at the Generation Facilities, the Warfield Complex, the Trail Office and the yard of the Castlegar District Office and discusses the Company's facility and operational requirements for the Generation and Operation departments. Section 4 describes the Project justification. A discussion of the SCC and BCC is included in the Confidential Application.

3.2 *OVERVIEW OF EXISTING ELECTRIC FACILITIES AND OPERATIONAL FUNCTIONALITY AND REQUIREMENTS*

FBC's Kootenay service territory ranges from the Boundary/Grand Forks area in the west to Kaslo/Crawford Bay in the north and to Creston in the east. FBC has a number of facilities including offices, warehouses, dams, substations and yard storage areas, located throughout the Kootenay region.

There are four main facilities that support operational requirements for both the Kootenay region of the FBC service area and the Company as a whole: the South Slocan Generation Site which includes the Administration and Warehouse buildings (the Generation Facilities) located adjacent to the South Slocan Generating Plant; the Warfield Complex; the Trail Office Building; and the Castlegar District Office. These facilities, represented geographically in Figure 3-1 below, are critical to FBC's ongoing ability to safely and reliably deliver electricity to its customers in a cost effective manner. The area served by these facilities encompasses over 11,000 km^2 and includes approximately 37,000 of FBC's approximately 131,000 direct customers.

Figure 3-1: Key Site Locations



The Trail Office Building provides office functions such as the Customer Contact Centre, and the Engineering and Information Systems departments. The three other facilities support primarily Operations and Generation field functions tasked with maintaining and upgrading FBC's transmission and distribution lines and feeders, substations and generating plants.

A description of the building history, building use and the operational functionality for the Generation Facilities, the Warfield Complex, the Trail Office Building and the Castlegar District Office is provided below.

3.2.1 Generation Facilities

The Generation Facilities are owned by FBC and are located in South Slocan, BC. The Generation Facilities consist of the Generation Administration Office, which is approximately 14,500 square feet, and the Warehouse, which is approximately 11,300 square feet.

3.2.1.1 *Building History*

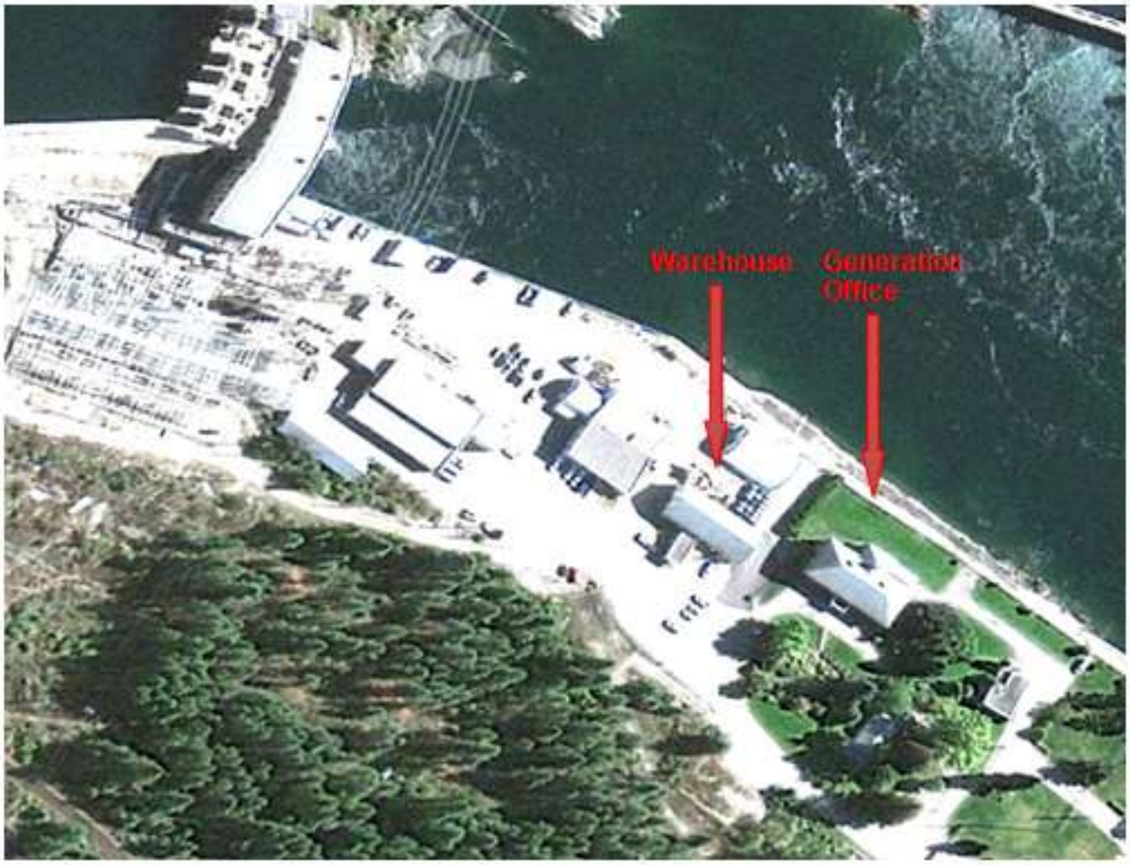
There are multiple structures at the FBC South Slocan Generation Site, including the Generation Administration Office, the Warehouse, the South Slocan Generating Plant and Powerhouse. The Generation Facilities are adjacent to the South Slocan Generating Plant and Powerhouse, which are not the subject of this Application.

The building that houses the Generation Administration Office was constructed in 1926 by Canadian Pacific Railway as a hotel supporting the construction staff. It eventually became a guest house for Cominco Ltd. In 1986, it was converted into an office building for West Kootenay Power Ltd., which was the predecessor of FBC.

The Warehouse building was originally constructed in 1930 for the purpose of housing construction horse teams, and was used for this purpose until the late 1940s, when it was converted to warehouse space.

The South Slocan Generation Site is depicted in Figure 3-2 below, with the specific buildings highlighted for reference (the Generation Administration Office is referred to as the Generation Office in Figure 3-2).

Figure 3-2: South Slocan Generation Site



3.2.1.2 *Building Use*

The Generation Administration Office contains three floors. As this building was originally constructed as a hotel, the majority of the offices are oversized and hence have shared space with two to three workstations in each room. The common facilities at the Generation Administration Office building include six washrooms (single), two meeting rooms, each of which can accommodate approximately ten people, and a shared open area on each floor containing a copier/printer. The lower floor, which is partially below ground level, contains a lunchroom, an open area containing copier/printing/plotter equipment, a large file storage area and a library of reference materials. It also contains a computer/communication room for corporate network infrastructure equipment. The Generation Administration Office currently houses Generation personnel including Engineers, Design Technologists, a Financial Analyst, Administrative Staff, and Supervisors and Managers.

The Warehouse building contains two floors as well as an unused attic/loft space. The lower floor has overhead doors and is used to store large items less than nine feet in height. The main floor contains some shelving for small material items that can be picked and packed. This floor also contains an open office to support the warehouse staff and has one unisex washroom.

3.2.1.3 *Generation Operations Functionality and Requirements*

FBC owns and operates four hydroelectric generating plants with an aggregate capacity of 225 megawatts in the Kootenay region. In addition, under third-party operating agreements, the FBC Generation department personnel located at the South Slocan Generation site operate five hydroelectric facilities totaling approximately 1300 megawatts for various owners.

Generation personnel are responsible for all day to day operations, local plant control, maintenance, capital support, service restoration and trouble calls. These responsibilities apply to all facilities and equipment from the water intakes to the transmission lines, including the plant switchyards.

The Generation department consists of the following groups:

- Major Maintenance – This group is responsible for all work other than routine maintenance, performing work on planned capital projects, non-routine projects and overhauls, and assisting the Core operations group when required. The Major Maintenance group is dispatched to hydroelectric facilities throughout the Kootenay region as required.
- Core Operation – There are four operations groups within the Generation Department. These personnel are responsible for performing routine maintenance on the plants/facilities, responding to call-outs, operating the plants and conducting daily checks on the plants.
- Administration and Support – This group is responsible for supporting Generation through preparing and planning projects for construction and auditing day to day activities to ensure employees are adhering to FBC's policies and safe work practices.
- Warehouse – Personnel at the Warehouse are responsible for managing the Warehouse and receiving and preparing material for storage, transport, and delivery.

Three electricians are on standby call for the Generation department each day.

3.2.1.4 *The Emergency Operation Centre (EOC) Functions and Activation*

The role of an Emergency Operations Centre is to support the operational response and manage the overall corporate response to an escalating emergency event. The Generation Administration Office is currently the designated EOC location to coordinate a corporate response to an emergency event occurring at or directly affecting any of FBC's Generation facilities. Currently, a meeting room in the Generation Administration Office is repurposed for use as the EOC in the case of an escalating emergency or dam alert/breach situation. In this situation, appropriate FBC staff will be brought in to support and manage the overall emergency response and recovery, including communications. Continuous coordination with agencies downstream of the dam, including local authorities, emergency services, and critical infrastructure owners, will take place throughout an emergency through the EOC. Communications to these agencies will be managed by the EOC to ensure that coordinated updates of information on priorities, activities, and risks are provided at regular intervals with the goal of maintaining public safety and the protection of property and environment.

3.2.2 Warfield Complex

The Warfield Complex property is owned by FBC and is zoned Light Industrial. It is approximately 8 acres in size and has multiple structures totalling approximately 44,000 square feet. The structures housing the Kootenay Station Services group and the groups operational functionality and requirements are described below.

3.2.2.1 *Building History*

The Warfield Complex property was purchased by FBC's predecessor in 1979 for warehouse and office use. The main structures include the combined Office and Warehouse/Truck Bays and the Fleet Operations building.

3.2.2.2 *Building Use*

The structures discussed in this Primary Application are the combined Office and Warehouse/Truck Bays and the Fleet Operations building and are depicted in Figure 3-3 below.

The Office (approximately 5,000 square feet) and Warehouse/Truck Bays (approximately 21,200 square feet) structure is a combined use building currently housing the following Network Services and the Kootenay Station Services employees serving the Kootenay region: Line Operations, Station Services, Fleet Services, Warehousing, and Engineering Services groups. Further, it provides warehouse storage for materials and dry heated storage for specialized Operations vehicle requirements.

Fleet Operations manages vehicle needs and performs scheduled and emergency mechanical work for the larger fleet vehicles. Fleet Operations occupies a total of about 11,250 square feet of space in the Warfield Complex with shops, office space and covered parking.

Figure 3-3: Warfield Complex

3.2.2.3 *Kootenay Station Services Operational Functionality and Requirements*

The Kootenay Station Services group is based out of the Warfield Complex and is responsible for the operation and maintenance of generation, transmission and distribution substations. The Station Services group mainly consists of Communication Protection and Control Technicians, Electricians, and Meter Technicians. During outage situations, the Stations Services group provides technical and trouble support when station equipment, protection and control and/or telecommunications are involved. This group also provides all internal field resources for capital and maintenance work for the transmission, distribution and generation substations in the Kootenay region. Its responsibilities include routine station checks, radio and telecommunications troubleshooting and testing, transformer and equipment testing, MRS testing, commissioning of station equipment and SCADA controls, as well as scheduled and unscheduled tests on cables, metering, telecommunications and protective relaying facilities to support safe and reliable operation of the electric network.

A tradesperson, typically an electrician, is on standby call for the Kootenay Station Services group each day.

3.2.3 Trail Office Building

The Trail Office Building is owned by FBC and is located in Trail, BC. The site houses a four-story building with parkade totalling approximately 45,000 square footage of Useable Space.[9]

3.2.3.1 *Building History*

The building was constructed, and FBC's predecessor entered into a lease agreement for the space, in 1993. In 2013, FBC exercised its option to purchase the building, which was approved by Order G-110-12. The site has one structure.

3.2.3.2 *Building Use*

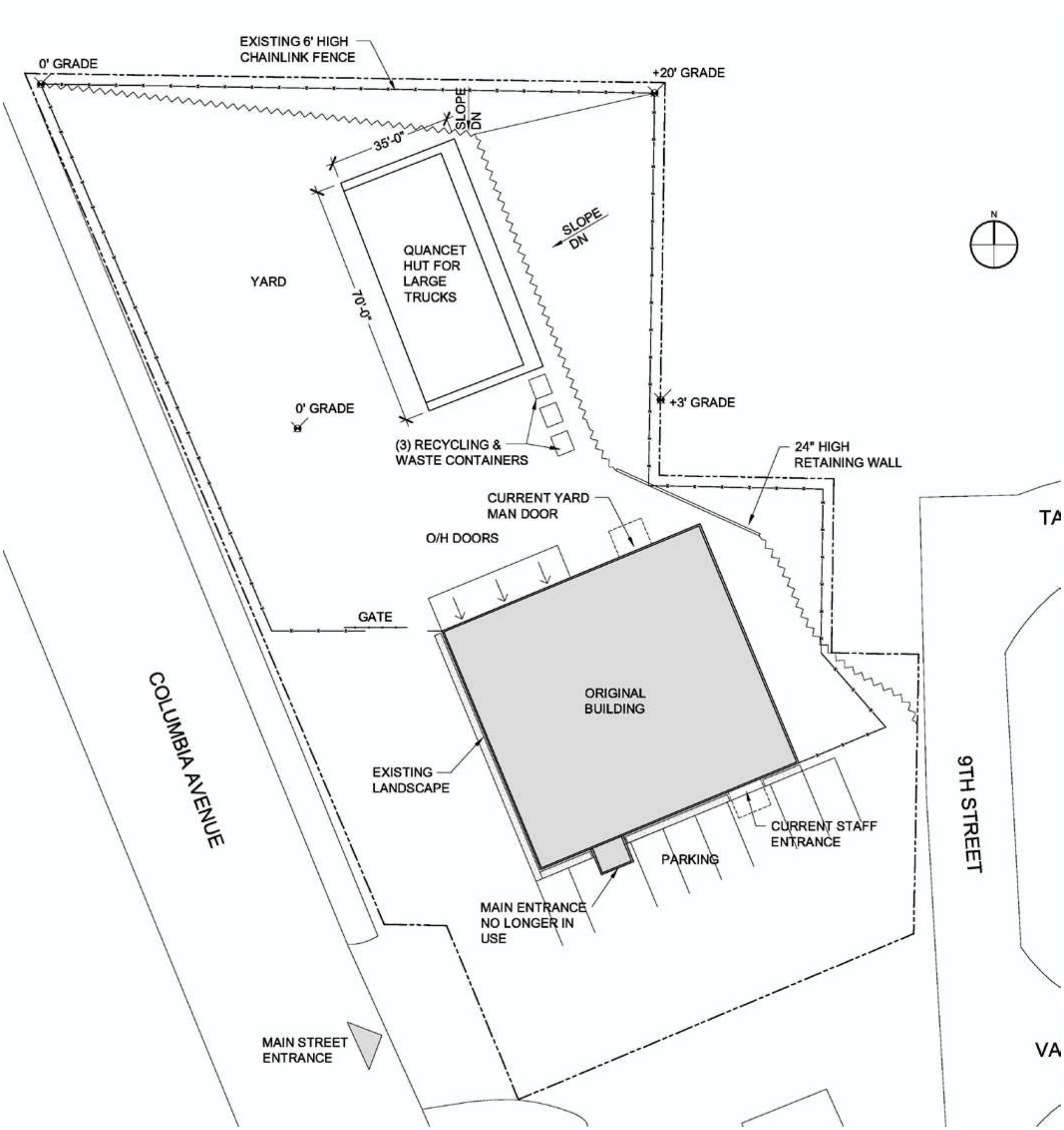
The building houses the Customer Contact Centre, and provides office space for Engineering Services, Information Systems, Human Resources and Regulatory personnel. Additionally, some of the building is leased to tenants. Other than the sidewalk, there is no additional land beyond the building's footprint.

3.2.4 Castlegar District Office

The Castlegar District Office is owned by FBC and is located in Castlegar, BC. The site consists of 42,750 square feet (0.98 acres) of land with 8,581 square feet of building structures on the property. As shown in Figure 3-4, the site is bordered on three sides by chain-link fencing and has a large elevated retaining wall on the fourth side limiting any further expansion.

[9] See definition in Section 5.

Figure 3-4: Castlegar District Office Site Plan



This Application affects the Castlegar District Office only with respect to the yard space limitations. The Castlegar District Office has age and condition issues and is nearing end-of-life but the facility condition and requirements can be addressed in the future. This Application provides a general description of the condition and function of the Castlegar District Office for context and background.

Building History and Use

The Castlegar District Office contains 2,100 square feet of office and 3,775 square feet of shop/warehouse/storage. The single level combined office and warehouse facility was originally constructed in 1962 and was purchased by FBC's Predecessor in 1989 and renovated for use as a district office.

The building houses Line Operations and other supervisory staff.

The building's warehouse contains an open area that houses material storage, a shop, lockers and vehicle storage. The overhead bay doors in the warehouse area are 12 feet high and have insufficient clearance for modern aerial rubber boom derrick bucket trucks (RBD trucks). A Quonset hut is located onsite for parking the RBD trucks (shown in Figure 4-4) but does not accommodate all the trucks; large trucks that do not fit under cover in the yard at the Castlegar District Office are covered with tarps every night during cold months, to ensure they are ready for use each day.

Yard at the District Office

The yard at the Castlegar District Office provides space for fleet and material storage for the Network Operations group including storage of items such as transformers, wire and lamp standards. The Castlegar District Office Power Line Technicians (PLTs) require access to poles and a pole trailer for installation of new services and emergency response for power outages involving damage to the poles. As the Castlegar District Office does not have space to store and access poles and pole trailers on site, these items are currently stored at the South Slocan Generation Site, which is approximately 25 minutes from the dispatch office.[10]

3.2.4.1 *Network Services Operational Functionality and Requirements*

The Kootenay Network Services Group out of the Castlegar District Office has overall responsibility for the Transmission and Distribution (T&D) facilities in the north Kootenay area. The majority of employees in Network Services are PLTs within the Line Operations group, and are the first responders for any power outages in the area. In addition to emergency response, the PLTs also perform activities to ensure the safety and reliability of the transmission and distribution system. These include annual line patrols, preventative and corrective maintenance of the transmission lines and distribution feeders, meter installations, disconnect/reconnects, non-emergency customer premises calls, and line construction services.

[10] FBC is in the process of performing site improvements that will allow for temporary relocation of the poles and pole trailers until permanent storage is completed as part of the KOC Project scope.

4. PROJECT JUSTIFICATION

4.1 *PRIMARY PROJECT DRIVERS*

The KOC Project is proposed to address issues associated with existing facilities in the Kootenay region of the FBC service territory.

The Generation Administration Office and Warehouse were built prior to modern-day building codes, in 1926 and 1930 respectively, and FBC has identified two primary concerns with these buildings requiring their repair or replacement. The first is the age, critical end-of-life condition and associated health, safety, and code compliance concerns of the existing Generation Facilities, and the second is their location and proximity to certain hazards, which could limit FBC's timely and efficient response to emergencies.

In addition to the immediate requirement to repair or replace the Generation Facilities, FBC has identified other critical operational requirements in the Kootenay region that require investment to address concerns related to the condition and practical limitations of the facilities currently in use: the SCC, the BCC and the yard at the Castlegar District Office. A further consideration is that the Company realize potential efficiencies and cost savings where feasible, and the Project provides an opportunity to do so for the Kootenay Station Services group.

This section will further describe the concerns identified within the Kootenay region. Specifically, the following primary concerns have been identified:

- The Generation Facilities are at the end-of-life and their condition poses future health, safety and compliance concerns;
- The Generation Facilities have functional challenges due to structural constraints and design limitations;
- FBC does not have a central and dedicated fully functional EOC in the region, and there are risks associated with the current EOC locations which could impact the timely and effective response to emergencies;
- The Kootenay Station Services group based out of the Warfield Complex is not centrally located in relation to their work locations; and
- Pole, construction project materials and pole trailers are not located in close proximity to the Network Operations dispatch location in Castlegar, resulting in operational inefficiencies.

In summary, the KOC Project will replace the existing Generation Facilities at the South Slocan Generation Site which are at end-of-life and pose health, safety and code compliance concerns due to the age and condition of facilities. The Project will also mitigate risks associated with the current location of the EOC and provide a centrally located and appropriately sized EOC with dedicated resources and equipment to support more timely and effective response to emergencies. Further, the Project will provide a cost effective and efficient solution with resulting cost savings for relocation of the Kootenay Station Services group, will provide a permanent solution for pole storage, and will provide an opportunity to consider the condition and requirements of the Castlegar District Office in the future.

The Confidential Application describes how the KOC Project addresses concerns related to the space, location and functionality of the SCC and BCC.

4.2 *GENERATION FACILITIES*

This Application addresses the Generation Facilities at the South Slocan Generation Site. The primary purpose of the South Slocan Generation Site is to support Generation Operations for the Company. There are multiple structures on the site, including the Generation Facilities. The other structures on the site support the Powerhouse and Generating Plant function.

FBC has identified three concerns with regard to the Generation Administration Office and Warehouse buildings:

1. Both buildings are beyond their expected end-of-life, which results in a variety of immediate performance issues impacting compliance, health, safety and facility operation;
2. The location of the Generation Administration Office is unsuitable for use as the designated Emergency Operations Centre for an emergency at any of the FBC owned and operated generation facilities; and
3. The Generation Administration Office and the Warehouse buildings do not function well as office and warehouse space respectively due to their original design purposes.

Each of these issues is explained in more detail below.

4.2.1 The Generation Facilities are at the End-of-Life

The Generation Administration Office and Warehouse buildings at the South Slocan Generation Site were built in 1926 and 1930 respectively and are over 85 years of age. The age of these buildings is well past the expected nominal building life of 60 years.

The deterioration of the buildings during their 85 plus year lifespan has resulted in clear signs of damage and extensive building component failure, which pose code compliance concerns and future health and safety concerns if not addressed.

FBC engaged Iredale Architecture Group to complete an extensive condition audit of these two buildings. A copy of the condition audit report (the Condition Report) is provided as Appendix B. The Condition Report concludes that both buildings are beyond their life expectancy. It also identifies a significant number of items requiring replacement or additions, including all building envelope components, fire detection systems, fire protection systems, electrical systems, plumbing systems, mechanical systems, and finish. As each of these systems fails, the Company will be required to complete a major replacement in order to keep the buildings suitable as a workplace. It would be expensive and disruptive to address these failures individually due to the environmental issues in the buildings and the extensive work which would be required to address structural issues.

The Condition Report further evaluates conformance to BC Building Code. The Warehouse building was constructed prior to the existing code and is grandfathered from compliance with the current code. If substantially changed or added onto, features which would have to be brought up to code include means of egress, fire suppression, fire separation, structural lateral loading, handicap accessibility and building envelope energy performance.

The Generation Administration Office building was renovated in 1986 and is subject to the 1980 BC Building Code. The Generation Administration Office code review identified handicap accessibility, egress structural lateral loading and fire suppression concerns.[11] In consideration of safety and the Company's responsibility to maintain a safe work environment, FBC has implemented temporary measures to address the life safety systems of the building such as installing fire panel notification and annunciation, correcting door egress and adding exit signs. These measures only address immediate building safety concerns and are intended to be interim until resolved through a long-term solution.

FBC has also identified environmental and health issues with the buildings. Ongoing water penetration into the buildings due to failed building envelope components will lead to mould growth, and will present a future health risk. A number of areas contain undisturbed asbestos, lead-based paint and ozone-depleting substances. Disturbance of these hazards through destructive testing or remediation of indoor air quality issues like mould has the potential to impact the health of FBC's employees working at the site. Any removal of these hazards is required to comply with strict regulations to protect the health and wellness of the employees that work in the space and the contractors that remove the hazards.

Copies of the life-cycle analysis charts included in the Generation Office and Warehouse Facility Assessment Report are provided below in Figure 4-1a and Figure 4-1b, and show that nearly all building components are well beyond their life expectancy.

[11] Appendix B-2 – Generation Office and Warehouse Architectural Report, pp. 2 and 4.

Figure 4-1a: Generation Administration Office Life-Cycle Analysis

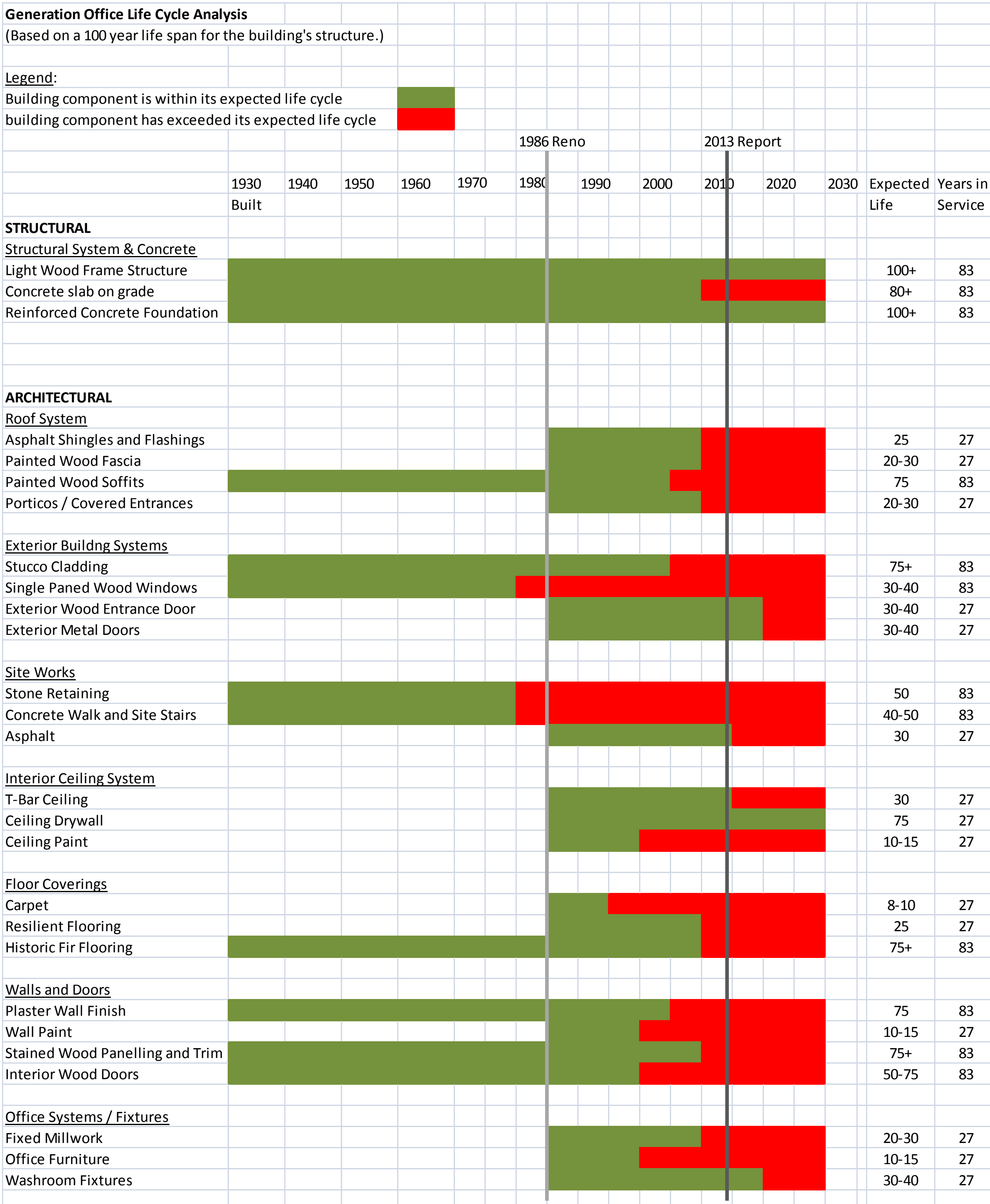
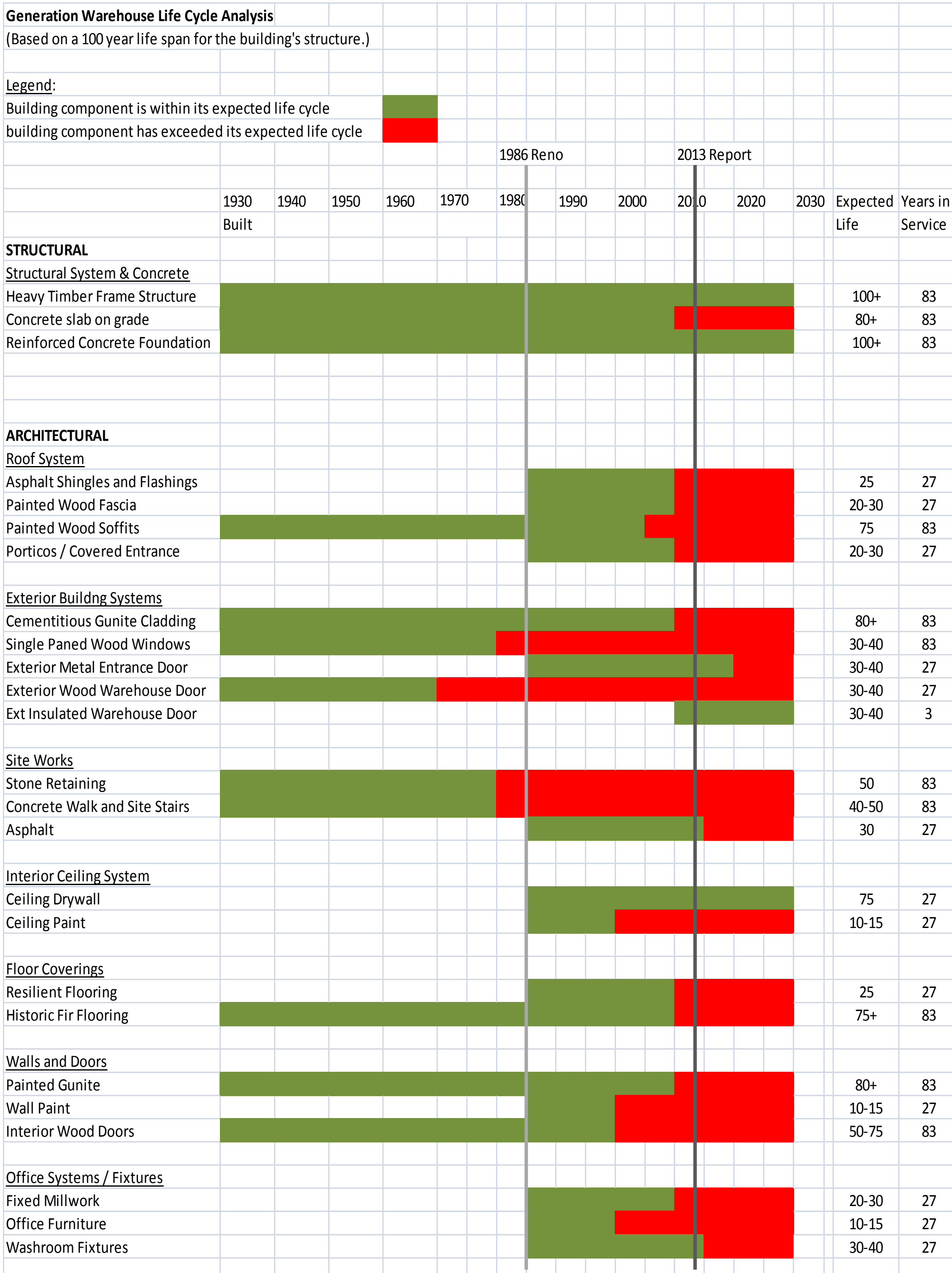


Figure 4-1b: Generation Warehouse Life-Cycle Analysis



Photographs of some of the components of the Generation Administration Office and Warehouse described in the Generation Office and Warehouse Facility Assessment Report are shown in Figure 4-2 to further illustrate the advanced age and deteriorated condition of the Generation Facilities.

Figure 4-2: Generation Administration Office and Warehouse

Generation Administration Building Envelope Failure

Generation Administration Office - Building Roof Condition

Generation Warehouse Water Penetration through the Building Envelope

Generation Warehouse Sill Plate Rot

Generation Warehouse Building Envelope Failure

Generation Warehouse Single Pane Window, No Building Insulation, Flooring Condition

4.2.2 The Generation Facilities Functional Challenges

The current Generation Administration Office building was constructed in 1926 as a Canadian Pacific Rail staff house and was converted by FBC's Predecessor in 1986 to an administration office. The layout of the building space to support office functions is not effective for several reasons:

- The Useable Space on the floors is fragmented due to the change in use of building from residential to office. The space was not originally built to support office functions, nor is it well suited or conducive to employee collaboration. For example, each of the original bedrooms, which have now been converted to office space, has an adjoining full washroom, which is not a productive use of limited office space and limits floor area reconfiguration;
- There is no central building core typically used to provide efficiency in an office building layout; and
- The current building hallways, stairs and other vertical penetrations render the space difficult to use efficiently.

The adjacent Warehouse building, constructed in 1930, is used for storage. Originally the Warehouse basement was used as a horse barn to house construction horse teams. The Warehouse basement now stores large material. The space is not effective for Warehouse operations and storage for the following reasons:

- Forklift operation for the Warehouse can only be used on the first floor as the second and third floors are made of wood that cannot structurally support the forklift operation and heavy item storage;
- The limited ceiling height of each of the floors of the Warehouse, at approximately 8 feet clear, restricts maximization and efficiency of racking and shelving layout and forklift operation; and
- The building envelope has reached its end-of-life and water runs through the basement when it rains and during the spring snow melt.

4.3 *REQUIREMENT FOR A FULLY FUNCTIONING AND DEDICATED EOC*

The role of an Emergency Operations Centre is to support the operational response and manage the overall corporate response to all levels of an emergency event. Contrary to best practices, FBC does not currently have a centralized and dedicated fully functioning EOC to manage all transmission, distribution and generation events.[12]

[12] Best practices provided in the Canadian Standards Association (CSA) Z1600-14 Emergency and Continuity Management Program highlight the advantages of a dedicated EOC and the communications and situational awareness benefits of a centralized EOC.

This presents certain challenges associated with emergency response communications and situational awareness[13] in the FBC electric service territory and could impact the timely and effective response to emergencies. In the sections below, FBC describes the need for a fully functioning and dedicated EOC with sufficient space to house both personnel and equipment configured to facilitate collaboration, situational awareness, information sharing, strategic discussions and confidential data sharing below.

4.3.1 Current EOC Limitations

4.3.1.1 *Communications*

FBC has two meeting rooms identified in the FBC service territory that can be set up for EOC purposes if required. In the Kootenay region, FBC has several lower level emergencies per year where an Area Command Centre (ACC) or lower level EOC is activated.[14] There is a meeting room in the Generation Administration Office that can be used to manage smaller scale generation plant emergencies if required, and a similar meeting room in the Springfield facility which can be set up to manage other emergencies if required.

Both meeting rooms have space limitations which prevent key response positions from being located at the same place. Limits to communications with the SCC and situational awareness are discussed in the Confidential Application. The presence of key individuals in the same room is recommended as it permits rapid information exchange and situational awareness so all involved in the emergency response are familiar with the action plan and are current on the situation, risk, and incident details. If multiple groups are not present in the same room the amount of external communication increases which can potentially limit the timely response to emergencies.

4.3.1.2 *Activation*

Current space, equipment and configuration limitations at the Springfield and South Slocan facilities hinder efficient functionality of the EOC/ACC and rapid activation due to the additional time required to establish the EOC/ACC.

A rapid response to emergency requires an EOC that has the key personnel, designated space, tools and equipment immediately available to manage, support and coordinate the emergency response.

As noted above, the FBC electric service territory does not have a dedicated and fully functioning EOC/ACC. There are functional limitations with the meeting rooms that are designated for use as an EOC/ACC if activated. The meeting rooms do not provide suitable

[13] Situational awareness is the ability to identify, process, and comprehend critical elements of information about what is happening to workers and infrastructure in the field.

[14] EOC in this Application is used to refer to activation of an ACC or EOC for any level of transmission, distribution and generation event.

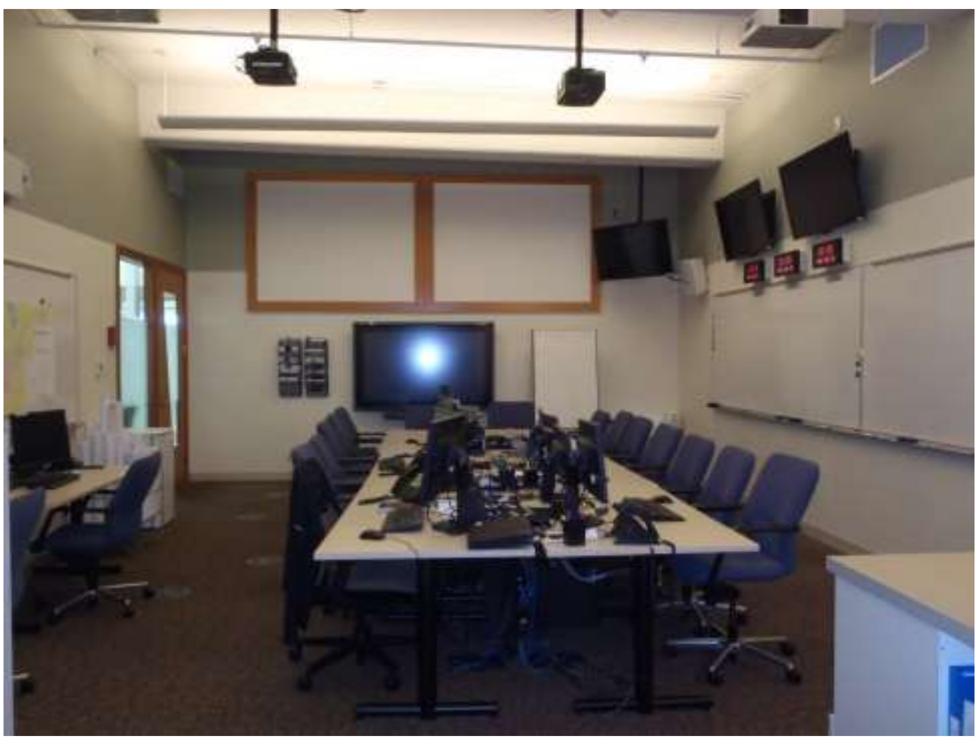
space for the set-up of an effective, open work area that is desirable in an EOC/ACC, complete with the technological, infrastructure, equipment and telecommunications that are necessary for a fully functioning EOC/ACC. In an emergency situation requiring activation of an EOC/ACC, a meeting room in the Springfield facility or South Slocan Generation Office would be converted within approximately one hour. This meeting room would be re-purposed and set up with the appropriate communication and hardware equipment and support material. Emergency response could be delayed as a result of having to set up and activate the EOC/ACC.

The limitations were confirmed during an EOC drill conducted in 2012 at FBC's Springfield facility in Kelowna. During this drill, FBC was able to evaluate the ability to convert an existing office space room at that facility to an EOC and determine whether the space, layout, and availability of equipment and supplies were adequate for the EOC to function effectively. Several issues were identified during the EOC drill, including:

- Furniture and equipment was fixed and not moveable;
- There was insufficient space to accommodate required the emergency response positions; and
- Technological, infrastructure, equipment and telecommunication challenges were encountered.

An example of a dedicated and fully-functioning EOC located in the FortisBC Energy Inc. Surrey Operations Centre is shown in Figure 4-3 below.

Figure 4-3: An example of a dedicated EOC



4.3.2 Risks Associated with the Current Location of the South Slocan Generation Office EOC

In addition, and as described in Section 3.2.1.4, the physical location of the South Slocan Generation Site presents risks should the EOC continue to be situated there. The Generation Facilities play an important role in the event of an emergency, and must remain accessible and operational in such circumstances. The Generation Administration Office is the designated Emergency Operations Centre in the event of an emergency at any of the FBC owned or operated generating plants. The Warehouse holds critical equipment that may be required during an emergency. In an emergency, employees located at these buildings are required to manage and respond to immediate and potential consequences to FBC's hydroelectric plants and FBC managed plants.

The current location of the Generation Administration Office presents potential risks which could impact key emergency functions:

- The Generation Facilities are located in the flood zone of the Kootenay River, as well as the inundation zone and the evacuation zone for the BC Hydro Canal Plant, the FBC Corra Linn Dam, and the U.S. Army Corps of Engineers Libby Dam; and
- The buildings are isolated by an uncontrolled railway crossing, which may potentially restrict or prevent access to the Generation Facilities during an emergency.

A flood or inundation event at the Generation Facilities site or restricted access due to an event at the railway crossing could result in an evacuation of staff and relocation of the EOC function. There would be a delay in emergency response as extra time would be required to set up the EOC at an alternate site, including relocation of responders and collection of key information, materials, and equipment from various locations in the Kootenay region.

4.4 *SYSTEM CONTROL CENTRE AND BACK-UP CONTROL CENTRE*

The SCC and BCC facilities are a critical component of the Company's operation because they manage employee and public safety through the monitoring and control of the power system, power supply operations to meet load requirements, water management, and managing the safety and reliability of the electrical supply.

The SCC was built in 1988 to house the Company's first computerized SCADA installation and the operating and support personnel who managed the power system. At that time, the scope of the SCC covered only the operational control and monitoring for the generation plants and transmission system; distribution operation functions were distributed amongst field personnel throughout the FBC service territory. Technological advancements since that time have allowed for much greater monitoring and control of the electrical system from the SCC which has improved customer reliability and provided enhanced consistency in safe work practices. The SCC now has a much more significant role in the support of all areas of the entire electrical system and requires additional space to accommodate changes such as the increased volume of distribution operation workload.

The BCC provides continuity of the critical processes for the Bulk Electric System in accordance with MRS requirements. Although the BCC can support the transmission and generation systems in the event that the SCC becomes inoperable, there are no Distribution Desks or direct support for distribution at the BCC due to space constraints. This limits the Company's resiliency and redundancy necessary for a business continuity plan that meets customer expectations for safe and reliable system operation.

There are three main concerns with the SCC and BCC:

- Space constraints limit SCC and BCC distribution desk operational capabilities, the SCC operational support function, and control centre training capability;
- Functional challenges at the SCC and BCC interfere with providing a productive and healthy working environment. As well, there are potential building code compliance concerns should any modifications to the SCC trailer be undertaken; and
- Local hazards in close proximity to both the SCC and BCC pose a risk that both control centres could be disabled simultaneously. If any single event were to affect both the SCC and BCC, the Company would have to manually monitor and control the electric system, which is impractical and unsustainable.

More detailed information related to FBC's SCC and BCC facilities and issues which affect them is provided in the Confidential Application.

4.5 *KOOTENAY STATION SERVICES GROUP IS NOT CENTRALLY LOCATED*

FBC has identified inefficiencies associated with the location of the Kootenay Station Services group.

The Kootenay Station Services group operates out of the Warfield Complex, which introduces inefficiencies in travel time. As shown in Figure 3-1, the Warfield Complex is not centrally located in relation to the employees' work locations. In general, for daily activities, members of this group are currently dispatched from the Warfield Complex. As a result, personnel routinely have significant travel to mobilize to work locations and trouble calls.

In addition, FBC recognizes there are certain inefficiencies due to the separation of the Generation Major Maintenance electricians located at the Generation Facilities described in Section 3.2.1.3 and the Kootenay Station Services Group located at the Warfield Complex. The groups share similar job functions but due to logistics have historically operated independently. There is some duplication of vehicles, tools, and equipment required for each of these groups to operate independently.

4.6 *YARD AT THE CASTLEGAR DISTRICT OFFICE*

The yard at the Castlegar District Office is congested, difficult to access, and is currently inadequate to stage standardized operational material like poles and trailers and the large operations vehicles used by FBC. As a result of these issues, FBC cannot store poles within the yard where crews are dispatched and instead stores them approximately 25 minutes away. Relocation of the pole yard to place it close to the crew dispatch location would improve efficiency for capital and third party work.

4.6.1 The Current Yard is Constrained and is Not Suitable for Certain Vehicles

The yard at the Castlegar District Office has immediate constraints that should be resolved.

First, the yard cannot adequately house all the vehicles needed to be housed there. Certain vehicles are not able to fit within the warehouse area and are therefore not adequately protected from the elements or kept dry. The overhead bay doors in the warehouse area are too small to accommodate the RBD trucks. Although the size of the 12 foot high bays was sufficient for older models of RBD trucks, the current models used by FBC are 13.5 feet and require height clearance of 14 feet.

A Quonset hut is currently being used for parking for the RBD trucks (Figure 4-4). These vehicles require electric plugins for their diesel engines as well as covered dry storage to ensure the safety of FBC staff when working on electrical lines. Although the Quonset hut provides some protection from the elements, it does not provide full protection as a secure enclosed garage would. The current RBD model only partially fits in the Quonset hut, and the replacement RBD truck planned for deployment at the Castlegar District Office in 2015 will also extend out of the cover due to its length. These larger RBD trucks have a longer boom which is required to set the longer poles in the ground that are currently being used by FBC. Not all RBD trucks fit in the Quonset hut; large trucks that do not fit under cover in the yard at the Castlegar District Office are covered with tarps every night during cold months so that they are ready for use each day.

Second, yard space at the Castlegar District Office is very constrained, which results in more movement of RBD trucks to and from distant storage facilities and other associated issues. Examples of the issues caused by the constrained yard space include:

- Poles, pole trailers and construction project material to support operations in the Castlegar District Office are stored 24 kilometres away at the South Slocan Generating Site because they do not fit at the yard at Castlegar District Office where crews are dispatched. On a typical callout that requires a pole, usually two PLTs from Castlegar District Office Operations drive the line truck to the South Slocan site to load a pole or poles which means a round trip of approximately 50 kilometres from the Castlegar District Office location.
- Transformers and other materials are stored outside the fenced yard which is a less secure location.
- A line truck with a pole trailer attached cannot be driven into the yard at the Castlegar District Office as there is insufficient space to turn around. It is difficult to manoeuvre other trucks in the yard. For instance, everyday tasks like end-of-day truck parking have

to be done in a certain guided sequence in order to fit all the trucks in. In addition, waste and material recycle bin pickup is a challenge, as is snow clearing in the winter.

FBC is currently in the process of temporarily moving poles, construction project materials and pole trailers to the vacant lot in Ootischenia, Castlegar until site improvements are completed as part of the Project scope and permanent storage can be completed. Relocation of the materials to this site will reduce travel time for Network Operations crews dispatched out of Castlegar District Office.

Figure 4-4 and 4-5 below depict the yard space at the Castlegar District Office.

Figure 4-4: Castlegar Quonset Hut

Figure 4-5: Castlegar Yard

4.6.2 Castlegar District Office Nearing End-of-Life Expectancy

FBC engaged Iredale Group Architecture to complete a condition audit of the Castlegar District Office, which is provided as Appendix C. The 2012 report identified that the building (constructed in 1962) is nearing its end-of-life within the next 3 to 5 years. The Company's long term plan is to operate the Castlegar District Office to its end-of-life, after which the KOC site can be considered to accommodate its functions.

4.7 *SUMMARY OF PROJECT JUSTIFICATION*

FBC has identified the following objectives based on the concerns identified in Section 4:

- Address the Generation Facilities which are at the end-of-life and have condition issues which pose future health, safety and compliance concerns if not resolved;

- Address the functional challenges at Generation Facilities due to structural constraints and design limitations;
- Address space constraints and functional challenges for the SCC and BCC;
- Eliminate risks associated with the proximity of both the SCC and BCC to certain hazards which pose an unacceptable long term risk to the reliability of FBC operations;
- Provide full redundancy and back-up of the SCC to support continued safe and reliable operations of the FBC distribution system and to sustain business continuity of the electrical system;
- Relocate the EOC away from risks associated with its current location to an appropriately sized and central space with dedicated equipment to improve the timely and effective response to emergencies;
- Centrally locate the Kootenay Station Services group, resulting in operational efficiencies and cost savings;
- Provide permanent storage for the poles and pole trailers (currently stored at the South Slocan Generating Site) in close proximity to the dispatch location; and
- Provide an opportunity for FBC to consider the condition of and potential requirements for the Castlegar District Office.

5. PROJECT ALTERNATIVES

FBC evaluated five alternatives to address the issues with the existing facilities discussed in Section 4. This section reviews each of the alternatives within the context of resolving the main issues identified in Section 4 and compares their relative costs and rate impacts.

Office building space programs are documents developed to calculate the required square footage for a building using headcount, furniture standards and circulation factors. The office building space programs provided are presented in terms of Gross Space and Useable Space. For reference, Gross Space is defined as the total floor area inside the building envelope, including the external walls, and excluding the roof. Useable Space is defined as the Gross Space excluding:

- stairwells;
- elevators and escalator shafts;
- building equipment and service areas;
- entrance and elevator lobbies;
- stacks and shafts; and
- permanent corridors in place or required by local codes and ordinances and/or required by the Company to provide an acceptable level of safety and/or to provide access to all essential building elements.

5.1 *SELECTION CRITERIA*

The Company has taken a strategic approach by pursuing a single, integrated solution to resolving the issues at all of the various facilities identified in the Application. The need to address multiple facilities at different locations provides the Company with an opportunity to resolve both the near term and longer term challenges that the Company will be facing within the Kootenay region, while allowing the Company to achieve efficiencies through centralization of functions and personnel that are currently spread out in the region and through avoidance of duplication in building design and space.

In determining the alternatives for the Project, the Company considered the ability of each alternative to meet the following criteria:

1. Address the immediate space and functional limitations of facilities which play an integral part of the Company's operational requirements. Key considerations include how each alternative will:
   - Address the end-of-life and condition issues at the Generation Facilities which pose future health, safety and compliance concerns if not resolved;

- Address the functional challenges at Generation Facilities due to structural constraints and design limitations;
- Relocate the EOC away from risks associated with its current location, in an appropriately sized and central space with dedicated equipment to improve the timely and effective response to emergencies;
- Centrally locate the Kootenay Station Services group to achieve operational efficiencies and cost savings;
- Provide permanent storage for the pole, construction project materials and pole trailers in close proximity to the Network Operations dispatch location in Castlegar; and
- Provide an opportunity to consider the condition and requirements of the Castlegar District Office when it reaches its end-of-life.

2. Resolve space issues consistent with the Company's long term space strategy that seeks to achieve the following:
   - Ensure a safe and efficient working environment and meet building code requirements;
   - Provide building capacity to meet current and future requirements;
   - Provide facilities within the service area and in a suitable location;
   - Provide for energy efficient facilities, which allow for cost effective operations; and
   - Ensure full utilization of the useful life of the building assets.

3. Provide a cost effective solution in consideration of both short-term and long-term rate impacts to customers.

The SCC and BCC selection criteria are outlined in the Confidential Application.

For each alternative discussed below, the Company considered the advantages and disadvantages of the alternative in light of the selection criteria discussed above. Alternatives that did not sufficiently meet the key objectives were not considered feasible.

5.2 *ALTERNATIVES CONSIDERED*

FBC evaluated five alternatives for their ability to address the overall Project needs. The alternatives, including capital costs, are discussed in further detail below. Table 5-3 comparing the ability of each alternative to meet the criteria is presented below in Section 5.3. The five alternatives considered are:

1. Alternative 1 – Do nothing to the existing facilities. This would involve operating the existing facilities in their current form with no renovations, replacements or relocation of space.
2. Alternative 2 – Renovate the existing facilities. This alternative includes renovating the Generation Facilities at the South Slocan Generation Site. The Generation Administration Office renovation would include a dedicated and fully functioning EOC.
3. Alternative 3 – Replace the existing facilities. This alternative includes replacement of the Generation Facilities buildings with a new combined office and material district stores located at the South Slocan Generation Site. The Generation Administration Office replacement would include a dedicated and fully functioning EOC.
4. Alternative 4 – Lease of a combined office and material district stores facility in or around the central location of Castlegar.
5. Alternative 5 – Construct a new combined office and material district stores at the KOC Project site to replace the Generation Facilities. The KOC would include a dedicated and fully functioning EOC, space to accommodate the relocation of the Station Services group from the Warfield Complex and yard storage for pole, pole trailer and construction project materials.

The SCC and BCC portions of the alternatives are discussed in the Confidential Application.

5.2.1 Alternative 1 – Do Nothing

The alternative of "doing nothing", i.e. maintaining the status quo, is not a feasible option for the Generation Facilities given the age, condition and location issues of the Generation Facilities and the potential for failure of key mechanical and electrical systems.

Advantages:

- FBC has not identified any advantages to this alternative.

Disadvantages:

This alternative does not:

- Address the end-of-life and condition issues at the Generation Facilities;
- Address health, safety and code compliance concerns related to the building condition;
- Address the functional challenges at Generation Facilities;
- Provide a dedicated and fully functioning EOC in a suitable location;
- Centrally locate the Kootenay Station Services group to achieve operational efficiencies and cost savings;
- Provide permanent storage for the pole, construction project materials and pole trailers in close proximity to the Network Operations dispatch location in Castlegar;

- Provide an opportunity to consider the condition and requirements of the Castlegar District Office when it reaches its end-of-life; and
- Resolve space issues consistent with the Company's long term space strategy that seeks to achieve the following:
  - Ensure a safe and efficient working environment and meet building code requirements;
  - Provide building capacity to meet current and future requirements;
  - Provide facilities within the service area and in a suitable location; and
  - Provide for energy efficient facilities, which allow for cost effective operations.

5.2.1.1 *Alternative 1 – Summary*

This alternative does not address the issues and concerns identified in Section 4 nor meet any of the selection criteria outlined in Section 5.1. Given the immediate risks to the Company's operations and the safety of its employees, the alternative of "doing nothing", i.e. maintaining the status quo, is not considered a feasible option.

5.2.2 Alternative 2 – Renovate the Existing Facilities

The estimated AACE Class 4 as-spent capital cost estimate to renovate these buildings is $24.628 million, including $1.504 million of AFUDC, and demolition and removal costs of $0.139 million.

This alternative includes repairing and renovating the Generation Facilities at the South Slocan Generation Site. Renovation of the facilities will require some staff and material to be relocated while the buildings are repaired and renovated. The temporary relocation and renovation of the buildings and relocation back to the renovated buildings is estimated to take approximately 17 months. Appendix G-1 Capital Cost Summary Confidential provides the details of the capital costs for Alternative 2.

Further information on the renovation of the SCC and BCC at their current location is provided in the Confidential Application.

To meet FBC's long term facilities strategy, the building would require major renovations. This includes upgrading the buildings to meet current standards with respect to seismic code, handicap accessibility, sewage and water treatment and energy standards. Due to the age of the Generation Facilities, this would necessitate extensive and costly upgrades to base infrastructure components such as the building envelope, electrical and mechanical systems but does not generally include the framing and foundations of the buildings.

Additionally, these two buildings have been identified as being beyond their end-of-life expectancy as indicated in the Condition Report in Appendix B. The Company believes that further significant capital investment in a building at its end-of-life is generally not good practice as such investment does not extend the building's life in a cost-effective manner. The costs associated with Alternative 2 are illustrated in the evaluation of the alternatives presented in Section 5.3.2.

An overview of the advantages and disadvantages associated with renovation of the Generation Facilities is provided below and information related to the SCC and BCC is provided in the Confidential Application.

Advantages:

This alternative addresses:

- The Generation Facilities that are at end-of-life;
- Health, safety and code compliance concerns related to the building condition; and
- The Company's long term space strategy that seeks to achieve the following:
  - Ensure a safe and efficient working environment and meet building code requirements;
  - Provide building capacity to meet current and future requirements;
  - Provide for energy efficient facilities, which allow for cost effective operations; and
  - Ensure full utilization of the useful life of the building assets.

Disadvantages:

This alternative does not:

- Address the functional challenges at Generation Facilities. There is no central building core which results in an inefficient use of the available floor space. This alternative does not resolve the ceiling height constraints on the first and second floors of the Warehouse which limits storage and prevents forklift access.
- Provide a dedicated fully functioning and centralized EOC or mitigate the risks associated with proximity to the flood and inundation zone and the proximity to the rail line;
- Centrally locate the Kootenay Station Services group to achieve operational efficiencies and cost savings;
- Provide permanent storage for the pole, construction project materials and pole trailers in close proximity to the Network Operations dispatch location in Castlegar;
- Provide an opportunity to consider the condition and requirements of the Castlegar District Office when it reaches its end-of-life; and
- Resolve all space issues consistent with the Company's long term space strategy that seeks to achieve the following:

- Provide building capacity to meet future requirements; and
- Provide facilities in a suitable location. The buildings would still be exposed to the risks arising from their location in a flood and inundation zone and from the potential access restrictions associated with the uncontrolled railway tracks.

In addition, renovation would introduce the following complications. With the exception of the relocation of the employees, the contingency for this alternative does not include the potential for the complications listed below. Even with significant upgrades to the building envelopes, there are still major components of the buildings that are 89 years old and nearing the end of their design life, such as the framing and foundations of the buildings.

- Temporary relocation of employees and materials would be required during renovation.
- Complexity, significant costs, health risks and the potential for schedule and cost overruns due to unforeseen issues arising from the remediation and containment of known contaminants.
- Further evaluation of the water and sewer treatment plants is required to determine if they are impacted by the current BC Building Code. Additionally, changes to the existing service facilities will trigger a licence review of the sewage plant operations. Environmental site requirements for placement of sewage treatment plant facilities in proximity to the river will also come under review as the operation of the existing installation is grandfathered from compliance with current environmental requirements.
- Environmental and geotechnical site studies would need to be completed for this site. The dam waterway retaining wall at the South Slocan Generation Site, which is located beside the Generation Administration Office (due to its riverside location), must be evaluated, and current flood plain building restrictions and river setbacks must be considered.
- The extent of renovation required to bring the Generation Facilities into conformance with the BC Building Code will likely trigger a review process that will warrant a traffic impact assessment. FBC expects that there will be a requirement for intersection upgrades at the highway and that there is a risk that significant off-site improvements will also be required. Current entry and exit to the site is via an uncontrolled intersection to the highway, with no acceleration or deceleration lanes.

5.2.2.1 *Alternative 2 – Summary*

FBC has concluded that the alternative of renovating the Generation Facilities including the EOC, the SCC and the BCC at a total incremental capital cost of $24.628 million, including $1.504 million of AFUDC, and demolition and removal costs of $0.139 million, is not sufficient as it does not address all the issues identified in Section 4.

This alternative is not a cost effective solution and does not address the selection criteria requirements outlined in Section 5.1. Based on the risks and issues identified above, FBC does not consider the renovation alternative to be a feasible option.

5.2.3 Alternative 3 – Replace Generation Facilities and SCC and Renovate the BCC at the Existing Site

The AACE Class 4 as-spent capital cost estimate to construct the new buildings and renovate the BCC at the existing site is $30.019 million, including AFUDC of $2.074 million and demolition and removal costs of $0.572 million. Details of the capital costs for Alternative 3 are in Appendix G-1 Confidential.

This alternative includes replacement of the Generation Facilities buildings with a new combined facility located at the South Slocan Generation Site and demolition of the existing Generation Facilities, and would include a dedicated and fully functioning EOC.

Further information on the replacement of the SCC at its current location and renovation of the BCC at its current location is provided in the Confidential Application.

Building space programs have been developed for each building based on the issues with each of the current facilities as discussed in Section 4, and are provided in Appendix D. A summary of the requirements related to replacement of the Generation Facilities at the existing sites is provided below.

Based on the building space program developed for this alternative, this facility would require a combined gross footprint of 19,214 square feet, a reduction from the current 25,800 square feet of the two facilities added together. Construction of the new facilities will require some staff and material to be relocated while the new buildings are constructed. The temporary relocation, construction of the new building and relocation back to the new building is estimated to take approximately 15 months.

Combining these structures would assist with building space efficiency by eliminating the need to duplicate base building and common facilities required if the buildings were built separately.

Advantages:

This alternative addresses:

- The Generation Facilities that are at end-of-life;
- Health, safety and code compliance concerns related to the building condition;
- The functional challenges at Generation Facilities;
- Provision of a dedicated fully functioning (but not centralized) EOC; and
- The Company's long term space strategy that seeks to achieve the following:
    - Ensure a safe and efficient working environment and meet building code requirements;
    - Provide building capacity to meet current requirements;

- Provide for energy efficient facilities, which allow for cost effective operations; and
- Ensure utilization of the full asset life.

Disadvantages:

This alternative does not:

- Provide a centralized EOC or mitigate the risks associated with proximity to the flood and inundation zone and the proximity to the rail line;
- Centrally locate the Kootenay Station Services group to achieve operational efficiencies and cost savings;
- Provide permanent storage for the pole, construction project materials and pole trailers in close proximity to Network Operations dispatch location in Castlegar;
- Provide an opportunity to consider the condition and requirements of the Castlegar District Office when it reaches its end-of-life; and
- Resolve all space issues consistent with the Company's long term space strategy that seeks to achieve the following:
  - Provide facilities in a suitable location. The buildings would still be exposed to the risks arising from their location in a flood and inundation zone and from the potential access restrictions associated with the uncontrolled railway tracks.

In addition, replacement would introduce the following complications. With the exception of the relocation of the employees, the contingency for this alternative does not include the potential for the complications listed below:

- Temporary relocation of employees and materials would be required during replacement;
- Environmental and geotechnical site studies would need to be completed for this site. The dam waterway retaining wall at the South Slocan Generation Site, which is located beside the Generation Administration Office (due to its riverside location) must be evaluated and current flood plain building restrictions and river setbacks must be considered;
- The sewage treatment plant, which is original to the site, will require functional evaluation and review of the terms of the licence to operate. Currently the licence to operate is grandfathered and may require a review if the functions of the current facilities are altered. The current cost estimate for this alternative assumes no changes to the sewage or water treatment plants;
- The extent of the development required to replace the Generation Facilities will likely trigger a review process that will warrant a traffic impact assessment. FBC expects that there will be a requirement for intersection upgrades at the highway and that there is a

risk that significant off-site improvements will also be required. Current entry and exit to the site is via an uncontrolled intersection to the highway, with no acceleration or deceleration lanes; and

- New building code setback and flood plain building rules may impact the building location.

5.2.3.1 *Alternative 3 – Summary*

FBC has concluded that the alternative of replacing the Generation Facilities and the SCC and renovating the BCC at a total incremental as-spent capital cost of $30.019 million, including AFUDC of $2.074 million and demolition and removal costs of $0.572 million, is not sufficient as it does not address all the issues identified in Section 4.

This alternative is not a cost effective solution and does not address the selection criteria requirements outlined in Section 5.1. Based on the risks and issues identified above, FBC does not consider the renovation alternative to be a feasible option.

5.2.4 Alternative 4 – Lease a New Combined Operations Centre to Replace Existing Facilities

This alternative consists of leasing a combined office, warehouse and yard space to replace the Generation Facilities, SCC, and to relocate the Kootenay Station Services employees from the Warfield Complex to the new leased facility.

The combined operations centre requires space for office, warehouse and yard that is unique to FBC's utility operations. FBC engaged CB Richard Ellis Ltd. (CBRE) to complete a search for facilities available for lease in the Castlegar area that meet FBC's space and operational needs. The Castlegar area was identified because of its central location within the Kootenay portion of FBC's service territory. The search yielded no available properties within the Castlegar and surrounding area for leasing purposes. In communities like those served by FBC in the West Kootenay, the market for specific building types is generally small, with limited opportunities for lease. A copy of the letter from CBRE regarding the lack of available lease facilities is provided as Appendix E.

5.2.4.1.1 ALTERNATIVE 4 - SUMMARY

FBC has concluded that the alternative of leasing an operations centre is not feasible due to the lack of appropriately sized and zoned property in the market area. For this reason, the Company has not considered any further evaluation of this alternative.

5.2.5 Alternative 5 – Build a New Combined Operations Centre to Replace Existing Facilities

The as-spent capital cost AACE Class 3 estimate of Alternative 5 as proposed is $20.651 million, including AFUDC of $1.128 million, and demolition and removal costs of $0.446 million. Details of capital costs are in Appendix G-1 Confidential.

This alternative consists of:

- Construction of a combined regional facility, namely the Kootenay Operations Centre, to replace the existing Generation Facilities, to provide a centralized and dedicated fully functioning EOC to manage all transmission, distribution and generation events in the FBC electric service territory, and to accommodate the relocation of the Kootenay Station Services group from the Warfield Complex to the new facility;
- Yard space at the KOC would be allocated for pole and trailer storage to deal with the lack of yard space at the Castlegar District Office. This alternative does not include any changes to either the buildings or the yard at the Castlegar District Office location; the yard at Castlegar District Office will continue to serve as material storage and fleet parking;
- Minor improvements would be completed to the South Slocan Generation Site shop space to accommodate the remaining operation crew that supports the operation of the Powerhouse;
- Demolition of the Generation Facilities; and
- Information related to the SCC and BCC is provided in the Confidential Application.

The building space program for the operations centre proposed under Alternative 5 is included as Appendix D-3 Confidential, and provides detail on the requirements for office, warehouse and yard areas, as well as detail on the required Useable Space to accommodate functions currently carried out by employees at the Generation Facilities, the yard at the Castlegar District Office, and Kootenay Station Services group at the Warfield Complex.

Based on the building space program developed for this alternative, the KOC would require a combined gross footprint of 29,775 square feet which would consist of approximately 22,961 gross square feet of office; 6,568 gross square feet of warehouse; and a separate fleet wash bay of 1,890 square feet.

This alternative would provide the Company with the opportunity to address the issues identified in Section 4 with respect to the Generation Facilities and in the Confidential Application with respect to the existing SCC and BCC facilities.

Moreover, this alternative provides the Company the opportunity to centralize many personnel based at these various locations into a single facility, which will generate operational efficiencies and cost savings.

Advantages:

This alternative meets all of the selection criteria identified in Section 5.1 and addresses all of the issues discussed in Section 4. Specifically, this alternative will:

- Address the end-of-life and condition issues at the Generation Facilities which pose future health, safety and code compliance concerns if the conditions are not addressed ;

- Address the functional challenges at Generation Facilities due to structural constraints and design limitations;
- Provide a dedicated and fully functioning EOC in a centralized location away from risks associated with its current location;
- Centrally locate the Kootenay Station Services group to achieve operational efficiencies and cost savings;
- Provide permanent storage for the pole, construction project materials and pole trailers in close proximity to the Network Operations dispatch location in Castlegar;
- Provide an opportunity to consider the condition and requirements of the Castlegar District Office when it reaches its end-of-life; and
- Resolve space issues consistent with the Company's long term space strategy that seeks to achieve the following:
    - Ensure a safe and efficient working environment and meet building code requirements;
    - Provide building capacity to meet current and future requirements;
    - Provide facilities within the service area and in a suitable location;
    - Provide for energy efficient facilities, which allow for cost effective operations; and
    - Ensure full utilization of the useful life of the asset.

Efficiencies Achieved through Relocation of the Kootenay Station Services Group

This alternative is the only option which allows for the realization of operational efficiencies and cost savings associated with relocation of the Kootenay Station Services group to a centralized location.

As discussed in Section 3.2.2.3, the Kootenay Station Services group is currently based out of the Warfield Complex and is responsible for the operation and maintenance of generation, transmission and distribution substations. The main trade groups consist of Communication Protection and Control Technicians, Electricians and Meter Technicians. Relocation to the Kootenay Operations Centre would centralize this group relative to its work locations. In addition, there are opportunities for efficiencies by co-locating with the Generation Major Maintenance Electricians (Table 5-1). There will also be some additional travel costs associated with the relocation of this group (identified in Table 5-2). Listed below are the expected efficiencies:

- A reduction in overall drive time for field workers in Kootenay Station Services due to the more centralized location in Castlegar. In general, for daily activities, members of this group are currently dispatched from their head office location at the Warfield Complex. Based on the proposed location for the Kootenay Operations Centre, drive times to the various assets would be reduced. Appendix F details the distances and estimated drive times from Warfield and the proposed Kootenay Operations Centre to the assets that the Kootenay Station Services group would be dispatched to for emergency response, operations, maintenance work and/or capital work. As detailed in Appendix F, the proposed Kootenay Operations Centre would result in savings of approximately 850 kilometres, or 17.5 hours of driving time, based on just one round trip to each station from the proposed facility as compared to travel from the existing Warfield location.

- A premium savings on call-out staff. The combined KOC would allow FBC to integrate standby personnel, allowing for operational savings.
- An FBC pool vehicle and mileage reduction. Both the Warfield Complex and Generation Facilities workforces require Company vehicles to allow employees to travel to the field or to other office locations to support operations. By centralizing all operations into one location there would be an opportunity to reduce the number of pool vehicles maintained.
- FBC tool crib savings. With a centralized location there is an opportunity to consolidate the purchase and management of the required tool inventory for Kootenay Station Services and Generation personnel.
- A reduction in Warfield janitorial O&M costs due to a reduction in space usage at Warfield.

The forecasted operating costs are summarized in Table 5-1 below. Operating costs of $295 thousand are offset somewhat by Generation recoveries and increased Generation travel time. In total, the forecast net operating costs of $175 thousand are offset by the expected O&M savings of approximately $200 thousand provided in Table 5-2 below, resulting in net incremental O&M savings of $25 thousand.

Table 5-1: Proposed Project – Alternative 5 – KOC Operating Costs

Item Description	2015 Estimated Annual O&M Cost and Savings ($000)
KOC Operating Costs	$295
Net Generation Recoveries	-$150
Increased Generation Travel	$30
Total	$175

Table 5-2: Proposed Project – Alternative 5 – Kootenay Station Services Gross O&M Savings[15]

Item Description	2015 Estimated Annual Savings (000's)
Travel Time C&M	$144
Premium Saving on Call Out Staff	$11
Tool Crib Savings	$10
Fleet Vehicle Savings	$25
Warfield Janitorial Cleaning Reduction	$10
Total	$200

Disadvantages:

This alternative achieves all identified criteria. However, as noted above, the opportunities for efficiencies by co-locating the Generation Major Maintenance Electricians with the Station Services group will be offset somewhat by additional travel costs associated with the relocation of the Generation group (identified in Table 5-2).

5.2.5.1.1 ALTERNATIVE 5 – SUMMARY

As discussed above, this alternative would resolve all the issues that have been identified in Section 4, including:

- The end-of-life and condition issues with the Generation Facilities, as well as the functional challenges with these buildings;
- The lack of a dedicated and fully functioning EOC in a centralized location away from identified hazards;
- The locational inefficiencies of the Kootenay Station Services group; and
- The lack of permanent storage for poles, construction project materials, and pole trailers in proximity to the Network Operations group dispatched out of the Castlegar District Office.

The alternative would also meet the Company's long term facilities strategy, including continuing to provide a healthy working environment for employees and provides an opportunity to consider the condition and requirements of the Castlegar District Office when it reaches its end-of-life.

Information related to the SCC and BCC is provided in the Confidential Application.

[15] Please refer to Appendix G-3 Confidential for additional details on the expected O&M savings.

The total as-spent capital cost for Alternative 5 is $20.651 million[16].

5.3 *EVALUATION OF ALTERNATIVES*

As discussed above, the Company considered various alternatives based on the criteria outlined in Section 5.1 above. In order to select a preferred alternative, FBC considered both non-financial and financial factors in its determination of a preferred solution. The Company did not conduct any further financial evaluation of Alternative 1 or Alternative 4, since, as explained in Section 4, they were not considered feasible and requiring further evaluation.

FBC has summarized the analysis of each alterative against the non-financial criteria in Table 5-3. Further, as summarized in Table 5-4 and Table 5-5, FBC completed a financial evaluation based on AACE Class 3 cost estimates for Alternative 5 and AACE Class 4 Cost estimates for Alternatives 2 and 3.

The Company also evaluated the benefits of centralizing the Generation department and the Kootenay Station Services group at the new KOC. These benefits are summarized in Table 5-6.

Appendix G-1 Confidential – Capital Cost Summary contains the summary details for the capital costs of each of the alternatives. Appendix G-2 Confidential contains the financial schedules for each of the alternatives.

5.3.1 Non-Financial Objectives – Alternative Evaluation

The Company considered the advantages and disadvantages of each alternative based on the non-financial factors noted in Section 5.1. The main criteria for the evaluation and for the summary are the Company's objectives to provide building space that will address the concerns raised in Section 4.

Listed in Table 5-3 is the summary of selection criteria analysis for each alternative.

[16] Total cost including Total As-Spent capital of $19.077 million plus AFUDC of $1.128 million plus demolition and hazardous removal costs of $0.446 million.

Table 5-3: Summary of Selection Criteria Analysis of Alternatives and the Proposed Project

	Alternative 1 Do Nothing	**Alternative 2** Renovate Existing Buildings	**Alternative 3** Replace Existing Building on Existing Sites	**Alternative 4** Lease a Facility	**Preferred Option 5** Kootenay Operations Centre at Central Location
Addresses Immediate Problems – Generation Facilities End-of-Life	✗	✓	✓	Not applicable	✓
Addresses Immediate Problems – Generation Facilities Functional Challenges	✗	✗	✓	Not applicable	✓
Addresses Immediate Problems – Central and Dedicated EOC	✗	✗	Partial[17]	Not applicable	✓
Addresses Immediate Problems – Castlegar Yard Storage	✗	✗	✗	Not applicable	✓
Improve Kootenay Station Services Operational Efficiency	✗	✗	✗	Not applicable	✓
Considers the Long Term Requirements for the Aging Castlegar Facility	✗	✗	✗	Not applicable	✓
Safe and Efficient Working Environment	✗	✓	✓	Not applicable	✓
Provide Building Capacity for Current and Future Requirements	✗	✓	✓	Not applicable	✓
Provides a Building in the Service Territory in a Suitable Area	✗	✗	✗	Not applicable	✓
Provides Energy Efficiency Which Allows for Cost Effective Operations	✗	✗	✓	Not applicable	✓
Full Life Cycle of Asset	✗	✓	✗	Not applicable	✓

Alternative 5 is the only option which addresses all of the non-financial considerations.

[17] Alternative 3 provides a dedicated and fully functioning EOC, but not in a centralized location away from identified hazards at the South Slocan Generation Site.

5.3.1.1 *Generation Department and Kootenay Station Services Group Centralization Impacts*

In addition to the non-financial criteria, FBC further considered impacts arising from centralization of the Generation department and the Kootenay Station Services group associated with Alternative 5. These are summarized in Table 5-4.

Table 5-4: Additional Considerations of Generation Department and Kootenay Station Services Group Centralization

Additional Considerations	Alternative 1	Alternative 2	Alternative 3	Alternative 5
Reduces foreman time by combining safety meetings				✓
Improves exchange of information due to central location				✓
Allows integration of Generation employees				✓
Avoids duplication of base building and common spaces[18]				✓
Maintain or improve travel time for Generation Major Maintenance		✓	✓	

5.3.2 Financial Objectives – Alternative Evaluation

The financial evaluation of each alternative consists of the following components:

- Capital costs, determined based on AACE Class 4 estimates for Alternatives 2 and 3, and on AACE Class 3 estimates for the preferred alternative – Alternative 5 are presented in Table 5-5; and
- Incremental Cost of Service, rate impact as a percentage of 2015 Forecast Revenue Requirement and Present Value of Discounted Incremental Cost of Service calculations as presented in Table 5-6.

Listed in Table 5-5 is a summary of the capital costs for each alternative and Table 5-6 provides a summary financial analysis for each alternative.

[18] The cost of new construction for the Generation Facilities and the SCC and renovation of the BCC (as compared to Alternative 5) is significant due to additional costs for design, base building requirements, and duplication of shared areas such as lunchrooms, washrooms, crew rooms, and warehouse facilities.

Table 5-5: Summary of Capital Costs of Alternatives ($ millions)

	Alternative 2	Alternative 3	Alternative 5
2015$[19]	$22.210	$26.483	$18.896
As-Spent	$22.985	$27.373	$19.077
AFUDC	1.504	2.074	1.128
Demolition / Removal[20]	0.139	0.572	0.446
Total	$24.628	$30.019	$20.651

Table 5-6: Summary of Financial Analysis of Alternatives ($ millions unless otherwise stated)

	Alternative 2	Alternative 3	Alternative 5
As-Spent Capital Costs	$24.628	$30.019	$20.651
2018 / 2019 Rate Base	2019: $23.764	2019: $29.660	2018: $20.459
Incremental Property Taxes – 2015$	$0.290	$0.310	$0.419
Gross Incremental O&M Expense - 2015$	$0.151	$0.137	$(0.025)
PV of Incremental Revenue Requirement	$39.366	$45.930	$33.912
DCF – NPV	$(0.681)	(0.570)	$(0.060)
2018 / 2019 Rate Increase (%)	0.9%	0.9%	0.7%

Based on the financial analysis, including the 2018/19 rate impact as a percentage of 2015 Forecast Revenue Requirement, it is evident that Alternative 5 is the most cost effective alternative to address the issues identified.

The Commission also noted in its Reasons for Decision on FBC's 2012-2013 Capital Expenditure Plan that it is important to "strike a balance between safety, reliability, quality of service, and achieving reasonable customer rates."[21] FBC has delayed the replacement of the Castlegar District Office in an attempt to balance the customer rate impact associated with the Project while still ensuring the Company is able to provide safe and reliable service. This balance will be achieved with the construction of the KOC as proposed to address the urgent issues at the Generation Administration Office and Warehouse and the SCC, while continuing the operation of the existing Castlegar District Office through to its end-of-life expectancy (2020). The deferral of the capital costs associated with the replacement of the Castlegar District Office would allow the accompanying rate impact to be shifted into the future, thus mitigating the rate impact to customers in the first few years.

[19] Includes costs charged to Electric Plant in Service and Demolition / Removal costs without escalation.
[20] Demolition / Removal costs are charged to Accumulated Depreciation; As-Spent plus AFUDC are charged to Electric Plant in Service.
[21] Order G-110-12, FortisBC Inc. 2012-2013 Revenue Requirements and Review of 2012 Integrated System Plan, p.91

Alternative 5 is the most cost effective solution of the alternatives.

5.3.3 Preferred Solution

FBC has examined five alternatives to address the risks and issues identified for the Generation Facilities, the SCC, the BCC, the yard at the Castlegar District Office, and the Kootenay Station Services group. Based on this analysis, Alternative 5, the proposed construction of a combined office and material district stores building, is the most effective solution in terms of both financial and non-financial factors. FBC has accordingly proposed it as the Project to be approved by the Commission.

6. PROJECT DESCRIPTION

6.1 *OVERVIEW*

The proposed Project comprises:

- Construction of a new centrally located operations centre to replace the existing Generation Facilities buildings which are at end-of-life, provision of adequate space for a dedicated and fully functional EOC, accommodation of the relocation of the Kootenay Station Services from Warfield, pole, construction material, and pole trailer storage requirements; and
- Information related to the SCC and BCC is provided in the Confidential Application.

The following section provides a description of the land, the building design for the KOC, the Project construction, resources and schedule, and associated risks to the construction.

6.2 *EVALUATION OF PROPOSED SITE AND ACQUISITION*

The requirement to replace multiple buildings at different locations provides the Company an opportunity to consider the optimal location for one operations centre. Several factors were considered when determining the most appropriate location. These include:

- Size, geography, potential hazards, and costs;
- Distance to customers;
- Distance to work areas; and
- Suitability for dispatching personnel for response to trouble calls.

In 2014, FBC purchased a site located in the Ootischenia area of Castlegar that was appropriate in light of these factors. The total acquisition cost was approximately $800K including legal and conveyancing fees. The site is a 10-acre parcel which is flat and rectangular in shape. It is zoned P1 – Public and Institutional, which permits Utility use. The site is brownfield (the previous structure was demolished in 2003) and has good road and highway access.

FBC conducted further review of the site by considering the necessary size of lot for the KOC, traffic impacts, geotechnical and site servicing. Findings upon review included the following:

- The roads bordering the site are side roads, and thus egress in and out of the site does not present a safety concern with respect to traffic moving at high speeds.
- FBC engaged a consultant to complete a Traffic Impact Study, based on an initial employee relocation of 160 personnel. The Traffic Impact Study is provided in Appendix

H. The Study concluded that the KOC will have minimal impact to the affected roads as existing traffic patterns are light, with no capacity concerns at the intersections. The Ministry of Transportation and Infrastructure (MoTI), which has authority over road access requirements for the site, agreed with the results of the Traffic Impact Study and concluded that no upgrades are required to the highway intersection or the side roads bordering the site. It should be noted that the Project as proposed would require relocation of approximately 85 employees. While the reduction of the number of employees to be relocated is not captured in the Traffic Impact Study, FBC expects a reduction of traffic as a result.

- FBC engaged a geotechnical consultant to assess the soil conditions to determine soil bearing capacity in relation to the building foundations. The report, included in Appendix I, was reviewed by the architect, structural and civil engineer and raised no concerns with respect to the proposed structure on the site.
- The site does not currently have water or sewer service. FBC has engaged in discussion with the local water district responsible for providing water service, as this brownfield site was previously serviced. The water district has confirmed its system has the required capacity for both demand and fire flow to supply the proposed Kootenay Operations Centre. A septic system will be installed to provide sewer service.

FBC is in the final process of preparing the land for temporary storage of poles, construction materials, and pole trailers. Permanent storage improvements to the land are included as part of the KOC Project requirements as discussed in Section 4.6.1. Permanent storage is conditional on the Ootischenia site development, as the City of Castlegar has an option to repurchase the property if FBC does not construct a building of at least 16,000 square feet on it.

6.2.1 Ancillary or Related Facilities

The site is located adjacent to FBC's fibre optic network, which can be cost-effectively extended to the new Kootenay Operations Centre without having to bring in third party service, which would be more costly. A reliable fibre optic network cable is required for data service at the facility.

6.3 BUILDING CAPACITY

The total site area is approximately 10 acres. The Operations Centre will consist of two structures: a new combined office and material district stores building totalling 30,091 gross square feet, and a building housing a 1,890 square foot wash bay and covered parking of 8,467 square feet totalling 10,357 gross square feet.

Building drawing (Figure 6-1) and site plans are provided in Appendix J.

6.4 *OPERATIONS CENTRE DESIGN*

The design of the Kootenay Operations Centre addresses office space, material and tool storage, fleet and yard storage requirements. To ensure adequate quality and pricing of the completed facility, FBC has engaged a consultant team to complete schematic design and working drawings of the proposed building which are used to support the AACE Class 3 cost estimates developed for the Project. The completed design identifies the component configurations, material specification and material performance, and ensures maximum efficiencies and performance. The design also incorporates green initiatives such as energy efficiencies, natural light and low-emitting materials.

6.4.1 Building Space Program

The KOC consists of a total site area of 437,834 square feet (approximately 10 acres) with a useable site area of 388,443 square feet. The KOC will have a combined office and material district storage building, consisting of 23,294 gross square feet of office and 6,796 gross square feet of material district stores. The office will support both the office and field staff functions, and the material district stores will support material and tool requirements for the field. In a separate building, the wash bay provides a means to clean the Company's vehicles and covered parking is available to ensure protection of trailer vehicles. In total, KOC features will include the following:

- A one-story combined office and material district stores building of approximately 30,090 feet;
- A fleet washbay building of approximately 1,890 square feet;
- Yard storage, laydown, receiving and circulation area of approximately 157,136 square feet;
- Drive aisles and fleet circulation of approximately 62,292 square feet;
- Parking stalls of approximately 40,982 square feet; and
- Other (septic field, utility hook-up space, waste management, fencing setbacks, site, circulation, concrete apron for outside employee space) of approximately 145,444 square feet.

The calculation of the total required square footage is detailed in Appendix D-3-1 KOC Space Program Confidential and was based on the following factors:

1. Reassessment of the square footage of existing buildings, consideration of building shortfalls and inefficiencies for impacted departments at existing buildings, and utilization of existing shared space. The information was compiled through staff interviews, examined through the preliminary space plans, and developed based on industry planning standards.

2. Review of the square footage required for a particular department and for shared areas in other FBC facilities. The dimensions of standard FBC workstations, millwork areas, furniture and equipment were used in order to calculate the area required.
3. Physical analysis of the tasks to be performed in a particular area, such as sitting at a computer, standing in front of a plotter, or working on a fleet vehicle, in order to ensure adequate space and safety within the area.
4. Headcount and anticipated future growth provided by FBC business groups:

- Base building service rooms (2,408 useable square feet):
    - Mechanical rooms – dictated by mechanical system, equipment size and capacity. A mechanical engineer specified the required area.
    - Electrical room – dictated by electrical system, equipment size and capacity. An electrical engineer specified the required area. 2012 Canadian Electric Code specifies the set clear space required in front of electrical panels.
    - Janitor room – FBC standard size.
    - Uninterrupted Power Supply (UPS) – the required area based on equipment size specified by an electrical engineer.
    - Local Area Network (LAN) – the required area based on rack size and quantity specified by an electrical engineer.
    - Washrooms and shower rooms - designed to suit Group D (office) and Group F3 (District Stores) occupancy classifications. The number of toilets and sinks is specified in the 2012 BC Building Code (Section 3.7 Health Requirements). The 2012 BC Building Code (Section 3.8 Building Requirements for Persons with Disabilities) also requires that washrooms in commercial buildings be barrier free, or handicap accessible, and specifies the number, size and layout of barrier free universal toilet rooms, washroom stalls and showers.
    - Water entry room – the required area based on functional need specified by a mechanical engineer.
- Office Staff (8,402 useable square feet):
    - Office size – Standard office sizes based on standard workstation size plus ancillary furniture.
    - Workstation size – FBC standard based on whether employee is fixed or mobile (consistent with new workstation size specified in 2012 Government of Canada Workplace 2.0 Fit-up Standards Section A: General–purpose Office Space).
- Field Office Staff (2,740 useable square feet):
    - Field office size.

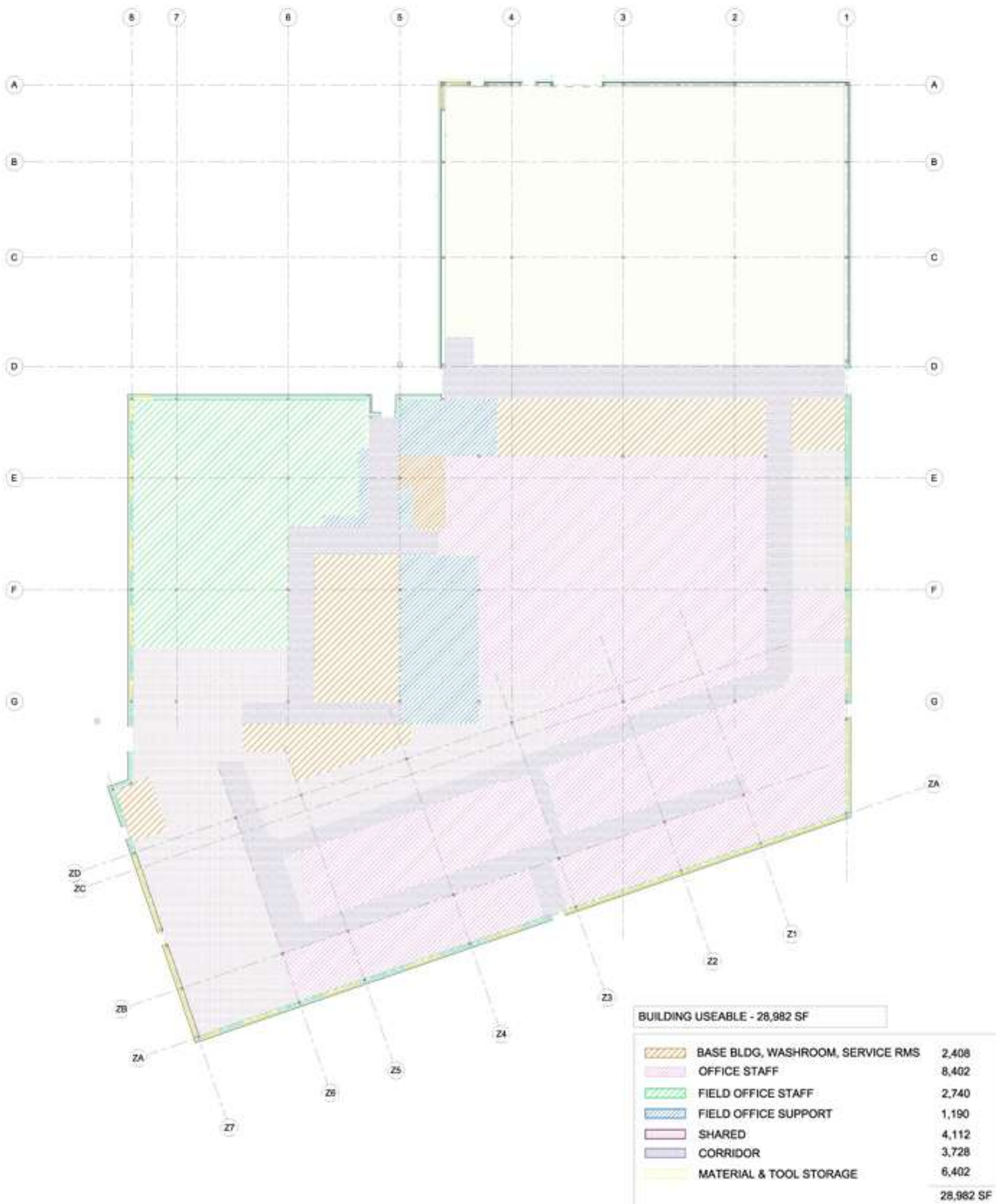
  - Workstation size – FBC standard based on whether employee is fixed or mobile (consistent with new workstation size specified in 2012 Government of Canada Workplace 2.0 Fit-up Standards Section A: General-purpose Office Space).
- Field Office Support (1,190 useable square feet):
  - Drying room - a small area for wet exterior clothing and boots to be hung to dry.
  - Clean clothes storage - a closet where clean uniforms and overalls will be stored.
  - Kootenay Station Services test bench - working bench areas for electric part testing.
- Shared area used by office and field staff (4,112 useable square feet):
  - Meeting rooms – The ratio of meeting rooms to staff depends on whether the office is predominantly an open plan or private offices. Firms that operate in predominantly open office environments, as proposed in the KOC, require more meeting rooms to supplement the open plan. The large meeting rooms are multifunctional because they can be subdivided with an operable partition.
  - Emergency Operation Centre – an assigned meeting space with dedicated resources and equipment. Sizing of room is based on staffing numbers to support Emergency Operation Organization.
  - First aid room – Required minimum levels of first aid is noted in Worksafe BC's OHS Regulations Part 3, Schedule 3A 2009[22]. The first aid room size of 100 square feet is based on the expected staff number and the proximity of the facility to the hospital.
  - Lunchroom – The room size is based on number of employees and is intended to be used as a multifunctional room.
  - Mobile filing – The room size is based on intended hard copy file capacity.
  - Copy/mail and plot/printing – Specialized equipment is shared in one large central copy/mail work room. Smaller print/copy provides convenient service for the office and field staff.
- Corridor (3,728 useable square feet):
  - Addition of a circulation factor of 40 per cent to the space calculation. A circulation factor is added to accommodate primary and secondary circulation of personnel, as required throughout the building. The industry standard circulation factor used in office planning can range from 30 to 60 per cent, depending on the type of space, efficiency of layout, type of furniture and size of project. FBC's design firm SSDG Interiors Inc. has completed numerous programming and space planning exercises and has determined that a 40 per cent circulation factor

[22] http://www2.worksafebc.com/publications/OHSRegulation/Part3.asp#Schedule3A.

is sufficient for the Kootenay Operations Centre due to the planned high percentage of open office workstation and shared space.

The building layout shown in Figure 6-1 (attached in Appendix J) has been modified to remove certain details for security purposes. It is intended to depict the general arrangement and square footage of the building and floor area.

Figure 6-1: Building Layout



The yard layout is shown in Figure 6-2. Determinations of the warehouse and yard requirements were calculated based on:

- Inventory of employee count and fleet vehicles to determine parking stall requirements;
- Inventory of equipment and material to determine storage requirements;
- Sizing of exterior infrastructure such as septic field and generator size; and
- Compliance with the applicable zoning bylaw which establishes limits and requirements for building density, building setback, landscaping, parking space and aisle dimensions requirements.

Figure 6-2: Yard Layout

6.4.2 Building Structure and Exterior

The building structure consists of:

- Foundations – cast in situ perimeter strip and pad footing with reinforced concrete foundation walls and pedestals providing frost coverage;
- Main Floor – reinforced concrete slab-on-grade;
- Roof deck – metal roof deck supported by open web steel joists, spanning to wide flange steel beams;
- Roof – two ply styrene butadiene styrene (SBS) torch-on membrane with an R40 value;
- Exterior Walls – pre-finished insulated metal panel system; and
- Windows – curtain glazing at main entrance area and punch out windows in remaining office area. Commercial aluminium frame units with thermally broken sealed double glazed units, Low E glass, and anodized finish with external shading devices.

6.4.3 Mechanical and Lighting Systems

The mechanical systems for the building are as follows:

- For standalone areas, like the LAN, Electrical and UPS rooms, the system will consist of internal fan coil units served by refrigerant piping from external roof mounted condensed units;
- The main office area will be heated and cooled by means of rooftop units with integral high efficiency heat pump compressors providing heating and cooling by DX coils; and
- Backup power systems will be supplied by UPS and a natural gas generator.

All heating and cooling is generated by heat pump units built into roof top unit plant. In extreme cold weather, the heat pump will change over to run direct electrical coils in the unit. Water conserving plumbing fixtures will further reduce the building's energy use.

The lighting system is comprised of linear direct and indirect fluorescent fixtures. Most of the lighting in the building will be largely supplemented with natural daylight. The use of lighting controls helps ensure minimization of the building's energy footprint. All design complies with American Society of Heating, Refrigerating, and Air-Conditioning Engineers (also known as ASHRAE) 90.1 for lighting power and control requirements.

6.4.4 Project Related Public Works, Undertakings or Infrastructure

The KOC will require infrastructure for services such as electricity, telephone, cable, natural gas, water and sewer services. The estimated costs of the following infrastructure have been included in the Project estimate:

- Telephone;
- Electricity;
- Cable for the EOC;
- Gas;
- Water;
- Storm Water; and
- Septic Field.

6.5 CONSTRUCTION AND OPERATING SCHEDULE

The Project is expected to take 26 months to complete, with 18 months of construction targeted for a May 2016 start-up. A detailed construction schedule is provided in Appendix K.

Table 6-1: Kootenay Operations Centre Key Milestones

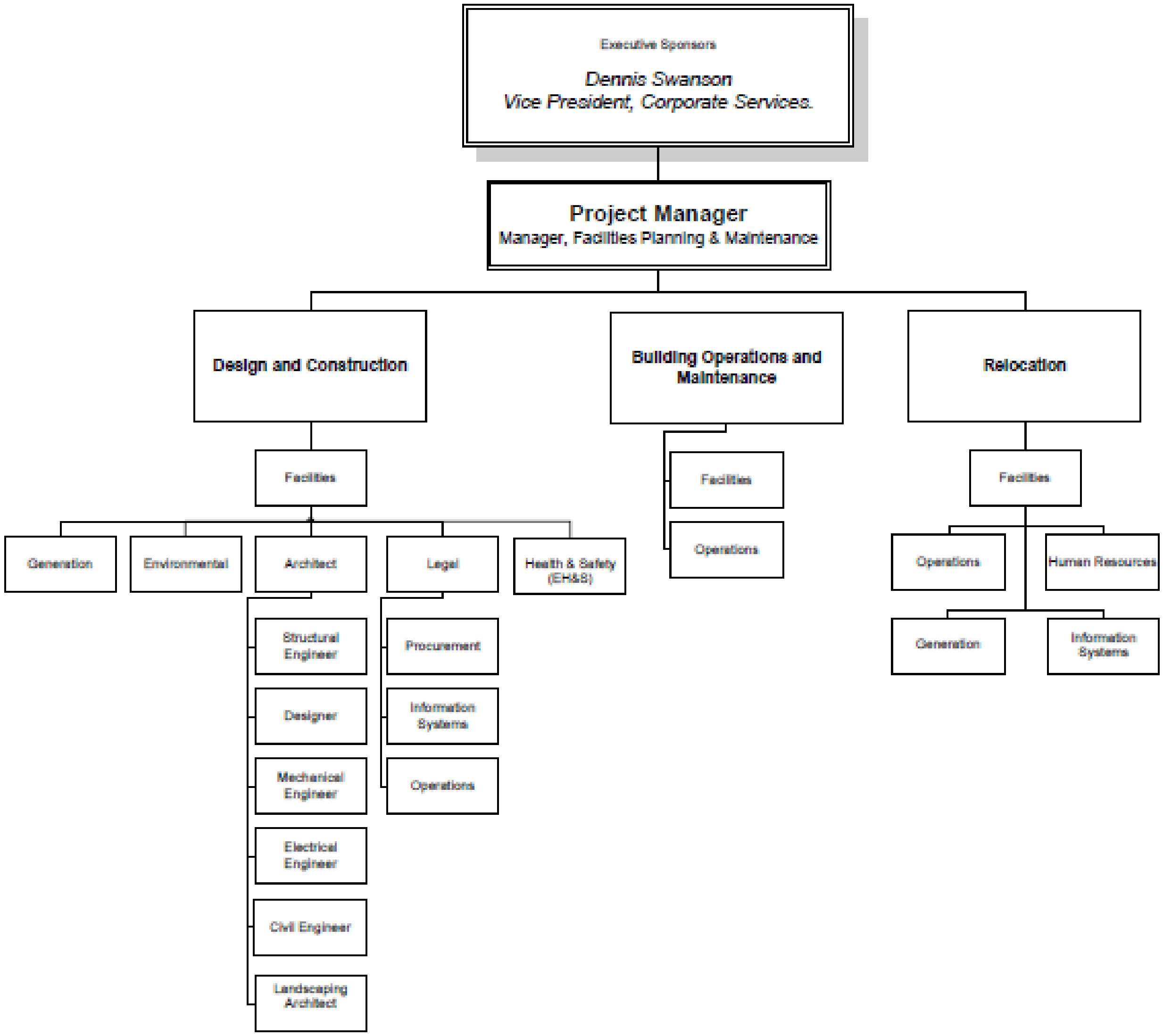
Milestone	Date
Construction Drawings and Specifications	September 1 – December 31, 2015
Proposed BCUC Project Approval	March 4, 2016
Construction Tender after BCUC Approval	March – April 2016
Construction	May 2016 – October 2017
Relocation to new Operations Centre	November 2017
Demolition of Generation Office & Warehouse	December 2017

6.6 RESOURCES PLANNING AND MANAGEMENT

6.6.1 Management and Human Resources for the Project

The FBC Project Manager will manage, implement, and oversee the execution plan for the Project. Figure 6-3 below outlines the organizational chart for construction, relocation and building operations and maintenance subsequent to the completion of the Project.

Figure 6-3: Project Organizational Chart



6.6.2 Construction Services

FBC will use a Design/Bid/Build for the provision of construction services.

Design/Bid/Build is the traditional method of construction in which the owner engages an architect to prepare the design, drawings and specifications and competitively bids construction of the facility.

6.7 *RISK ANALYSIS*

In this section, FBC has considered risks related to the construction cost and the construction schedule, and has determined that the risks related to these aspects of the Project are manageable.

6.7.1 Risk Related to Construction Cost

As shown in Table 6-1, building construction would not begin until early 2016 following BCUC approval, and would continue through 2017. The cost estimate is based on current 2015 market conditions.

The construction market in the Okanagan and Kootenay regions, as provided by the Quantity Surveyor from LTA Consultants, has seen a higher than normal escalation factor estimated between 8-10% in 2014. This pressure has continued in 2015 with the change to the Canadian dollar exchange rate, which has a direct impact on the Project as many materials in a building are supplied through the U.S.A. market. Materials normally equate to approximately 40% of a total building cost.

Oil prices have seen a reduction in 2015, which has provided for lower transportation cost in bringing material into Canada and subsequent distribution, as well as oil-based industries such as paving. However, these savings will only be realized for projects that are being tendered and constructed at this point in time. Presently, there are many differing opinions as to what will happen to oil prices in the next 12-24 months.

While these market conditions bring risk to the Project, experience over the past decade indicates that the Project should expect increasing prices for construction and the potential for market volatility.

To mitigate this potential risk, the Company has built in a three per cent escalation factor for each year as part of the cost estimate for construction, furniture and equipment, and relocation costs to the KOC. Summary details of the capital costs for Alternative 5 new KOC is in Appendix G-1 Confidential.

6.7.2 Risk Related to Construction Schedule

The Project assumes a total 26-month schedule, with construction of the Project expected to take 18 months to complete and based on a construction commencement of May, 2016. Due to the geographic location of the Project, it is important for construction to break ground prior to winter months so as not to incur additional construction costs related to frozen ground conditions. A delay in the commencement of construction beyond June 30, 2016, would impact the construction schedule and delay start-up to 2017. This change would impact escalation costs and introduce greater risk associated with the deteriorating condition of the Generation Facilities.

6.7.3 Risk Related to SCC and BCC Relocation

Please refer to the Confidential Application, which provides a discussion of the risks related to relocation of the SCC and BCC.

6.8 *OTHER APPROVALS REQUIRED*

The property is currently zoned to permit utility use. In order to begin construction, development of the property must be approved through a Development Permit issued by the City of Castlegar. FBC will be responsible for ensuring the building complies with all relevant codes, building and bylaw requirements. FBC has discussed the Project with the City of Castlegar in detail and does not foresee any challenges associated with approval of development and building permits. The building and development permit costs have been included in the Project cost estimate.

The Ministry of Transportation and Infrastructure (MoTI) has jurisdiction over the side roads bordering the property. As a result, FBC will need to apply for an access permit to the property in order to develop the Project. FBC has discussed preferred access with the MoTI to allow for early feedback on its requirements. FBC has also engaged a third party to complete a Traffic Impact Study (see Appendix H), which is a requirement of the MoTI. The MoTI agreed with the report findings and has finalized any requirements for intersection or road improvements to accommodate the proposed facility.

7. PROJECT COST ESTIMATE

7.1 DESCRIPTION OF ESTIMATING METHOD

The KOC Project is estimated at a capital cost of $20.651 million (including AFUDC of $1.128 million and Demolition and Waste Removal costs of $0.446 million). The cost estimate for the Project has been developed to a Class 3 degree of accuracy as defined in the AACE International Recommended Practice No. 105-90.

In this section, FBC will describe its estimating method, the percentage of engineering completed for the Project at the time of the estimate, and assumptions and data used in the calculations. The Project cost estimates include inflation, contingency, AFUDC, and other related costs.

In order to maintain confidentiality with regard to the construction estimates, FBC has provided details of the LTA Consultants engineering Project cost estimates in Confidential Appendix L.

7.1.1 Construction of the Project

FBC engaged consulting services to complete a detailed schematic design for the proposed facility. Consultants including Architect and Interior Designer, MQN Architect and SSDG Interiors provided drawings and specifications, which are 100 per cent schematic design and 50 per cent complete construction documents. This information is considered to be 90 per cent accurate based on the AACE International Cost Estimate for Class 3 guidelines. The prepared drawings and specification were provided to LTA Consultants in order to produce a cost estimate for the construction of the Project.

LTA Consultants visited the site, reviewed the drawing documentation and information provided, and discussed the Project with FBC and its consultant team to establish the scope and extent of the construction. The estimated construction costs are based on LTA Consultants' training, experience and expertise in the field of quantity surveying, and are supported by the following:

- Accurately measuring quantities from the drawings and applying unit rates to the measured work elements;
- Specific trade quotations and information received from contractors and sub-trades for specific work elements;
- Independent research from supplier trade brochures, price lists and quotes; and
- Detailed analysis based on observations and independent research and information provided in productivity standard literature for various work activities. This allows the pricing of work activities using prevalent labour rates in the local construction market.

7.1.2 Equipment and Relocation Costs

FBC has completed a preliminary relocation plan which includes a phased implementation into the KOC building due to the complexity of the move with multiple buildings, multiple locations, and integration of multiple departments. Table 7-1 below outlines the locations and total employee positions relocating.

Table 7-1: Site Locations and Total Positions Relocating

Current Location	# of Positions Relocating
Generation Facilities	42
Warfield Complex	38
Trail Office Building	4
Total Employee Positions Relocating	***84***

Equipment and relocation costs were gathered from vendors that currently provide services to FBC. Each vendor was provided with the requirements for the scope of work, and has completed a cost quote for the acquisition and relocation of equipment and content of the buildings related to the Project. The cost estimates are for items such as move services, data network relocation, furniture and other equipment.

This approach to estimating costs enhances the accuracy and certainty of cost estimates for equipment and relocation.

7.2 *ESTIMATION VALIDATION*

FBC has followed the practices listed below to enhance the accuracy of its cost estimates. FBC has:

- Secured a proposed location to ensure that accurate design/development could be completed for the building drawings;
- Engaged subject matter experts for schematic and design development phases;
- Used specifications and drawing at 90 per cent accuracy for costing;
- Verified with user groups that details were captured on drawings; and
- Confirmed inventory of equipment, furniture and yard storage requirements.

The same process was followed for FEVI's Victoria Regional Operations Centre, which resulted in the delivery of a successful project on time and on budget.

7.3 ASSUMPTIONS AND DATA USED

7.3.1 Assumptions

The following assumptions are used in developing the cost estimates for the Project:

- Space planning calculations are based on number of job positions provided by Operations and Generation departments;
- Furniture standards are used in space planning;
- The construction of the Project will be procured on a fixed stipulated "lump sum" contract basis, from a competitive bidding field of at least six competent General Contractors; and
- Pricing for this Project is based upon LTA Consultants' opinion of current March 2015 standard industry market costs for this size and type of institutional project in the Castlegar area.

7.3.2 Depreciation Rates

For General Plant Buildings, FBC currently has a depreciation rate of 6.1% approved by the BCUC for Masonry Structures (Account 390.1). This rate is primarily determined by the experience that FBC has had with the assets in the class and is not reflective of the lifespan it expects from a new building such as the new Kootenay Operations Centre. That is, it would result in a cost recovery that significantly prematurely recovers the cost (6.1% rate for 17 years) relative to the expected composite life of the building. Based on conversations with LTA Consultants Inc. Quantity Surveyor and Gannett Fleming Inc. concrete structures generally have an expected life of 75 to 80 years and components of the building, such as mechanical and lighting, have a shorter expected life of approximately 25 years.

The rate of 1.9%, that FBC is seeking Commission approval for is a composite rate for the new building that is based on the building components that are expected to last approximately either 25 years or 75 years. (See also Appendix G-4 for buildings' depreciation rates for Alternatives 2, 3 and 5).

The following table shows the derivation of the proposed composite rate for the KOC (Alternative 5) of 1.9% used in the financial analysis. Please note that FBC has used existing approved depreciation rates for all other applicable asset categories.

Table 7-2: Composite Depreciation Rate for KOC Building

BCUC Account	Particular	2015$ $000's	Duration	Provision $/Year
390	Other Office	2,224	25 Years	$89
390	Warehouse	260	25 Years	10
390	Wash Bay	75	25 Years	3
	All Other Building	9,659	75 Years	129
390	Total KOC Structure	**$12,218**	**1.9%**	**$231**
	Composite Average Life		53 Years	

7.3.3 Escalation and Contingency

FBC has used a three per cent per year escalation factor and five per cent contingency for construction, equipment and relocation.

7.3.4 Kootenay Long Term Facilities Strategy Deferral Account

Upon Commission approval of the KOC CPCN, the Kootenay Long Term Facilities Strategy non-rate base deferral account,[23] with an account balance which is projected to be approximately $640 thousand, will be transferred from the deferral account to work-in-progress. The $640 thousand is included in the total capital costs. On December 31, 2017 after the facility is placed into service, these costs will be closed to FBC's Electric Plant in Service (EPIS) along with the remainder of the Project costs.

7.3.5 Discount Factors and AFUDC

To calculate the present value of the total cost of service impact, two discount factors were used. FBC used a factor of 6.01 per cent (FBC After Tax Weighted Average Cost of Capital from the Annual Review for 2015 Rates).[24] FBC also used a factor of 10 per cent for standard practice comparative purposes. Please note that the After Tax Weighted Average Cost of Capital is equal to the AFUDC rate and thus the rate of 6.01% has been used to calculate the AFUDC forecast embedded in the forecast project costs.

[23] This Non-Rate Base deferral was created based on the Commission Decisions / Orders:

- Order G-110-12, FortisBC Inc. 2012-2013 Revenue Requirements and Review of 2012 Integrated System Plan, pp. 112-113, 154-155; and
- Order G-139-14, FortisBC Inc. Multi-Year Performance Based Ratemaking Plan for 2014 through 2018, pp. 222, 229-231, 257.

[24] See FBC Annual Review for 2015 Rates, filing of February 6, 2015, Section 8, p. 47 and Section 11, Financial Schedules 27 – Return on Capital for test year 2015.

7.3.6 Data and Benchmark Sources

FBC used multiple subject matter experts, data sources and current market quotes to complete the cost estimate, and has also verified the estimate as discussed above. Specifically, building operating costs was based on an operating cost per square foot and is an example of the benchmarking information used.[25] As building specifications were well-developed, FBC requested quotes where possible to ensure accurate pricing.

7.4 COST IMPACT ON RATEPAYERS

The financial evaluation of the KOC consists of the following components:

- Capital costs determined based on AACE Class 3 estimates for the Project as contained in Confidential Appendix G-1; and
- Incremental cost of service (revenue requirements), rate impact as a percentage of 2015 Forecast Revenue Requirement, and Present Value of Incremental Cost of Service (Table 7-4).

FBC evaluated the incremental cost of service, cash flow and rate impacts associated with the Project over a 50 year period plus two preceding years during the planning and construction phase. The 50 year period was chosen to allow for an appropriate period of time to compare the revenue requirement impacts from the various long term capital investment alternatives as discussed in Section 5. The incremental cost of service estimates are based on FBC's capital structure, cost of capital and tax treatment as set out in the Company's Annual Review for 2015 rates.[26] The alternatives were evaluated using current regulatory treatment for FBC, and the depreciation (other than the applied for depreciation rate to apply to the new KOC building) and overheads capitalized rates currently approved by the Commission for FBC. Gross operating and maintenance expense attract the approved 15 per cent overhead capitalization rate.

Per the BCUC Uniform Code of Accounts, FBC will account for the capital costs of the purchase of land and construction of the Project in Construction Work-in-Process, attracting AFUDC. FBC will transfer the costs to the appropriate plant asset accounts on December 31 of the year that the facilities and equipment are in-service and begin depreciating the assets at the start of the following year. Based on the Project schedule, the in-service date will be November, 2017.

Although it may not be considered an incremental cost of the project, in the interest of providing a fulsome rate impact analysis for Alternative 5 in which FBC would be incurring demolition / removal costs associated with the buildings, the costs of demolition / removal have been charged to the plant accumulated depreciation, and the building asset cost has also been retired

[25] International Facilities Management Association Benchmarks Annual Facility Cost and Operations and Maintenance Benchmarks.

[26] As filed. Revised FBC financial schedules, including the approved capital structure and cost of capital for 2015 reflecting Order G-107-15 will be filed on July 10, 2015.

and charged to accumulated depreciation. (Charging Demolition / Removal costs to Accumulated Depreciation was also done in Alternatives 2 and 3; Alternative 3 also includes retirement of the Generation Administration Office and Warehouse buildings). Since these buildings are almost fully depreciated, the value of the reduced depreciation expense is only carried forward for five years, which reflects the point in time at which the asset would have otherwise been fully depreciated. In Alternative 5, the Generation Administration Office and Warehouse would be demolished in 2018, resulting in a reduced depreciation expense. The reduced depreciation expense would only occur for another 6 years at which time the existing structures would be fully depreciated in 2023.

The results of the financial analysis for the Project are summarised in Tables 7-3 and 7-4 below.

Table 7-3: Summary of Forecast KOC Project – Capital Costs ($ millions)

Particular	2015$	As-spent	AFUDC	Total
Total Additions Charged to Plant	$18.476	$19.077	$1.128	$20.205
Demolition / Removal Costs	0.420	0.446	--	0.446
Total Project Capital Cost	$18.896	$19.523	$1.128	$20.651

Table 7-4: Financial Analysis of KOC CPCN Project

AACE Class 3	Alternative 5: KOC at Central Location
Costs Charged to Electric Plant in Service ($ millions)	$20.205
Demolition / Removal Costs ($ millions)	0.446
Total Capital Costs ($ millions)	$20.651
2018 % Increase on Rate	0.7%
PV of Incremental Revenue Requirement ($ millions)	$33.912
Discounted Cash Flow NPV ($ millions)	$(0.060)
2018 Incremental Rate Base ($ millions)	$20.459

The financial schedules for the Project are provided in Confidential Appendix G-2.

8. SOCIO-ECONOMIC IMPACT AND BRITISH COLUMBIA'S ENERGY OBJECTIVES

The socio-economic impact of the Project is expected to be limited.

The Castlegar area has a population of approximately 16,000, which includes the city itself and surrounding communities of Blueberry Creek, Robson, Brilliant, Genelle, Ootischenia, Pass Creek, Shoreacres, Tarry's and Thrums. Castlegar is located roughly halfway between Vancouver and Calgary and is situated at the intersection of highways leading to Nelson, Trail, the Slocan Valley and Grand Forks, all of which are within a one-hour drive from Castlegar. It is expected that businesses in the Kootenay area will be positively impacted by the Kootenay Operations Centre both during the construction phase and ongoing operations, as a result of the support services generated from the influx of the daily workforce.

Most of the professional and construction services will be provided by personnel based in BC, with materials required for the construction largely produced and/or procured from suppliers within North America. During construction, expenditures by the workforce will likely be of some benefit to local businesses.

8.1 *EMPLOYEE IMPACT*

FBC is a committed employer and values the health and wellness of its employees. The proposed Kootenay Operations Centre reflects the Company's goal to create a more vibrant, healthy and sustainable workplace that contributes to employees' well-being and retention. The new facility will provide:

- Interior design that will maximize interaction, collaboration and synergies;
- Standardized space allocation;
- Daylight harvesting in all the building perimeter space; and
- Green interior environments that contribute positively to employee physical and emotional health, resulting in improved workplace performance and productivity.

Moving employees to a new location is a challenging issue from a human resources perspective. The move will be seen by some as favourable and some as negative mainly depending on the impact to their commute distance and time. The average employee commute distance from their home to the KOC will be increased by approximately by 4 kilometres. This analysis was determined by calculating the distance changes between employee postal code regions, their current work site and the address of the proposed KOC site. As the average increase is minimal, FBC does not expect the relocation will lead to any abnormal employee turnover or attrition. FBC will develop a comprehensive plan for communicating to employees the benefits of the new location and progress of the construction, and for helping the affected staff with the relocation.

8.2 *BRITISH COLUMBIA'S ENERGY OBJECTIVES*

Section 46 (3.1)(a) and (b) of the UCA states that in considering whether to issue a CPCN, the Commission must consider British Columbia's energy objectives as provided in the Clean Energy Act (CEA). The CEA defines British Columbia's energy objectives, which include:

- To use and foster the development in British Columbia of innovative technologies that support energy conservation and efficiency and the use of clean or renewable resources; and
- To encourage economic development and the creation and retention of jobs.

The proposed KOC, though not a specific energy project or program for the purpose of achieving energy objectives, supports both of these objectives because the Company is committed to energy conservation and efficiency.

In April 2013, British Columbia officially adopted Building Code requirements that introduce the concept of energy efficiency and greenhouse gas reductions while harmonizing with the National Building Code.

Buildings today are required to be more airtight in and out of conditioned spaces and require a continuous air barrier system with minimal air leakage rates across building materials, assemblies, doors, windows and skylights. New buildings also require a higher level of insulation value within the foundation, wall, fenestration and roof assemblies. These new requirements ensure that the insulation is continuous in the assemblies which reduces thermal bridging and heat loss. The increased requirements for insulation are determined by the zone and climatic data of the Project, as opposed to a single level (previously a value attributed throughout the entire province). The amount of glazing is now set to a percentage maximum permitted within the wall face, due to the energy loss through glazing and associated framing.

The mechanical units are more efficient and can be sized in relation to the efficiency of the entire building envelope system if considering a prescriptive path. For, example if a building has a higher level of glazing, then an increased value of insulation (within the wall or roof) may be provided as a trade-off to maintain a minimum level of overall building efficiency.

In terms of electrical implications, motion sensors are required in office spaces to allow for the ability to control 50 percent of lights automatically, with 50 percent of the lighting in a space to be controlled manually.

Further described in the sections below, FBC considered building performance in the design of the KOC building.

8.2.1 Building Envelope

The architecture of the building, including its envelope and daylight air movement considerations, provide the primary foundation for sustainability. Design of the KOC focussed on maximizing energy efficient performance through the following building envelope components:

- Thermal, solar and visible light transmittance of transparent elements: high performance glazing optimized for maximum thermal comfort;
- External shading devices: operable shading element optimized for solar load protection on each exposure and for the day lighting strategies; and
- Improved building envelope insulation for roofs and walls: R40 – roofs; R25 – walls; Low-E gas-filled windows.

8.2.2 Mechanical System

The mechanical systems have been developed to provide comfort and flexibility, with the overall goal of energy efficiency.

8.2.3 Electrical System

The electrical system for the KOC is designed to support energy conservation. All of the lighting on the site will be controlled by a computerized facility and building management system, allowing lights to be managed on operating schedules. This ensures that the building lighting is consuming energy only during occupied periods and maintains flexibility in operations. In addition to the building management controls, lighting in the majority of areas is controlled by local occupancy sensors. There is also daylight harvesting in all the building perimeter spaces. These lighting controls will help minimize the building's energy footprint while automatically adapting to dynamic operating requirements.

Most of the lighting in the building will be largely supplemented with daylight, especially in the open office spaces. The main area lighting will use high efficiency linear fluorescent lamps and electronic ballasts. The interior feature spaces will also be provided with accents with LED (Light-Emitting Diodes) and high efficiency compact fluorescent luminaires. The lighting fixtures will use highly optimized reflector systems to direct the light and increase the efficiency of the luminaires. These features, combined with a warm lamp temperature throughout, will provide a comfortable and highly efficient lighting system, while minimizing the carbon footprint and environmental impact of the building systems.

9. CONSULTATION

9.1 *PUBLIC CONSULTATION*

Public consultation is an important and necessary component for the development of capital projects. FBC regards its responsibility to engage stakeholders in a meaningful and comprehensive consultation process as a key consideration in the development and execution of its projects necessary to provide electrical service that is safe, reliable, and cost effective.

In order to inform the general public about the KOC Project and provide a forum for feedback on the Project plan, FBC initiated a public consultation program in 2012 involving meetings with local government and key stakeholders as well as an information session hosted in the Castlegar area. In 2015, FBC again reached out to these groups as well as the local customer base in order to update them on the Project. FBC will continue to engage with the public and key stakeholders as the Project progresses and construction commences. A public consultation log is included as Appendix M-1.

9.1.1 Regional Government Consultation

City of Trail and Regional District of Kootenay Boundary (RDKB)

For two years leading up to the public disclosure of the Project, FBC had been informing the Mayor and Chief Administrative Officer of the City of Trail on the potential for the Project as well as providing preliminary information on the Company's plan to relocate some operational resources from Trail to the Castlegar area. Information was shared on why the Company's preferred location for an operations centre was in the Castlegar area, and what types of employees would be relocated.

In August 2012 when the public was informed through an article in the Castlegar News that FBC had identified a piece of land in Castlegar where it wanted to build the KOC, the City of Trail sent a letter to John Walker, then President and CEO of FBC, expressing concern around loss of jobs in Trail, lack of consultation with the entire city council and not being able to submit an alternative location. RDKB Chair Larry Gray also expressed concern about jobs moving from Trail to Castlegar.

FBC followed up by:

- Replying to the letter from the City of Trail in September 2012 (Appendix M-2) by reinforcing FBC's commitment to maintaining the Trail Office Building, and informing the City of Trail on FBC plans in the Trail area and benefits to Trail at the Warfield Complex;
- Meeting with both City Council of Trail and the Board of the RDKB in August 2012 to reinforce FBC's commitment to the City of Trail to maintain its downtown Trail Office Building and employees as well as informing them on how to become part of the

regulatory process and assuring them that the concerns they have expressed will become part of that process and forwarded to the Commission; and

- Meeting with the Lower Columbia Community Development Team, as recommended by the City of Trail, in September 2012.

On May 8, 2015, FBC representatives again met with the Mayor and Chief Administrative Officer of the City of Trail and provided an update about the Project and information on the BCUC regulatory process. FBC representatives spoke over the phone with the Chief Administrative Officer of the Regional District of Kootenay Boundary and provided an update and information on the regulatory process.

While the City of Trail and the RDKB remain concerned over any job movement from their boundaries, FBC believes it has adequately consulted both parties and continues to have conversations with the Mayor and Chair around the KOC Project as well as other planned work in the area.

City of Castlegar

In April 2012, in the early stages of the Project, FBC and its consultants engaged the City of Castlegar by meeting with the Mayor and city staff. In August 2012, FBC met with City Council before announcing the Project publicly. The City of Castlegar was pleased with the opportunity to have FBC relocate resources to the City, and expressed no concerns around the scope or construction of the Project.

On March 5, 2015, FBC met with the Mayor and Chief Administrative Officer of the City of Castlegar about the Project to provide an update on the Project including information about fencing the property.

FBC will continue discussions with the City of Castlegar during the Project's further development and construction phases.

Local MLA

FBC also spoke with local MLA Katrine Conroy in August 2012 about the Project. She expressed concern over rate impacts, adequate consultation and potential loss of jobs. The Company explained there were no plans for job losses due to the Project.

On March 5, 2015 FBC updated the local MLA's office on the Project over the phone and provided information about the Company's letters to local residents (described further below) and employee movement. FBC will continue to update the local MLA's office around rate impacts and consultation activities as the Project progresses.

9.1.2 Public Consultation

Since 2012, FBC has identified, engaged, and solicited feedback from its customer base, the public and affected parties near the Project and provided them with information on the proposed work plan. FBC has conducted the following consultation (in chronological order):

In August 2012, FBC customers located within a 500 meter radius of the proposed site were mailed a notice outlining the scope of the proposed Project and inviting them to an information session (Appendix M-3).

In August 2012, advertisements with respect to the public information sessions were placed in the Trail Times and Castlegar News newspapers and various webzines in the Project area. The advertisements ran for two to three weeks before the information session took place in the community (Appendix M-3).

On August 29, 2012, a public information session was held in Castlegar to communicate the plans for the proposed Project to the general public, and obtain feedback about the Project from customers. Approximately 60 people attended the public information session. Participants reviewed a series of poster boards describing the Project (Appendix M-3). Attendees had an opportunity to ask questions of the Project team and were supplied with a comment sheet to complete prior to their departure. Comments received from the open house are included as Appendix M-3.

While the response to the Project at the open house was generally positive, specific concerns emerged:

- **Building location:** There were questions around a commercial building being placed in a residential neighbourhood. There were also questions about the sale of the land to FBC when it had previously been proposed as the site of a new hospital. While the site is zoned for utility use and was previously the site of a school, FBC is sensitive to these concerns. FBC will work with neighbours to minimize perceived impacts. FBC has no comments on previous City plans for the property.
- **Traffic and safety concerns:** Concerns were brought up around increased traffic in the area and specifically in proximity to a school bus stop. FBC site plan includes a walking path beside the property. FBC representative McElhanney Consulting discussed the bus stop, plowing of the road and increased traffic with the School District No. 20 Kootenay-Columbia. The School District expressed that they would monitor the situation, but that buses pick up children in areas of significant traffic throughout Castlegar and they were not concerned. The School District No. 20 consultation is attached in Appendix M-4. FBC will continue to work with the residents and School District 20 to ensure safety for the residents and the employees in the area.
- **Format of the meeting:** Some attendees remarked that the format of the meeting was inadequate and that there should have been a place for the public to express their concerns to attendees. At the meeting, FBC had numerous staff and consultants on

hand to take and record comments and questions as well as provide answers wherever possible. FBC also believes that the format utilized is the best way for all community members to express their opinions directly to FBC.

- **Building visual impacts related to sightlines and lighting:** FBC has designed the building at approximately 15 feet high and has landscaping plan to minimize any sight line issues on the one-story building proposal. FBC also has a lighting plan that is dark sky friendly and aims to have no light escape the property boundaries.

In March 2015, FBC sent out a letter to property owners within 500 meters of the proposed site to provide an update about the Project, the plan for the property, and the plan to file the CPCN Application, and to provide a point of contact at FBC should residents have comments. This letter is attached as Appendix M-5.

In May 2015, FBC's public website[27] was updated with information about the Project, and the Company's contact centre provided information in response to customer inquiries regarding details about the Project.

Also in May 2015, FBC placed advertisements (Appendix M-5) in the Castlegar News notifying the public of its intent to file a CPCN application for the Project, the website address with information on the Project, and an email address and phone number should anyone have questions about the Project. FBC plans to provide further updates as the Project progresses and through the construction of the Project.

As of June 25, 2015, FBC has received 5 responses to the March 15 letter and May advertisements:

- Two individuals asked about potential work on the Project. FBC replied that CPCN approval is required before any work will take place.
- The Regional District of Central Kootenay building inspector called to thank FBC for the update.
- Two nearby landowners contacted FBC to raise the issue of traffic increase in the area and to discuss concerns regarding the school bus stop. FBC replied that it had been in touch with the School District and would monitor the traffic and that the Company would put a walking path in alongside the property.
- One comment was received asking if FBC would consider building a playground nearby as part of the Project. FBC replied that this was outside the scope of the Project but did direct the customer to the FBC Community Investment Program and gave them a direct number for a discussion around potential projects for the area.

[27] www.fortisbc.com/About/ProjectsPlanning/ElecUtility/ProjectsInYourCommunity/Pages/default.aspx.

On May 13, 2015 the Castlegar News published an article titled "*FortisBC moves ahead with plans to build operations centre."* It is included as Appendix M-5.

FBC believes that to date it has adequately consulted with key stakeholders, community and customers about the construction of the KOC Project in the surrounding area of the Project given the locality of the Project and potential impact of the Project on the local communities and public. FBC has addressed and will continue to address issues raised during consultation. FBC will continue to engage these key stakeholders throughout the Project.

9.2 *FIRST NATIONS ENGAGEMENT*

FBC does not believe that the Project has the potential to adversely impact any aboriginal title or right as the land on which the Project is built is within a municipality, zoned for public and institutional (including utility) use and was previously the site of a school. Furthermore, as explained below, there are also no known archaeological or heritage sites in the proposed site on which the Project is to be built.

As mentioned in Section 6.9 above, a permit from the MoTi is required for accessing the site. FBC will work with the MoTi if it determines that First Nations consultation is required for the purpose of that permit.

FBC values its relationship with First Nations and routinely communicates with First Nations during Project proposal and implementation. Thus, although FBC believes there is no potential of adverse impact on aboriginal title or right from this Project, for the purposes of maintaining and enhancing relationship with the First Nations whose claim for traditional territories is in FBC's service areas, FBC has done the following in respect of this Project:

- FBC discussed the Project with representatives of the Ktunaxa Nation and Okanagan Nation Alliance, whose claimed traditional territory includes the Project site location. Both Nations asked FBC to ensure that there was no archeological value at the proposed site.
- FBC had a preliminary field reconnaissance of the property done by Tipi Mountain Eco-Cultural Services Inc. The field reconnaissance produced negative results, with no archaeological materials or sites being observed within the currently defined development boundaries. That report is included in Appendix N-1.
- FBC recently informed First Nations identified through the BC Consultative Areas Database with an interest in the area of FBC's filing of this Application. The List is included as Appendix N-2 and the letter as Appendix N-3. The Archeological study was included as part of the notification.

FBC continues to have ongoing discussions as and where desired by the First Nations. Any issues or concerns identified by First Nations will be appropriately addressed by FBC should they arise.

10. CONCLUSION

The proposed construction of the KOC presented in Alternative 5 is the most cost-effective solution to meet all the criteria identified by the Company. The KOC Project is required to address issues associated with existing facilities in the Kootenay region of the FBC service territory.

The Generation Administration Office and Warehouse were built prior to modern-day building codes, in 1926 and 1930 respectively, and FBC has identified two primary concerns with these buildings requiring their repair or replacement. The first is the age, critical end-of-life condition and health, safety, and code compliance concerns of the existing Generation Facilities, and the second is their location and proximity to certain hazards, which could limit FBC's timely and efficient response to emergencies.

In addition to the immediate need to repair or replace the Generation Facilities, FBC has identified other critical operational requirements in the Kootenay region which require investment in the short and long term to address concerns related to the condition and practical limitations of the facilities currently in use: the SCC, the BCC and the yard at the Castlegar District Office. A further requirement is that the Company realize potential efficiencies and cost savings where feasible, and the Project provides an opportunity to do so for the Kootenay Station Services group.

FBC has examined five alternatives to address the risks and issues identified for the Generation Facilities, the Kootenay Station Services group, the SCC, BCC, and the yard at the Castlegar District Office. Based on this analysis, Alternative 5, the proposed construction of a combined office and material district stores building, is the most effective solution in terms of both financial and non-financial factors. FBC has accordingly proposed it as the Project to be approved by the Commission.

FBC has consulted with key stakeholders, community and customers about the construction of the KOC Project in the surrounding area of the Project given the locality of the Project and potential impact of the Project on the local communities and public. FBC has addressed and will continue to address issues raised during consultation and will continue to engage these key stakeholders throughout the Project.

Furthermore, while FBC does not believe that the Project has the potential to adversely impact any aboriginal title or right, the Company will continue to have ongoing discussions as and where desired by the First Nations. Any issues or concerns identified by First Nations will be appropriately addressed by FBC should they arise.

Once completed, KOC Project will replace the existing Generation Facilities at the South Slocan Generation Site which are at end-of-life and mitigate health, safety and code compliance concerns. It will address concerns related to the space, location and functionality of the SCC and BCC as described in the Confidential Application. It will mitigate risks associated with the current location of the EOC and provide a centrally located and appropriately sized EOC with dedicated resources and equipment to support more timely and effective response to emergencies. The Project will provide a cost effective and efficient solution with resulting cost savings for relocation of the Kootenay Station Services group; will provide a permanent solution for pole storage; and will provide an opportunity to consider the condition and requirements of the Castlegar District Office in the future.

The new KOC is forecast to cost $20.651 million (including $1.128 million of AFUDC and $0.446 million for demolition / removal).

Appendix A

FBC RESTRICTED INFORMATION PROPOSED PROTOCOL

FortisBC Inc. (FBC) application for a Certificate of Public Convenience and Necessity for a capital project for the Kootenay Operations Center (the Application). The Application contains potentially three classes of information:

Public Information – This type of information is regularly placed in the public domain and can be accessed by the public. Disclosure will not adversely impact FBC's operations. The treatment of such information will follow the usual process adopted by the British Columbia Utilities Commission (the Commission).

Confidential Information – This type of information usually covers sensitive financial, commercial, scientific or technical information, and the disclosure of such information can result in undue financial harm or prejudice to FBC. Some of the Confidential Information may contain redactions of Restricted Information which will be discussed below. The treatment of such information will follow the established "Confidential Filing Practice Directive of the British Columbia Utilities Commission".

Restricted Information – This type of information relates to the security of FBC's critical infrastructure and operations. It requires a higher level of protection because disclosure of such information could pose a potential threat to FBC's operations, including methods to protect against potential vulnerability, and could create or increase the risk of a debilitating impact on the safe and reliable operation of FBC's system and thus public safety. FBC requires restrictions on access, sharing, storage and handling of information identified as Restricted Information.

While the initial Application will not have any Restricted Information filed, if during the course of the regulatory review process, the Commission deems it necessary to obtain Restricted Information, FBC has proposed a protocol for handling and management of Restricted Information as part of this document.

Examples of Restricted Information relevant to the Application include:

- Network or communications topology or similar diagrams related to critical infrastructure;
- Equipment lists and layouts related to critical infrastructure;
- Detailed building designs and locations related to critical infrastructure;
- Information related to personnel and/or infrastructure vulnerabilities;
- Emergency response plans;
- Security configuration information;
- Operating procedures related to critical infrastructure; and
- Benefits analysis based on Restricted Information.

For clarity, information requests or any other material regarding the Restricted Information is also deemed Restricted Information. For further clarity, generally financial or commercially sensitive information would not be considered Restricted Information and would typically be covered by the Confidential Information protocol described above. The treatment of "Restricted Information" during and after the Commission hearing is proposed below.

It is the responsibility of FBC to identify and mark information contained in the Application "Confidential Information" or "Restricted Information" where applicable, and to make requests for corresponding treatment during the Commission hearing process.

RESTRICTED INFORMATION PROTOCOLS

Consistent with the statutory principles underlying the Practice Directive of the British Columbia Utilities Commission for “Confidential Filing” (the Confidential Filing Practice Directive), and further to the obligation under section 12 of the *Utilities Commission Act* (the Act) (obligation to keep confidential information) and to the Commission’s discretion under the Confidential Filing Practice Directive, FBC proposes the following protocols for treatment of Restricted Information, should any Restricted Information be required to form part of the evidentiary record as it develops through the regulatory review process, particularly addressing access to, exchange of, and maintenance of the security of Restricted Information by two groups of parties that may need access in the context of a public hearing on the Application: (1) Commissioners, Commission staff and consultants; and (2) interveners.

Requests for Restricted Information Treatment

1. Request by FBC

    a. FBC will identify and mark the Restricted Information when submitting the information to the Commission, along with a request for Restricted Information treatment. In the request, FBC shall describe the general nature of each document or piece of information that FBC is seeking the Restricted Information treatment and provide reasons for seeking such treatment. FBC’s request will be placed on the public record of the Commission proceeding for the Application.

Access to Restricted Information

2. Access by Commissioners, Commission staff and Commission consultants:
    a. The Commission will designate an individual within the Commission to be the person (the Key Person) administering and managing the internal process for Commission personnel (including Commission consultants) to access the Restricted Information. With respect to the access by Commissioners, Commission staff and consultants, the Key Person is responsible for:

        - reviewing all internal Commission requests for access to Restricted Information by Commissioners, Commission staff and consultants working for, or on behalf of, the Commission;
        - determining whether access to the Restricted Information is necessary;
        - maintaining a log or some form of documentation to record all requests for access to the Restricted Information, whether or not access was granted, reasons for granting or denying access, and the format of the access provided (electronic version or hardcopy);

- verifying the identity (i.e. by photo identification if required) and obtaining signatures of all Commissioners, Commission staff and Commission consultants to whom access has been granted; and
- obtaining and maintaining a signed acknowledgement from Commissioners and Commission staff to whom access has been granted that they have read this protocol and confirming the understanding by Commissioners and Commission staff the obligations under section 12 of the Utilities Commission Act. A form of the acknowledgement (Form A contains a proposed draft in Appendix O-4 to the Application).
- obtaining and maintaining the Undertaking of Confidentiality for Restricted Information (Form B contains a proposed draft in Appendix O-4 to the Application) required to be executed by consultants who have been engaged by the Commission to assist with review of the Application and have been granted access to the Restricted Information.

3. Access by Interveners:
   a. All parties who have registered as, and have been granted the status of, intervener in the review of the Application may, upon written request, be permitted access to all or certain Restricted Information, subject to the processes outlined in items (b) to (f) below.
   b. The intervener's written request to access the Restricted Information shall be clearly marked "Request for Access to Restricted Information" and contain a statement explaining specifically why the intervener needs to access the Restricted Information and how it anticipates the requested information will be used in furtherance of their participation in the Commission's review and determination of the Application. The explanation shall be specific to each piece of the Restricted Information to which the intervener requests access.
   c. A copy of the Request for Access to Restricted Information made to the Commission shall be served on FBC electronically to the following email address: electricity.regulatory.affairs@fortisbc.com; or by courier, hand delivery or registered mail to FortisBC Inc., 16705 Fraser Highway, Surrey, B.C., V4N 0E8, to the attention of the Manager, Regulatory Compliance and Administration. The Commission Secretary will route the access request to the Key Person. The Key Person will ensure FBC Regulatory Affairs has received a copy of any access requests by interveners. Prior to any decision to allow intervener access to the Restricted Information, FBC will be given an opportunity to make submissions on whether access to the Restricted Information should be granted to the requesting intervener. Failure to provide such comments or otherwise respond is not deemed to be a waiver that the information is restricted.
   d. The Commission can conduct additional process to make a determination on whether or not, or the extent to which, access should be granted.

e. Intervener access to the Restricted Information shall be limited to the intervener's legal counsel, consultants or experts, and to the review of a hardcopy of the Restricted Information to which access will be provided, if granted, at one of FBC's offices by appointment.

f. Legal counsel, consultants or experts intending to access the Restricted Information on behalf of an intervener which has been granted access must execute the Undertaking of Confidentiality for Restricted Information before reviewing the Restricted Information. A form of the Undertaking of Confidentiality for Restricted Information is provided (Form B contains a proposed draft in Appendix O-4 to the Application). An executed copy of the Undertaking of Confidentiality for Restricted Information will be provided to FBC prior to any access being provided.

g. The review of the Restricted Information will occur at one of FBC's offices. FBC shall:

   i. Ensure receipt of the signed Undertaking of Confidentiality for Restricted Information;

   ii. Record or document the time of such access and the Restricted Information accessed;

   iii. Verify valid photo identification and obtain a signature from the person reviewing the Restricted Information; and

   iv. Without infringing upon any privilege that may exist arising from interveners' counsel reviewing the Restricted Information, supervise access to the Restricted Information to ensure no copy or reproduction in any manner is made of the Restricted Information.

h. Except for item 11 below regarding information requests and responses thereto related to the Restricted Information, no Restricted Information will be provided to interveners in electronic format (PDF files, AutoCad drawings, etc.).

4. Access by Any Other Parties:

   a. Access to Restricted Information by any parties who have not been granted intervener status by the Commission in the Application proceeding is not allowed.

   b. Consistent with section 61(2) of the *Administrative Tribunal Act*, the *Freedom of Information and Protection of Privacy Act* does not apply to the Restricted Information.

Exchange and Maintenance of Restricted Information for Commission Use

5. Exchange of Restricted Information with the Commission:

   a. Except for item 11(b) below, if the Restricted Information is exchanged in electronic format, the Restricted Information will be encrypted and sent to the Commission

Secretary for management by the Key Person or to FBC by email to electricity.regulatory.affairs@fortisbc.com, as the case may be. A de-encryption method will be provided to the party receiving the information.

b. If the Restricted Information is exchanged in print format (hardcopy), it must be delivered by courier, hand delivery or registered mail, to the attention of the Key Person at the Commission, or to FortisBC Inc., 16705 Fraser Highway, Surrey, B.C., V4N 0E8, to the attention of the Manager, Regulatory Compliance and Administration, or both, as the case may be.

6. Reproduction of Restricted Information by the Commission:

    a. Restricted Information shall be reproduced to the minimum extent necessary consistent with the need to carry out duties of the Commission, provided that the reproduced material marked (Restricted Information and Do Not Copy), is accessed and maintained in the same manner as the original material. Copies are to be individually controlled and tracked by the Key Person.

    b. The Key Person shall keep a log or record documenting:

        i. what Restricted Information has been reproduced;

        ii. to whom it is distributed;

        iii. how the Restricted Information is reproduced; and

        iv. adherence to the process for returning or destroying the Restricted Information set forth in item 9 below.

7. Storage of the Restricted Information in Electronic Format by the Commission:

    a. If the Restricted Information is provided in electronic format, it:

        i. Shall be stored and/or posted in a restricted access location to which the Key Person controls access permission;

        ii. Shall not be stored permanently on local computer drives;

        iii. Shall not be stored on unsecured portable media (i.e. DVDs, USB drives); and

        iv. Shall not be stored on cloud platforms.

    b. It is acceptable to use encrypted, password protected USB devices for storage and transfer of Restricted Information in electronic format, and to store a local copy of Restricted Information while working on the Application. It is the responsibility of the individual to ensure that the local copy is not accessible by others.

    c. The Restricted Information shall be completely deleted from the computer or any other storage media, including “Deleted Items” or “Recycle Bin” folder, promptly when work on the Application is complete.

d. If the Commission requires retention of the Restricted Information in electronic format for the Commission's records after the review of the Application is completed, it must continue to keep the Restricted Information in a restricted access location, and the storage and access to it shall continue to follow the process set forth in items 2 and 7.

8. Storage of Hardcopy Versions of Restricted Information:

   a. If Restricted Information is in print format (hardcopy), it:

      i. Shall not be left unattended and in plain view; and

      ii. Shall be kept in a restricted access location (locked cabinet, room or drawer).

   b. The hardcopy versions of all Restricted Information shall be returned to FBC or destroyed in accordance with the process set forth in item 9 below.

   c. If the Commission requires retention of a hardcopy version of the Restricted Information for the Commission's records, it must continue to keep the Restricted Information in a restricted location, and access to it continues to follow the process set forth in item 2 above.

9. Return and Destruction of Restricted Information:

   a. Restricted Information exchanged or obtained through the review of the Application shall be returned to FBC or destroyed after the Commission's review of the Application is completed, but no later than 60 days after the Commission renders a decision in the Application except in the event that one of the following applies:

      i. The Commission decides to reconsider its decision, in which case the Restricted Information shall be returned to FBC or destroyed no later than 60 days after the Commission renders its reconsideration decision, except in the event of an appeal of the reconsideration decision;

      ii. An appeal is taken from the Commission's decision, in which case the Restricted Information shall be returned to FBC or destroyed no later than 60 days after all avenues of appeal to the courts are exhausted.

   b. Hardcopies of the Restricted Information shall be either returned to FBC or destroyed through secured shredding receptacles or other secured document destruction methods.

   c. Destruction of electronic copies of the Restricted Information shall follow item 7(c) above.

   d. If the Restricted Information is destroyed, the Commission shall confirm to FBC in writing by the Key Person that the Restricted Information is destroyed.

   e. Items (a) through (d) are in addition to any of the Commission's own document retention/destruction policies.

10. Periodic Reviews/Audits:

    a. The Key Person shall periodically review or audit the access to and maintenance of the Restricted Information to ensure the processes set forth in items 1-9 above have been followed and properly documented (where required).

    b. If FBC needs to review the documentation recording the access for regulatory compliance purposes, FBC may request such documentation for the purposes of submitting it to the regulatory compliance body.

Exchange of Information Requests and Responses on Restricted Information

11. Exchange of Information Requests and Responses on Restricted Information:

    a) Exchange and treatment of information requests and responses thereto on the Restricted Information between the Commission and FBC shall follow the applicable processes set forth in items 5 to 10 above;

    b) The information requests and responses thereto on the Restricted Information from legal counsel for an intervener to whom access to the Restricted Information has been granted shall follow the process below:

        i. The intervener may put forward information requests to FBC:

            (a) in electronic format by email to the Commission Secretary for management by the Key Person and to FBC at electricity.regulatory.affairs@fortisbc.com, provided that the information requests regarding or containing Restricted Information are encrypted and a de-encryption key is provided to FBC and the Key Person at the Commission; or

            (b) in print format, delivered by courier, hand delivery or registered mail, to the attention of the Key Person at the Commission and to FortisBC Inc., 16705 Fraser Highway, Surrey, B.C., V4N 0E8, to the attention of the Manager, Regulatory Compliance and Administration.

        ii. FBC will file and deliver responses to the information requests to the Commission following the process set forth in items 5 above; and

        iii. The intervener may review a copy of the responses to the information requests on specific Restricted Information, to the extent that such access has been granted, at FBC's office following the process set forth in item 3(g) above.

Appendix B

GENERATION OFFICE AND WAREHOUSE FACILITY ASSESSMENT AND REPORTS

Generation Office and Warehouse Facility Assessment

Prepared by: Iredale Architecture Group
Generation Office & Warehouse Facility Assessment **March 11, 2013**

Contents

Executive Summary

FortisBC Inc. engaged a consultant team to review and make recommendations on the building condition for its Generation Administration Office and Warehouse building located at their South Slocan site. The consultant team completed a visual assessment of the buildings, commented on the condition and expected end of life for the major building components as well as identified significant issues with the building envelope, concrete slab settling, and mechanical and electrical systems that need to be resolved within the next three years.

Both the Administration Office and Warehouse buildings were built circa 1926 when building code did not exist. The condition assessment identifies the buildings have performed well over the 87 year period but are now realizing extensive building component failures.

One of the significant issues seen is water penetration into the buildings. FortisBC notes that this has been seen by staff and rot was visible to the Consultants in both the Warehouse and the Office Building. Destructive testing was not completed to validate the extent of the rot but it can be reasonably concluded that if this is not corrected within the next few years, water penetration will continue to move further into the building damaging additional building components and providing an ideal situation for mould growth which presents a health risk to staff and users of the space. Both buildings have structural settling of the concrete slab that requires correction and portions of the mechanical and electrical systems are failing or need to be corrected to meet regulated compliance.

The costs estimated to repair the building is $8.520 million excluding furniture, furnishings, equipment, FortisBC Inc. staff time, escalations and loadings. This cost estimate assumes the building components identified by the consultant team as “to be replaced within 0 to 3 years” will be part of the scope of work. Based on the extensive nature of these required building repairs the project will be subject to compliance with the 2012 BC Building Code. Additional items identified to be replaced within 4 – 10 years should be completed at the same time due to the hazardous material that will need to be disrupted to repair the 0 to 3 years components and the disruption to staff as they will have to move to temporary facilities while the work is completed.

The cost per square foot to repair the buildings and extend the building life by approximately 40 years is $384 per square foot for the Administration Office Building and $203 per square foot for the Warehouse Building. The Building Industry standard considers recommendations from programs like the current province wide seismic upgrade program for schools, in which the BC Government has established that a building should be replaced when the anticipated repair / upgrade costs exceed 70% of the expected replacement cost. As the repair costs for the Generation Office and Warehouse rival and exceed the cost of a new purpose- built facility ($225-325 sq. ft. for Office space and $150 -$200 sq. ft. for Warehouse space), FortisBC needs to carefully consider whether moving forward with the repair/replacement is a prudent financial decision in comparison to constructing a new building. A new building would incorporate the latest in energy efficient building products and techniques. This improved technology would dramatically reduce the life cycle costing of a new facility throughout the expected building's life, and would provide a significantly superior, functionally efficient, energy efficient, safer and healthier environment for all users of the building.   .

1. Introduction

FortisBC Inc.'s ("FBC") South Slocan Generation site is located at 3100 South Slocan Station Road, South Slocan, BC and has been occupied by FBC for over 100 years. FBC engaged Iredale Group Architecture ("Iredale") and MCW Consultants Ltd. ("MCW") to provide a visually based condition facility assessment on the Administration Office and Warehouse buildings at the South Slocan Generation site. Destructive testing was not completed on the buildings due the existence of hazardous material within the space.

The purpose of the Facility Assessment is to investigate the current condition of the building, to analyse each main building component and where it is in its typical life-cycle, to propose improvement and corresponding repair/replacement costs and to identify potential opportunities to increase building life cycle and capacity.

Iredale and MCW attended the site on January 22, 2013. The assessment team consisted of:

- Graham Coleman, Architect, AIBC, MRAIC, LEED AP, Partner, Iredale Group Architecture
- James Emery, Architect AIBC, MRAIC, P. Eng, LEED AP BD+C, Partner, Iredale Group Architecture
- Ken Quan, P. Eng. LEED AP, Associate, MCW Consultants Ltd.
- Matthew Yim, P. Eng. LEED AP, CEM, PM, MCW Consultants Ltd.

1.1 Project Rationale and Scale

The consultant team is engaged to identify the following:

- Visually assess all building components of the administration office and warehouse building including surrounding site work.
- Determine current condition of the building components
- Identify the building component on where it is in the typical life cycle using the Life Cycle Rating classifications of:
    1. Very Poor - The building component has exceeded its expected life (100%). Failure has either already begun, or is imminent.
    2. Poor – The building component is nearing the end of its expected life (75-100%), or is aging prematurely. Even with maintenance, the building component is likely to fail within the next 3-5 years.
    3. Average – The building component is approximately half way through its expected life (50%), and is performing as intended. Increased maintenance is required to achieve full life-expectancy.
    4. Good – The building component is at the end of the first quarter of its design life (25%), and is performing as intended. With regular maintenance, full life-expectancy can be anticipated.
    5. Very Good – The building component is new, or nearly new (0-10%), and is performing as designed. Only regular maintenance is required at this point in its life-cycle.
- Review building components for compliance to existing regulatory code
- Recommendations on extending the building life to be categorized into three categories – immediate remedial work, near term remedial work and functional enhancements and upgrades
- Cost estimates priced based on immediate remedial work, near term remedial work and functional enhancements and upgrades.

1.2 History

1.2.1 Building History

Administration Office Building

- 1926 - The building was originally built by Canadian National Rail (CNR) as a hotel supporting the railway staff.
- Layout followed a typical hotel with a double loaded central corridor, and hotel rooms both sides. Each room contained an ensuite bathroom
- Each floor contains a central, panelled salon
- 1940 - the building became a guest house for Cominco guests and employees
- 1986 – the building was converted into an office building
- The hotel rooms were converted into office space with the ensuite bathrooms remaining but not in use
- The salon areas (each containing a fireplace which remain but are unused) are utilized as meeting rooms

Warehouse Building

- Built in 1930, the Warehouse has always been used as a storage building. It was constructed with robust first growth wood timbers and studs, and clad in two layers of 3/4" cementitious "gunite" stucco (1 1/2" thickness in total).
- The walls have never been insulated. Staff reports that the building is quite cold in the winter, and very hot in the summer.
- Steam heat was added in 1932, and a washroom in 1940. Renovations have occurred over the years to replace failed building components.
- Due to the sloping site, and the lack of perimeter weeping tiles, there is a history of melt-water running through the basement during each Spring season. This has led to decayed wood bottom plates in at least two locations (one on the uphill and one on the downhill side).

1.2.2 Building Area

Administration Office	
Upper Floor	~ 4,900 sf
Main Floor	~ 4,900 sf
Basement	~ 4,900 sf
Subtotal	~ 14,700 sf
Warehouse	
Attic Floor	~ 3,800 sf
Main Floor	~ 3,800 sf
Lower Floor	~ 3,800 sf
Subtotal	~ 11,400 sf
Gross Area	**~ 26,100 sf**

1.2.3 Building Description

- The Administration office building is three storeys high but the land drops away to the east so that the basement floor is mainly buried. It is constructed of light wood framing and is clad in unpainted stucco. The form is a simple rectangle with a rectangular build-out on the east side. The whole building is capped by a hip roof and has a large central chimney. The main entry is through a covered porch with a veranda on top.

Generation Office Building - west facade

- The Warehouse building is a two storey building with an attic. The land drops away to the east, access to the upper floor is only via the west side. It is constructed of wood timbers and studs, and clad in two layers of gunite stucco.

Generation Warehouse Building - south facade

1.2.4 Building Program

Administration Office Building

- The basement floor (partially buried) is comprised of:
  - Staff break room and lunchroom
  - Filing storage both current and archived
  - Electrical and Mechanical rooms
  - Washrooms
  - Copiers
- The Main and Upper floors contain:
  - Reception area off of central stairwell,
  - Ladies and Men's Washrooms on each floor, not handicap accessible,
  - Copiers on each floor,
  - Meeting rooms behind the reception area,
  - Original hotel rooms utilized as shared office space (each space includes an ensuite washroom which is no longer in use),
  - Houses Generation Employees: Engineering, Design Technologists, Financial Analyst, Administrative Staff and Supervisors and Managers

Warehouse Building

- The warehouse houses:
  - Lower floor – houses large material storage items, and is accessible by forklift (but has only 11' clear under the beams),
  - Main floor - houses a warehouse office; small material stock items due to structural loading of floor; is not accessible by forklift and is not handicap accessible,
  - Washroom (unisex and not handicap accessible).

1.3 Building Code

The Warehouse building was built circa 1930, prior to the existence of a building code. For that reason, the current Warehouse does not conform to the Code for egress, fire suppression, structural lateral loading, building envelope energy performance and handicap ("HC") accessibility. Typically, if no changes are made to the buildings, they are grandfathered from compliance. However, an Owner always has the responsibility to correct an unsafe condition in a building (1.1.1.1).

The Administration Office building was built circa 1926, however its occupancy was changed when it was renovated in 1986, therefore it is subject to the 1980 BC Building Code.

This building assessment will review regulatory compliance of the existing evacuation, electrical and mechanical systems which are not grandfathered.

Building improvements will be subject to review by the Authority having Jurisdiction ("AHJ") to determine compliance with the current British Columbia Building Code ("BCBC"). Where substantial changes or additions are being made to an existing building, the owner is required to meet the BCBC. Based on the extensive required building repairs, it is expected that they will be subject to compliance with the 2012 British Columbia Building Code. Listed below are the building code and regulatory compliance issues:

<u>Administration Office Building Code Review</u>

- Handicap Access: It is the responsibility of an Owner to ensure their building is HC accessible. The current BCBC, Subsection 3.8.1, states that access for persons with disabilities shall be provided to alterations, additions and changes in occupancy. With six steps at the front entrance, no ramp, and no elevator, there is no HC access to the current Office Building. Within the building, the washrooms are not HC accessible (no grab bars, insufficient clearance at the toilets and doors, no HC sinks), and the typical door hardware are not HC levers.
- Fire Exits: Section 3.4 of the current BCBC addresses Exiting. The Code states that once in an Exit, a person should have a safe means of travel, protected from fire, to an exterior open space. Within the exit route, the doors must swing in the direction of travel, and the stairs must be Code compliant. At the Generation Office Building, at least one exit door swung in the wrong direction, the exit stairs were too steep, their treads too shallow, and they used prohibited winder treads. In addition, the exterior exit stairs were covered by ice, and open to possible falling icicles.

- Structural Lateral Loading: it is essential for a structure to have sufficient lateral loading to ensure it can withstand wind, seismic or other lateral forces. BCBC Part 4 outlines the requirement for lateral loading to allow for a building not to collapse to minimize life safety hazards from seismic and wind loading events. There is limited documentation for the building and the recommendation is based on site observation, a few site measurements, calculations, experience and judgement. It is expected that the building lacks proper floor and roof diaphragms, proper connections between diaphragms and shearwalls, and adequate shearwalls.
- The installed fire alarm system is not in compliance with the current BCBC and is past its life expectancy.
- Exterior handrails do not meet current code
- There are areas on all floors where additional emergency lights should be added to provide the minimal levels of illumination for emergency egress to meet Code requirements.
- Exit signs are in general adequate; however, it is noted that two locations do not have Exit signs.

Warehouse Building Code Review

- According to the BCBC (3.2.2.71), a Group F-2 warehouse of this size is permitted to be of combustible construction. However, in order to meet Code in the existing building, the holes and openings in the floor separation would need to be carefully filled. The interconnecting stairs would need to be replaced with Code compliant stairs and enclosed in fire separations. Any load bearing walls constructed of wood would need to be given a fire-resistance rating not less than 45 minutes, or replaced with non-combustible construction (typically steel stud and rated drywall).
- Structural Lateral Loading: it is essential for a structure to have sufficient lateral loading to ensure it can withstand wind, seismic or other lateral forces. BCBC Part 4 outlines the requirement for lateral loading to allow for a building not to collapse to minimize life safety hazards from seismic and wind loading events. There is limited documentation for the building and the recommendation is based on site observation, a few site measurements, calculations, experience and judgement. The building does not have proper roof and floor diaphragms and has no shearwalls for transfer of lateral load.

Domestic Water System:

- Incoming service is approximately 1" and undersized by current codes
- Installation of backflow preventers are required (Code CSA B64.10)

Fire Protection System:

- Fire Protection Hose Reel System and domestic water are connected without any cross-connection protection devices. A double check detector assembly should be provided to prevent domestic water being contaminated by stagnated water in hose system
- While the existing Warehouse does have several standpipes with fire hoses, the most important safety upgrade to consider would be to sprinkler the building.

Plumbing Systems:

- Domestic Water System: incoming system is approximately 3/4" and undersized by current codes; no premise back flow prevention device was observed (CSA B64.10)
- Domestic Hot Water Heater: Hot water is produced by a small electric water heater - no hot water recirculation system is installed

Electrical Grounding:

- Unable to clearly review electrical grounding system - it is recommended to locate position of grounding rods and/or metallic plumbing pipe forming portion of the grounding system. Conduct an earth electrode resistance test to confirm the integrity of the grounding system

Electrical system- Interior Lighting

- Lamps are predominantly outdated T12 fluorescent lamps
- Lower floor inadequately illuminated with outdated ineffective shrouded luminaries with compact fluorescent lamps
- Recommendation: Upgrade lighting to comply with ASHRAE 90.1, this upgrade will require an automatic lighting control system and a check to ensure all light fixtures are seismic restrained as mandated by BCBC
- Recommended to upgrade luminaries to improve illumination levels in lower floor to warehouse to suit associated warehousing task, upgrade lighting loft

- Additional emergency lighting should be added throughout the warehouse to meet the minimum Code requirement. Exit signs are required to be installed - there currently are none. Many areas on the Lower and Upper Floor areas should have additional lighting provided for safety and convenience.

Electrical System - Exterior Lighting

- Improve lighting with additional lighting. Monitor operations of exterior lights for lamp and/or ballast replacement upon failure. Check timing controls of exterior lighting fixtures for appropriate times of on/off operation.

Electrical System - Fire Alarm

- Currently no fire alarm system. Recommend abide by BCBC code Ruling #3.2.4.1h which is requirement of a fire alarm and detection system which is subject to Major Occupancy classification of the warehouse and applicability

Electrical System - Emergency Lighting

- Emergency illumination coverage is inadequate in event of a power outage, does not meet requirements of BCBC 3.2.7.3

1.4 Riparian and Flood Plain Regulations

Since the facility is in close proximity to the Kootenay River, the most current Riparian Area Regulation (RAR) and Streamside Protection and Enhancement Areas (SPEA) criteria should be followed. The closest portion of the administration office building on the west side is within approximately 15 meters of the Kootenay River. This is considered to be in the riparian zone. FBC will need to engage an Environmental Professional for any renovation considerations and costs for the site. FBC has not included any considerations in this report or costing.

1.5 Hazardous Materials

Hazardous material is a material that may expose a person to risk of injury or occupational disease. WorkSafe BC dictates Occupational Health and Safety Regulations for workplaces in which hazardous material may be present to protect the employees and assist the employer in meeting their legal obligations to provide a safe working environment for their workers. Hazardous material requires special procedures to ensure it is either encapsulated or abated.

A hazardous material study was completed for the Administration Office in 2006 by Golder Associates Ltd. and identifies the following hazardous material. The Warehouse building has not been evaluated at this time. The hazardous material study is included in Appendix F.

Administration Office Building

Asbestos Containing Materials

- All Drywall joint compounds
- Beige mosaic sheet flooring
- Pipe thread sealants
- Ceiling texture coatings in office
- Flooring - white /brown

Lead –Based Paints

- Interior cream window sills
- Interior brown stain baseboards
- Interior grey window sills and trim
- Interior black on metal doors
- Exterior green window trim
- Exterior white window and flashing paint
- Exterior dark grey on stairs
- Exterior black and green on metal railings
- Original lead based cream paint and brown stain are present under all other paint layers

Ozone- Depleting Substances

- Three (3) Compressor units on northeast exterior of building
- Three (3) Air conditioning fan units

Mercury

- Fluorescent light bulbs containing mercury vapour were identified

Radioactive Materials

- Seven (7) smoke detectors suspected to contain radioactive material were identified.

2. Existing Facilities

2.1 Facility Analysis

2.1.1 Administration Building

2.1.1.1 Exterior

A. Roof

- Construction – asphalt shingles
- Condition – (2) poor.
- Note – the asphalt shingles are past their expected service life, are curling and buckling, and should be replaced. During replacement, a new “snow and ice” underlay should be installed. A metal roof should be considered with “sno-gems” to hold snow in place and reduce build-up at the eaves. The ceiling vapour barrier and roof insulation should be improved to reduce or prevent ice damming on the roof and icicles on the eaves. Heat traced metal gutters with leave guards should be installed, and the heat tracing should be carried down the RWLs to the below grade frost level.

B. Fascias

- Construction – painted wood.
- Condition – (1) very poor.
- Note – the painted wood fascia boards are covered with organic growth and are subject to constant icicle build-up. Likely they are decayed and should be replaced. The new fascia should be composed of a framing barge board piece, protected by a sacrificial decorative fascia. Greater longevity will be achieved by using factory painted cementitious trim (Hardie board) for the replacement fascia. Heat traced gutters and RWLs should be added (see Roof notes above).

C. Soffits

- Construction – painted 1x4 T&G wood (likely cedar).
- Condition – (3) average.
- Note – the existing T&G 1x4 wood soffiting is stained and peeling. Some decay is to be expected adjacent to the decayed fascia boards. The existing soffits should be scraped, sanded and repainted. Decayed pieces should be replaced with similar S4S cedar T&G 1x4.

D. Cladding

- Construction – unpainted cementitious stucco.
- Condition – (3) average.
- Note – typical cracks and minor amounts of spalling are evident. The extensive vines should be removed, and all organic material should be brushed off to leave a clean stucco surface. The cracks and spalling should be repaired with new crystalline cementitious stucco. The entire stucco surface should then be covered with a brush applied crystalline cementitious protective layer (such as a Kryton Krystol system).

E. Foundations

- Construction – concrete.
- Condition – (2) poor.
- Note – see the Structural Engineer's report. It is unlikely that the original concrete foundations have sufficient reinforcing steel to meet the current building code, nor tie-downs to the frame walls. The Structural Engineer noted the foundations were subsiding in the south-east corner. All organic material adjacent to the foundations should be removed, and a minimum 8" clear concrete should be provided. Slope the hard and soft landscape a minimum 2% to drain away from the building.

F. Windows

- Construction – painted wood.
- Condition – (1) very poor.
- Note – the existing windows are single paned wood, with both casement and double hung sash versions. Most do not work. The exterior glazing putty is extensively cracked and spalling. The exterior wood trim and wood sills are cracked, peeling, and have extensive open wood grain. There are no head flashings, and incomplete sill flashings. The existing windows should be removed and replaced with modern, thermally broken double or triple paned windows. For a historic look, the replacement windows could be painted aluminium on the exterior, and stained wood on the interior. The current style with French pane look could be replicated.

G. Exterior Doors

- Construction – a combination stained wood, painted wood and painted metal.
- Condition – (3) average.
- Note – the exterior doors appear to be in reasonable repair. Two of the exit doors that swing in against the flow of traffic should be changed. One exit door is only 29” wide, and it should be widened to the Code minimum of 32” if possible. The existing front door should be replaced with a new, full-lite wood door to match the original historic look of the building.

H. Exterior Stairs

- Construction – a combination of painted wood, painted steel, and concrete.
- Condition – (2) poor for the wood front stairs, (1) very poor for the steel fire exit stairs
- Note – the treads of the front wood stairs are worn, loose, have no slip-resistant grip, do not have contrasting coloured nosings, and have handrails that do not meet Code. They should be rebuilt to meet Code and designed to match the historic look of the building. The metal exit stairs on each end of the building are covered in ice, not protected from the weather, have a single riser, and are dangerous to use. They should be replaced with new, covered fire exit stairs. The concrete landscape stairs are beginning to spall and should be replaced.

I. Porticos

- Construction – painted wood.
- Condition – (2) poor.
- Note – all three porticos are in poor shape. They require re-roofing, and their painted wood trim and fascia boards should be replaced. The portico at the main entrance needs special attention. It should be rebuilt to fit the historic look of the building.

J. Sitework

- Construction–concrete walks, asphalt paving, and planted landscape.
- Condition – (2) poor.
- Note – the concrete walks have begun to crack and much of the asphalt paving is cracked and requires replacement. During any extensive renovation, the planted landscape should be replaced with plantings to match the historic feel of the original design.

2.1.1.2 Interior

A. Flooring

- Construction – historic stained fir, and carpet
- Condition – (2) poor.
- Note – the historic fir flooring should be refinished and restained. The carpet should be removed and replaced with carpet tile in the corridors and offices, leaving a lovely exposed band of fir flooring at the room edges and at the door thresholds.

B. Trim and Casework

- Construction – painted wood.
- Condition – (3) average – lead based paints
- Note – the historic trim and casework is stained douglas fir, and has the typical nicks, dents and scratches for normal wear and tear. It should be carefully touched up to a historic quality.

C. Ceilings

- Construction – combination of painted GWB, and 2x4 acoustic t-bar.
- Condition – (3) average.
- Note – the stippled GWB in the common spaces should be repainted. The 2x4 acoustic t-bar should be replaced with a 2x2 acoustic t-bar system that has a more historic, detailed look.

D. Wall Finishes

- Construction – painted plaster.
- Condition – (3) average – drywall compounds contains asbestos
- Note – the existing wall surfaces are painted 3/8” cementitious plaster on wood lath, on wood framed walls. The plaster was never of high quality and shows waves and movement. In areas it has begun to crack and spall. The worst cracks and the spalled areas should be repaired, and the plaster walls should be repainted.

E. Doors

- Construction – stained fir wood.
- Condition – (4) good.
- Note – the existing interior fir doors are rail and panel style, and many have historic edge grain fir for the rails. The typical nicks and scratches should be carefully touched up to a historic quality. The Door hardware should be replaced with HC accessible lever handles.

F. Washrooms

- Construction – sheet flooring, tile walls, plastic laminate counters, painted metal toilet partitions, and vitreous china fixtures.
- Condition – (3) average.
- Note – the washrooms are in average shape. During any extensive renovation of the building, they should be gutted to studs, and rebuilt with robust, modern finishes and fixtures that suite the historic style of the building.

2.1.2 Warehouse

2.1.2.1 Exterior

A. Roof

- Construction – asphalt shingles.
- Condition – (2) poor.
- Note – the asphalt shingles are past their expected service life, are curling and buckling, and should be replaced. During replacement, a new “snow and ice” underlay should be installed. A metal roof should be considered with “sno-gems” to hold snow in place and reduce build-up at the eaves. The ceiling vapour barrier and roof insulation should be improved to reduce or prevent ice damming on the roof and icicles on the eaves. Heat traced metal gutters with leave guards should be installed, and the heat tracing should be carried down the RWLs to the below grade frost level.

B. Fascias

- Construction – painted wood.
- Condition – (1) very poor.
- Note – the painted wood fascia boards are covered with organic growth and are subject to constant icicle build-up. Likely they are decayed and should be replaced. The new fascia should be composed of a framing barge board piece, protected by a sacrificial decorative fascia. Greater longevity will be achieved by using factory painted cementitious trim (Hardie board) for the replacement fascia. Heat traced gutters and RWLs should be added (see Roof notes above).

C. Soffits

- Construction – painted 1x4 T&G wood (likely cedar).
- Condition – (3) average.
- Note – the existing T&G 1x4 wood soffiting is stained and peeling. Some decay is to be expected adjacent to the decayed fascia boards. The existing soffits should be scraped, sanded and repainted. Decayed pieces should be replaced with similar S4S cedar T&G 1x4.

D. Cladding

- Construction – painted cementitious gunite.
- Condition – (3) average.
- Note – typical cracks and minor amounts of spalling are evident. The cracks and spalling should be repaired with new crystalline cement product. The entire gunite surface should then be covered with a brush applied crystalline cement protective layer (such as a Kryton Krystol system).

E. Foundations

- Construction – concrete.
- Condition – (2) poor.
- Note – see the Structural Engineer's report. It is unlikely that the original concrete foundations have sufficient reinforcing steel to meet the current building code, nor tie-downs to the frame walls. The Structural Engineer noted the foundations were subsiding in the south-east corner. All organic material adjacent to the foundations should be removed, and a minimum 8" clear concrete should be provided. Slope the hard and soft landscape a minimum 2% to drain away from the building.

F. Windows

- Construction – painted wood.
- Condition – (1) very poor.
- Note – the existing windows are single paned wood, with both casement and double hung sash versions. Most do not work. The exterior glazing putty is extensively cracked and spalling. The exterior wood trim and wood sills are cracked, peeling, and have extensive open wood grain. There are no head flashings, and incomplete sill flashings. The existing windows should be removed and replaced with modern, thermally broken double or triple paned windows. To replicate the historic aesthetic, the replacement windows could be painted aluminium on the exterior, and stained wood on the interior. The style with current French pane look could be replicated.

G. Exterior Doors

- Construction – a combination painted wood and painted metal.
- Condition – (2) poor.
- Note – the new overhead door at the basement level is too small, and should be replaced with a new door that is a minimum 9' wide. The existing painted basement door does not open, and should be replaced with a similar new overhead door that is a minimum 9' wide. The existing metal entrance door is in reasonable shape.

H. Exterior Stairs

- Construction – concrete.
- Condition – (2) poor for the wood front stairs.
- Note – the concrete entrance stairs are beginning to spall and should be replaced. A concrete sloped apron should be installed at the south basement door.

I. Porticos

- Construction – painted wood.
- Condition – (2) poor.
- Note – the entrance portico is in moderate shape. It should be re-roofed, and the painted wood trim and fascia boards should be replaced.

J. Sitework

- Construction – combination of asphalt, concrete and gravel.
- Condition – (2) poor.
- Note – the asphalt and concrete is cracking and areas should be replaced. ¾” clear crush gravel should be installed around the perimeter of the building. Ground water typically enters the west (uphill) side of the building each Spring season during the melt, and has led to decay in the wood sill plates in at least two locations.

2.1.2.2 Interior

A. Flooring

- Construction – historic 2x6 fir on edge, sheet flooring, and concrete topping.
- Condition – (2) poor.
- Note – the existing 2x6 on edge flooring is robust and solid, but has shifted over the years and is so uneven that the staff has difficulty using hand dollies. This historic flooring should be planed smooth and stained. The sheet flooring should be removed, and only replaced in the office, new washrooms, and at the loading area.

B. Trim and Casework

- Construction – painted wood.
- Condition – (3) average.
- Note – there are very minor amounts of trim and casework.

C. Ceilings

- Construction – unpainted GWB.
- Condition – (2) poor.
- Note – the existing unpainted drywall should be removed and replaced with two layers of 5/8" Type X drywall to meet Code fire separation requirements. Paint finish.

D. Wall Finishes

- Construction – painted interior face of the gunite cladding.
- Condition – (2) poor.
- Note – there is no wall insulation or interior wall finishes. The existing exterior walls should be insulated with batt insulation (mineral wool or glass batt), a vapour barrier should be installed, and 5/8" Type X drywall with a paint finish.

E. Doors

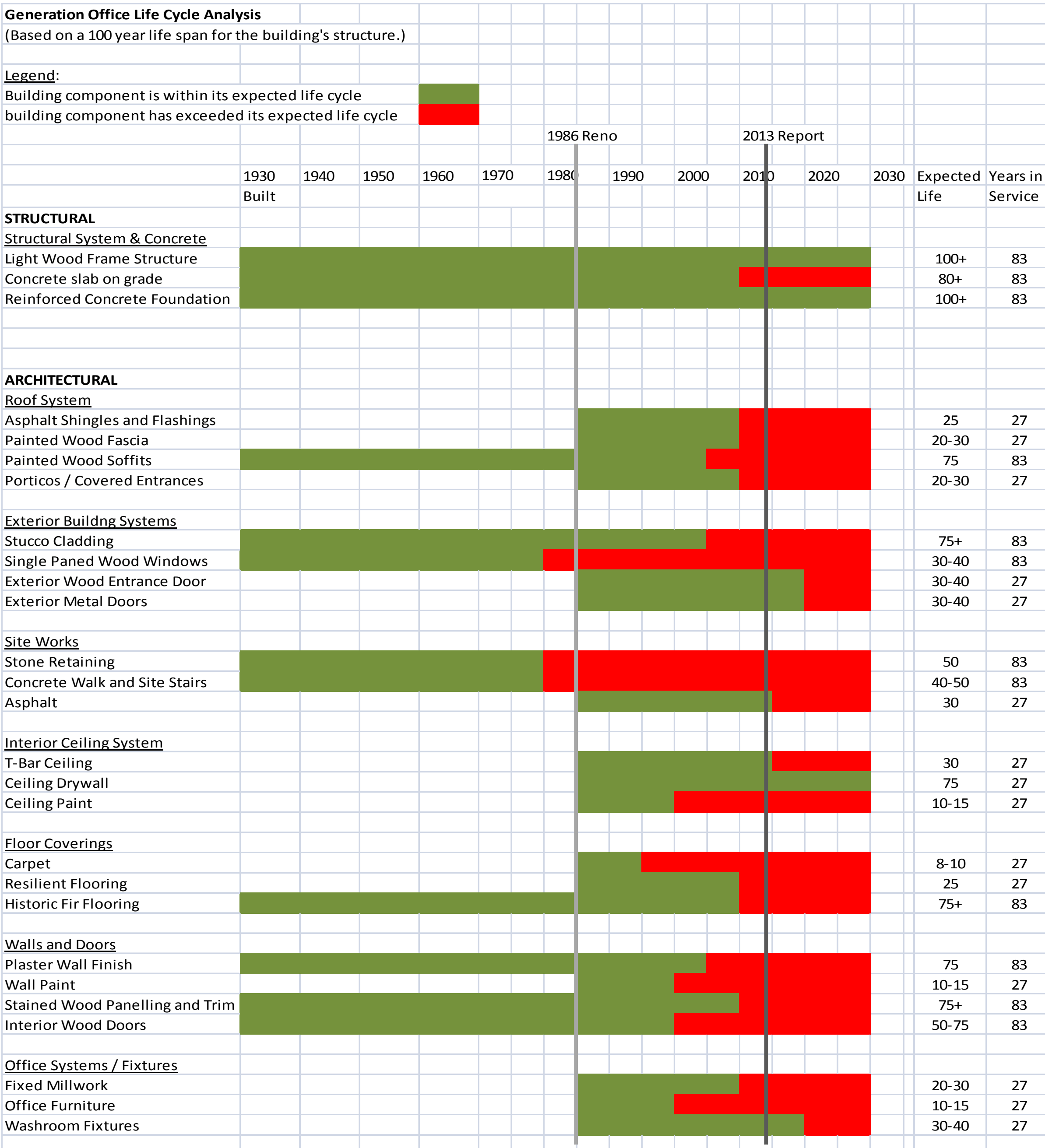
- Construction – painted wood at the washroom.
- Condition – (3) average.
- Note – replace doors when the washroom is renovated.

F. Washrooms

- Construction – sheet flooring, painted plywood walls, and vitreous china fixtures.
- Condition – (2) poor.
- Note – the washroom is in poor shape and is not HC accessible. During any extensive renovation of the building, it should be gutted to studs, and rebuilt with robust, modern finishes and fixtures that suite the historic style of the building.

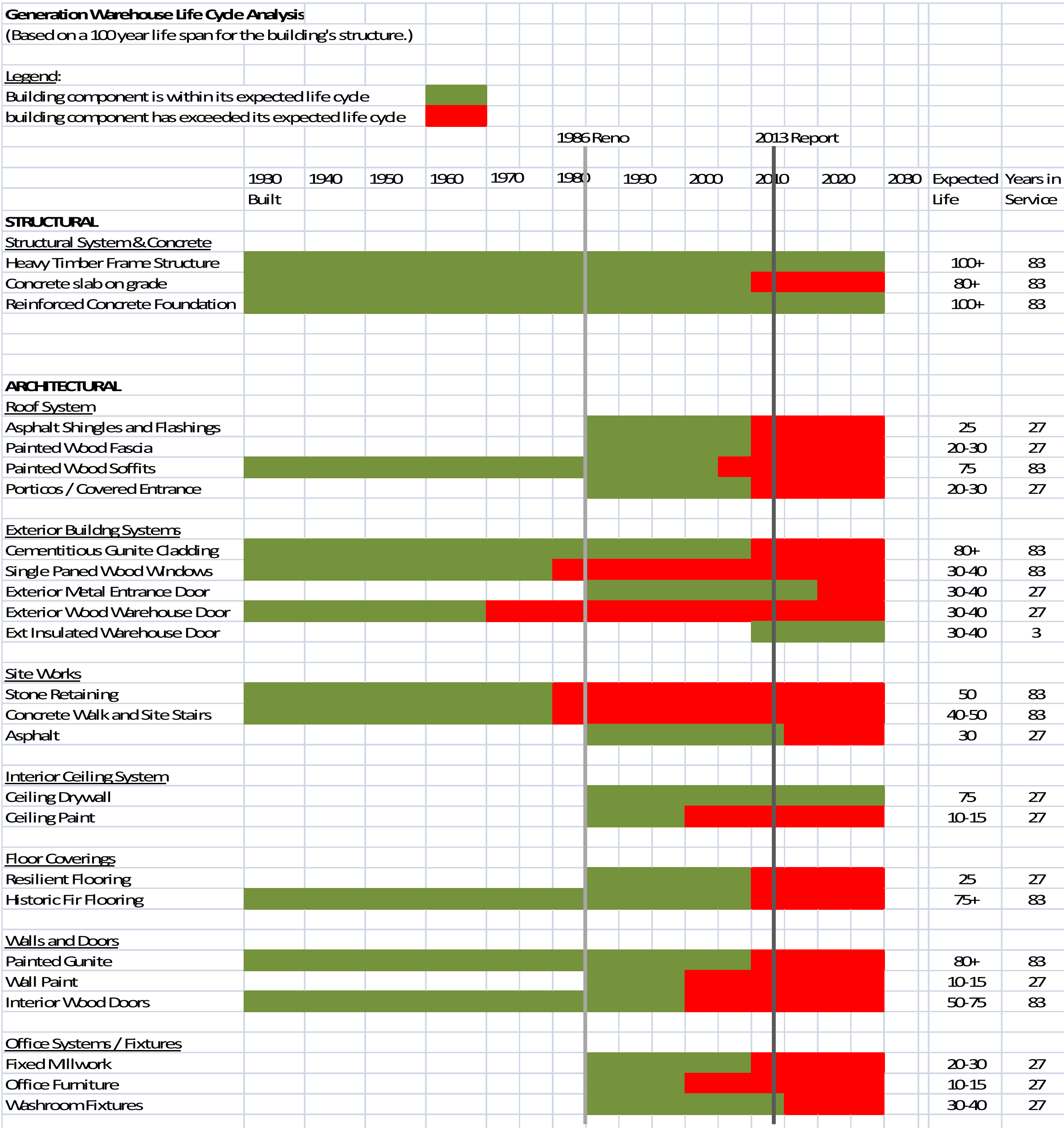
2.2 Graphic Life-Cycle Analysis

2.2.1 Architectural and Structural Components - Office



	Expected Life	Years in Service
STRUCTURAL		
Structural System & Concrete		
Light Wood Frame Structure	100+	83
Concrete slab on grade	80+	83
Reinforced Concrete Foundation	100+	83
ARCHITECTURAL		
Roof System		
Asphalt Shingles and Flashings	25	27
Painted Wood Fascia	20-30	27
Painted Wood Soffits	75	83
Porticos / Covered Entrances	20-30	27
Exterior Buildng Systems		
Stucco Cladding	75+	83
Single Paned Wood Windows	30-40	83
Exterior Wood Entrance Door	30-40	27
Exterior Metal Doors	30-40	27
Site Works		
Stone Retaining	50	83
Concrete Walk and Site Stairs	40-50	83
Asphalt	30	27
Interior Ceiling System		
T-Bar Ceiling	30	27
Ceiling Drywall	75	27
Ceiling Paint	10-15	27
Floor Coverings		
Carpet	8-10	27
Resilient Flooring	25	27
Historic Fir Flooring	75+	83
Walls and Doors		
Plaster Wall Finish	75	83
Wall Paint	10-15	27
Stained Wood Panelling and Trim	75+	83
Interior Wood Doors	50-75	83
Office Systems / Fixtures		
Fixed Millwork	20-30	27
Office Furniture	10-15	27
Washroom Fixtures	30-40	27

2.2.2 Architectural and Structural Components - Warehouse



2.2.3 Mechanical Components

Life Cycle Analysis

Legend:

- Building component is within its expected life cycle
- building component has exceeded its expected life cycle

Generation Office

1930 Built; 1990 Renovation; 2013

Component	Expected Life	Years in Service
HVAC Systems		
Basement and Main Floor Heating	20	26
Basement and Main Floor Air Conditioning	20	8
Second Floor Heating and Air Conditioning	20	20
Bathroom Ventilation Fans	20	26
Staff Room (Basement) Exhaust Fan	20	26
Main Floor Conference Room Reversible Fan	20	26
Fire Protection System		
System	30	14
Plumbing Systems		
Storm Drainage	25	unknown
Domestic Water System	25	26
Domestic Hot Water Heaters	12	6
Sanitary Drainage	50	87
Plumbing Fixtures	50	26

Warehouse

Component	Expected Life	Years in Service
HVAC Systems		
Unit Heaters	35	30
Window Type A/C Units	20	10
Exhaust Fan	25	30
Fire Protection System		
System	50	original
Plumbing Systems		
Storm Drainage	N/A	N/A
Domestic Water System	25	83
Domestic Hot Water Heater	12	unknown
Sanitary Drainage	50	83
Plumbing Fixtures	35	10

2.2.4 Electrical Components

Life Cycle Analysis												
Legend:												
Building component is within its expected life cycle												
Building component has exceeded its expected life cycle												
Generation Office												
	1930	1940	1950	1960	1970	1980	1990	2000	2010	2013	Expected	Years in
	Built					Reno 1987					Life	Service
Generation Office												
Electrical Service and Distribution											>30	26
Electrical Grounding											30	40
Electrical Branch Wiring (Pre-1950)											>25	>50
Electrical Branch Wiring and Receptacle devices											>25	26
Interior Lighting											25	26
Exterior Lighting											20	>25
Fire Alarm											20	26
Data/Comm Wiring and Equipment											<10	20
Emergency Lighting											25	15
Exit Signage											25	26
Security											20	25
Warehouse												
Electrical Service and Distribution											>30	30
Electrical Grounding											30	>40
Electrical Branch Wiring (Pre-1950)											>25	>50
Electrical Branch Wiring and Receptacle devices											>25	26
Interior Lighting											25	15-25
Exterior Lighting											20	>25
Fire Alarm											20	N/A
Data/Comm Wiring and Equipment											<10	20
Emergency Lighting											25	15
Exit Signage											25	N/A
Security											20	25

2.3 General description of required functions and improvements

Administration Building

The Administration Office building was constructed in 1926 as a CN Rail Staff House and converted in 1987 to an administration office. The layout of the building space does not meet FortisBC's current space requirements as described below:

- The useable space on the floors is fragmented due to the change in use of building from residential to office. The space program is not built for the purpose of office. For example, original bedrooms, now offices, each have an adjoining washroom.
- There is no central building core typically used to provide efficiency in an office building layout. The current building hallways, stairs and other vertical penetrations render the space difficult to use efficiently.

The Administration Office building features offices located along the full perimeter of the space with the exception of a large meeting room. These closed single function areas are wasteful and not conducive to employee collaboration.

Separate to the concerns noted above, the building requires the following work to rectify the building component failures:

1. Roof - demo the existing asphalt shingles to clean roof structure. Provide new metal roofing, on ice and snow shield, on new 1/2 plywood roof sheathing.
2. Gutters - provide new aluminum gutter and rainwater leader system throughout. Gutters should have a leaf guard cover. Provide an electric heat tracing on the gutters and rainwater leaders down to the 36" frost level.
3. Fascia - remove the existing wood fascia and replace with new painted wood fascia throughout.
4. Soffits - prep and paint the existing T&G wood soffits. Replace all decayed soffit to match existing.
5. Porticos and Exit Roofs - rebuild the front portico to historic detail with a new roof membrane, and new detailing. Remove and replace the small side and rear Exit Roofs.
6. Stucco Cladding - remove the existing organic vine growth. Patch the existing stucco cracks with a mesh patch system. Rough the existing stucco surface. Cover with Kryton Krystal stop or equivalent. Apply a new top coat of cementitious stucco.

7. Exterior Windows - remove all existing wood windows, sills, jambs, heads, trims and casing. Install new, double paned thermally broken windows with a painted aluminum exterior finish, and a stained wood interior finish. Install new, painted exterior wood casing and trim, and new stained interior casing and trim.

8. Exterior Doors - remove and replace the existing exterior doors and frames with new, painted insulated doors. The new oversized front entrance door should be stained wood with glazing lites to match the historic entrance door.

9. Foundations - Fix the foundation settlement as noted in the structural report. Provide a new perimeter perforated drain pipe system. Provide two coats of waterproofing, dimpled drain mat and 12" wide chimney of 3/4" clear crush adjacent to the foundations down to frost level. Provide a new storm water system as noted in the mechanical report.

10. Site Work - remove and replace all site works, including the asphalt drive, the concrete walks, and the concrete site stair with painted metal railings.

11. Demo Interior Finishes - remove the existing interior finishes throughout to clean studs, except for the historic fireplaces, and finishes to the central "salons / solaria" on each floor, and the interior entrance stairs. Remove the existing carpets, sheet flooring, and tile flooring. Refinish the historic fir flooring throughout. Remove the interior plaster from the wall and ceiling throughout. Remove the existing 2X4 t-bar ceiling. Remove the existing interior doors.

12. Demo Interior Partition Walls - remove the existing interior partition walls as indicated on the drawings.

13. Demo Interior Exit Stairs - demolish the two existing, non-conforming fire exit stairs at each end of the building, and replace with new, Code compliant steel stairs with proper treads and risers.

14. Demo Mechanical - demo the existing mechanical back to source, and provide a new HVAC system throughout.

15. Demo Electrical - demo the existing electrical system back to source, and provide a new electrical and data system throughout.

16. Structural - provide structural repairs as indicated in the structural report.

17. New Insulation and Drywall - provide R20 batt insulation, 6 mil poly VB, and painted 5/8" Type X GWB at all of the exterior walls.

18. New Interior Finishes - assume 10' floor to floor, with 1' for structure. Provide new, typical office finishes to the new open offices being created on each floor. . Provide historic quality stained wood finishes to the central "salons / solaria" on each floor.

19. Washrooms - provide a new men's washroom and a new women's washroom on each floor. The washrooms should have typical tile floors and walls, typical painted metal partitions, typical sinks in solid surface counters, and three fixtures each. One fixture will be HC.
20. Light Fixtures - replace interior and exterior light fixtures that utilize lamps and ballasts that are no longer manufactured by law due to their inefficiencies
21. Plumbing - there is no premise backflow preventer and there is also no backflow preventer between the irrigation system and the domestic water system.
22. Plumbing - most of the showers are not currently being used and as a result their traps will run dry if not manually primed on an ongoing basis – this will lead to sewer gases entering the living spaces of the building, this should be addressed by decommissioning unused fixtures or installing automatic trap primer.
23. Gutters - the building does not have a storm system however the lack of gutters on the exterior of the building has led to icicle build up which poses a hazard to workers.
24. HVAC - there is currently no safe way to service the roof top air conditioning units in the winter and they can only be serviced in the Summer by implementing safe work procedures.
25. Wiring - pre-1980 wiring in crawl space – recommended old non-metallic sheathed cables should be replaced with new NMD or armoured cable – currently susceptible to failure from aging and rodents and could lead to electrical fires
26. Lighting - the lighting should be replaced to comply with ASHRAE 90.1, Upgrade will require automatic lighting control system. Light fixtures are seismic restrained as mandated by BCBC
27. Fire Alarm - code deficiencies (proper zone annunciations and additional manual stations at exits) non-compliant with BCBC 3.24.8 2)b)I. Central vacuum system not tied to fire alarm system as required (not recommended to use existing fire alarm panel due to age of the system)

Warehouse

The Warehouse building, constructed in 1930, has continually been used for storage since its construction. However, it is no longer suitable for the following reasons:

- The warehouse upper floors are made of wood which restricts the loading on the floor because it cannot structurally support the fork lift operation and heavy item storage.

- The height of the floors for the lower warehouse, which is approximately 11 feet clear, restricts maximization and efficiency of racking and shelving layout and forklift operation.

Separate to the concerns noted above, the building requires the following work to rectify the building component failures or code compliance**:**

1. **Construction Materials** – the size of the warehouse under a Group F-2. Occupancy is permitted to be of combustible construction (timber frames). However to meet Code 3.2.2.71 the following items have to be addressed: holes and openings in rated floor separation would need to be carefully filled. The interconnecting stairs would need to be replaced with Code complaint stairs and enclosed in fire separations. Any load bearing walls constructed of wood would need to be upgraded to a fire-resistance rating of not less than 45 minutes, or replaced with non-combustible construction (typically steel stud and rated drywall).
2. **Roof** - demo existing asphalt shingles. Provide new metal roofing on ice and snow shield on new 1/2 plywood roof sheathing.
3. **Gutters** - provide new aluminum gutter and rainwater leader system throughout. Gutters should have a leaf guard cover. Provide an electric heat tracing on the gutters and rainwater leaders down to the 36" frost level.
4. **Fascia** – remove the existing wood fascia and replace with new painted wood fascia throughout
5. **Soffits** – prep, paint and replace decayed pieces of existing T&G Wood soffits.
6. **Porticos** – entrance portico should be re-roofed, painted and fascia boards replaced.
7. **Cladding** – patch the existing cracks with a crystalline cement product. Cover entire surface with Kryton Krystal system
8. **Exterior Windows** – remove all existing wood windows, sills, jambs, heads, trims and casing. Install new, double or triple paned thermally broken windows. Install new, painted exterior wood casing and trim and new interior casing and trim with a painted aluminum exterior finish
9. **Exterior doors** – overhead doors in the basement should be replaced with a new door that is a minimum 9' wide (one is too small and other does not open)
10. **Foundations** – it is unlikely the original concrete foundations have sufficient reinforcing steel to meet the current Building Code nor sufficient tie-downs to the frame walls. The foundations are subsiding in the south-east corner. Organic materials adjacent to foundations should be removed and a minimum 8' clear concrete should be provided; slope a minimum 2% to drain away from building.

11. **Site Work** – asphalt and concrete is cracking and areas should be replaced. Gravel installed around the perimeter of the building .Ground water has been entering the uphill side of the building each spring leading to decay in wood sill plates in at least two locations.
12. Provide structural repairs as indicated in the structural report.
13. **Flooring** – Construction – fir on edge, sheet flooring, concrete topping – 2nd floor is warped and has tripping hazards. Re-plane flooring
14. The **grounding system** is recommended to be checked for continuity and the distribution system be thermo-graphically scanned
15. There is no premise **backflow preventer**. Install backflow preventer to meet code compliance.

3. Conclusion

Building Condition Assessments and Life-Cycle Analysis provide vital information to a facility Owner. As a building ages, these periodic assessments allow the Owner to budget for regular maintenance and repair. Building systems have different inherent life-cycles, and require repair and / or replacement at different intervals.

Through regular Building Condition Assessments, the Owner is able to properly maintain a building in good working condition during its expected life-span, and then properly budget for the building's replacement once its effective life has passed.

It is important to note that even with regular maintenance, there comes a point in a building's life when the cost of repairing / replacing worn components outweighs the cost of replacing the building as a whole. British Columbia industry standard typically recommends that any building repair that exceeds 70% of a cost of a new purpose-built facility should be carefully examined.

Another important aspect of a Life Cycle Analysis for a building is to consider whether the facility continues to meet the programmatic needs of the Owner. How we conduct business - both the technology we use and the ways we interact with our clients - has changed significantly over the past decades. Many buildings become obsolete even before their core components reach the end of their effective life span. Given that renovation typically costs more per square foot than new construction, there comes a point in every building's life when we have to ask the question, if we renovate will we have the building we need?

In evaluating the condition assessment of the Generation Administration Office and Warehouse buildings components it has been determined that replacement of many building components is required on these buildings within the next 3 years to avoid further deterioration of the buildings and cause potential health risks to the occupants

The estimated costs of the noted repairs, building component replacements, and Code upgrades exceed the cost of a new building. In addition, even extensive renovation work such as discussed above will not extend the useful life of the buildings past that of a new building. Nor will the renovated spaces provide the same programmatic quality of a new, purpose built facility. Therefore, it is recommended that the existing buildings be deemed end of life, and it is noted that it would be more cost effective to replace them with new buildings.

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11 March 2013

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IREDALE GROUP ARCHITECTURE

The Life-Cycle condition of each building component below will be rated on a 1-5 scale:

1. Very Poor – The building component has exceeded its expected life (100%). Failure has either already begun, or is imminent.
2. Poor – The building component is nearing the end of its expected life (75-100%), or is aging prematurely. Even with maintenance, the building component is likely to fail within the next 3-5 years.
3. Average – The building component is approximately half way through its expected life (50%), and is performing as intended. Increased maintenance is required to achieve full life-expectancy.
4. Good – The building component is at the end of the first quarter of its design life (25%), and is performing as intended. With regular maintenance, full life-expectancy can be anticipated.
5. Very Good – The building component is new, or nearly new (0-10%), and is performing as designed. Only regular maintenance is required at this point in its life-cycle.

1 Summary – Office Building

1.1 History

- The building was originally built in 1926 as a Guest House for the CPR railway. It is laid out as a typical two storey hotel, with a double loaded central corridor and hotel rooms both sides, each with an ensuite bathroom. On both floors is a central, panelled salon where the guests would gather and repose. At grade is a half-buried basement level.
- In 1986 the Guest House was renovated and converted into an office building. The bedrooms were converted into shared offices, the ensuite bathrooms mothballed, the salons used as meeting rooms, and the basement turned into storage and a staff lunchroom. Sprinklers were installed, and metal fire escape stairs attached to both ends of the building.

1.2 Program

- It is important to note that the layout of the converted Guest House does not meet the current typical office program requirements for FortisBC. The re-purposed hotel rooms are significantly too large to act as individual offices, and the ensuite washrooms are redundant. There is no effective open space for the typical office pool. The basement offices are substandard with lower ceilings, exposed piping, and little access to daylight.
- Most importantly, the physical separation of the Office Building from the Warehouse does not allow the integration of the Shop and Warehouse staff into the Office area via the typical "touchdown" zone.

IREDALE GROUP ARCHITECTURE

1.3 Code

- Because the 1985 BC Building Code came into effect on 28 Sept 1987, it is likely that the 1986 renovation occurred under the 1980 BC Building Code.
- HC Access: It is the responsibility of an Owner to ensure their building is HC accessible. The current BC Building Code, Subsection 3.8.1, states that access for persons with disabilities shall be provided to alterations, additions and changes in occupancy. With six steps at the front entrance, no ramp, and no elevator, there is no HC access to the current Office Building. Within the building, the washrooms did not appear to be HC accessible (no grab bars, insufficient clearance at the toilets and doors, no HC sinks), the typical door hardware were not HC levers, and there did not appear to be any Areas of Refuge as part of the Exit Routes.
- Fire Exits: Section 3.4 of the current BC Building Code addresses Exiting. The Code states that once in an Exit, a person should have a safe means of travel, protected from fire, to an exterior open space. Within the exit route, the doors must swing in the direction of travel, and the stairs must be Code compliant. At the Generation Office Building, at least one exit door swings in the wrong direction, the exit stairs are too steep, their treads too shallow, and they use prohibited pie-shaped winder treads. In addition, the exterior exit stairs were covered by ice, and open to possible falling icicles.

1.4 Life-Cycle of Building Components

- Most buildings today are designed with a maximum 50 year life expectancy. Since both the Generation Office Building and the Warehouse were built with robust first growth materials, we have used their 100 year structural life-cycle as the outside parameters of this report. Within that maximum time frame, individual building components age at different rates depending on their use and exposure.
- Based on our review, it is clear that many of the building's architectural components are either approaching or have met their expected life-cycle. Many will require repair or replacement within the next five years. Included in this list are:

  i. Asphalt roofing, painted wood fascias and painted soffits,
  ii. Install gutters, heat-traced rainwater leaders, and a stormdrain system,
  iii. Porticos and entrance canopies,
  iv. Stucco cladding,
  v. Exterior, single-paned wood windows,
  vi. Site works, concrete walks, and asphalt driveways,
  vii. T-bar ceilings and interior paint,
  viii. Interior flooring (carpet, resilient flooring, historic fir wood flooring)
  ix. Plaster wall repair and repainting,

x. Millwork, office furniture,

xi. Washroom fixtures and finishes.

2 Summary – Warehouse

2.1 History

- Built in 1930, the Warehouse has always been used as a storage building. It was constructed with robust first growth wood timbers and studs, and clad in two layers of 3/4" cementitious "gunite" stucco (1 1/2" thickness in total).
- The walls have never been insulated. Staff reports that the building is quite cold in the winter, and very hot in the summer.
- Steam heat was added in 1932.
- A single washroom was installed in 1940, and the original fixtures remain.
- Minor renovations have occurred over the years to replace failed building components.
- Due to the sloping site, and the lack of perimeter weeping tiles, there is a history of melt-water running through the basement each Spring. This has led to decayed wood bottom plates in at least two locations (one on the uphill and one on the downhill side). Good building science tells us that ongoing water penetration is the enemy of building longevity, especially in wooden buildings. It leads to decay of the wood framing members, likely mould growth, and subjects cementitious materials to the deleterious effects of freeze-thaw ice-jacking, cracking and spalling.

2.2 Program

- Similar to the Office Building, the existing Warehouse layout does not meet FortisBC's current program for warehouse space. The upper floor is not accessible by a forklift, and as a result only hand-moved small ticket items can be stored on this level. Large ticket items are stored in the lower floor, which is forklift accessible, but there is only 11' clear to the structural beams. The exterior doors are either inoperable, have rapidly sloped aprons, or are too narrow for larger ticket items to be moved efficiently.
- Ideally, a modern FortisBC warehouse would be situated on a single level, with forklift access throughout, ample clearance heights, effective insulated overhead doors, and have an interconnection to the Office Area.

2.3 Code

- The building's Major Occupancy would likely be classified as Group F-2, "Medium-hazard industrial occupancies." According to the Code (3.2.2.76), a Group F-2 warehouse of this size is permitted to be of combustible or non-combustible construction.
- However, for the existing building to meet the current Code, the "floor assemblies would need to be fire separations and, if of combustible construction, shall have a fire-

resistance rating not less than 45 min." To achieve this, two layers of 5/8" Type X drywall would need to added to the underside of both the main and upper floors, and the upper surface would need to be protected by a minimum of 3/4" solid wood flooring. In addition, the holes and openings in the floor "fire separations" would need to be carefully filled.

- The interconnecting stairs would need to be upgraded to Code compliant stairs and enclosed in 45 minute fire separations composed of studs with one layer of 5/8" Type X drywall each side.
- Finally, the Code requires that any "load bearing walls, columns and arches supporting an assembly required to have a fire-resistance rating shall have a fire-resistance rating not less than 45 min, or be of noncombustible construction." Because it would be unrealistic to replace the existing wood stud walls with new steel studs, the more reasonable course of action would be to upgrade the existing wood stud walls to a 45 minute rating using 5/8" Type X drywall, mineral wool insulation, and fire-caulked penetrations.
- Washrooms: currently the Warehouse has a single, non-HC accessible washroom. Based on the building's Occupant Load, the current BC Building Code would require at least two HC accessible washrooms.
- Sprinklers: please see the Electrical Report for comment on fire alarm, exit lighting, and exit signage Code violations. In addition, while the existing Warehouse does have several standpipes with fire hoses, the most important safety upgrade to consider would be to sprinkler the building throughout.

2.4 Life-Cycle of Building Components

- As with the Office Building, many of the architectural building components of the Generation Warehouse are tired, and at the effective end of their life-cycles. Many will require repair or replacement within the next five years. Included in this list are:

  i. Asphalt roofing, painted wood fascias and painted soffits,
  ii. Install gutters, heat-traced rainwater leaders, and a storm drain system,
  iii. Entrance canopies,
  iv. Cementitious gunite cladding,
  v. Exterior, single-paned wood windows,
  vi. Site works, concrete walks, and asphalt driveways,
  vii. Replace the decayed wood bottom plates and decayed studs,
  viii. Interior paint,
  ix. Interior flooring (cracked concrete, resilient flooring, re-plane the historic fir wood flooring)

x. Millwork, office furniture,

xi. Washroom fixtures and finishes.

3 Architectural Analysis – Office Building

3.1 Exterior

A. Roof

- Construction – asphalt shingles.
- Condition – (2) poor.
- Note – the asphalt shingles have past their expected service life, are curling and buckling, and should be replaced. During replacement, a new “snow and ice” underlay should be installed. A metal roof should be considered with “sno-gems” to hold snow in place and reduce build-up at the eaves. The ceiling vapour barrier and roof insulation should be improved to reduce or prevent ice damming on the roof and icicles on the eaves. Heat traced metal gutters with leave guards should be installed, and the heat tracing should be carried down the RWLs to the below grade frost level.

B. Fascias

- Construction – painted wood.
- Condition – (1) very poor.
- Note – the painted wood fascia boards are covered with organic growth and are subject to constant icicle build-up. Likely they are decayed and should be replaced. The new fascia should be composed of a framing barge board piece, protected by a sacrificial decorative fascia. Greater longevity will be achieved by using factory painted cementitious (Hardie board) for the replacement fascia. Heat traced gutters and RWLs should be added (see Roof notes above).

C. Soffits

- Construction – painted 1x4 T&G wood (likely cedar).
- Condition – (3) average.
- Note – the existing T&G 1x4 wood soffiting is stained and peeling. Some decay is to be expected adjacent to the decayed fascia boards. The existing soffits should be scraped, sanded and repainted. Decayed pieces should be replaced with similar S4S cedar T&G 1x4 soffiting. Continuous screened soffit venting with baffles to the attic should be installed.

D. Cladding

- Construction – unpainted cementitious stucco.
- Condition – (3) average.
- Note – typical cracks and minor amounts of spalling are evident. The extensive vines should be removed, and all organic material should be brushed off to leave a clean stucco surface. The cracks and spalling should be repaired with new crystalline cement stucco. The entire stucco surface should then be covered with a brush applied crystalline cement protective layer (such as a Kryton Krystol system).

E. Foundations

- Construction – concrete.
- Condition – (2) poor.

- Note – see the Structural Engineer's report. It is unlikely that the original concrete foundations have sufficient reinforcing steel to meet the current building code, nor sufficient tie-downs to the frame walls. The Structural Engineer noted the foundations were subsiding in the south-east corner. All organic material adjacent to the foundations should be removed, and a minimum 8" clear concrete should be provided. Slope the hard and soft landscape a minimum 2% to drain away from the building. Where the foundation is exposed for structural repair, apply two coats bitumen water-proofing, drain-mat, a 12" chimney of clear crush gravel, and a typical perimeter drainage system.

F. Windows

- Construction – painted wood.
- Condition – (1) very poor.
- Note – the existing windows are single paned wood, with both casement and double hung sash versions. Most do not work. The exterior glazing putty is extensively cracked and spalling. The exterior wood trim and wood sills are cracked, peeling, and have extensive open wood grain. There are no head flashings, and incomplete sill flashings. The existing windows should be removed and replaced with modern, thermally broken double or triple paned windows. For a historic look, the replacement windows could be painted aluminum on the exterior, and stained wood on the interior. The current style with a French pane look could be replicated.

G. Exterior Doors

- Construction – a combination stained wood, painted wood, painted metal, and painted metal.
- Condition – (3) average.
- Note – the exterior doors appear to be in reasonable repair. Two of the exit doors that swing in against the flow of traffic should be changed. One exit door is only 29" wide, and it should be widened to the Code minimum of 32" (800 mm) if possible. The existing front door should be replaced with a new, half-lite stained wood door to match the original historic look of the building.

H. Exterior Stairs

- Construction – a combination of painted wood, painted steel, and concrete.
- Condition–(2) poor for the wood front stairs, (1) very poor for the steel fire exit stairs.
- Note – the treads of the front wood stairs are worn, loose, have no slip-resistant grip, do not have contrasting coloured nosings, and have handrails that do not meet Code. They should be rebuilt to meet Code and still fit the historic look of the building. The metal exit stairs on each end of the building are covered in ice, not protected from the weather, have a non-code compliant single riser, and are dangerous to use. They should be replaced with new, covered fire exit stairs. The concrete landscape stairs are beginning to spall and should be replaced.

I. Porticos

- Construction – painted wood.
- Condition – (2) poor.

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- Note – all three porticos are in poor shape. They require re-roofing, and their painted wood trim and fascia boards should be replaced. The portico at the main entrance needs special attention. It should be rebuilt to fit the historic look of the building.

J. Sitework
- Construction–concrete walks, asphalt paving, and planted landscape.
- Condition– (2) poor.
- Note – the concrete walks have begun to crack and much of the asphalt paving is cracked and requires replacement. During any extensive renovation, the planted landscape should be replaced with plantings to match the historic feel of the original design.

3.2 Interior

A. Flooring
- Construction – historic stained fir, and carpet.
- Condition – (2) poor.
- Note – the historic fir flooring should be refinished and re-stained. The carpet should be removed and replaced with carpet tile in the corridors and offices, leaving a lovely exposed band of fir flooring at the room edges and at the door thresholds.

B. Trim and Casework
- Construction – painted wood.
- Condition – (3) average.
- Note – the historic trim and case work is stained douglas fir, and has the typical nicks, dents and scratches for normal wear and tear. It should be carefully touched up to a historic quality.

C. Ceilings
- Construction – combination of painted GWB, and 2x4 acoustic t-bar.
- Condition – (3) average.
- Note – the stippled GWB in the common spaces should be repainted. The 2x4 acoustic t-bar should be replaced with a 2x2acoustic t-bar system that has a more historic, detailed look.

D. Wall Finishes
- Construction – painted plaster.
- Condition – (3) average.
- Note – the existing wall surfaces are painted 3/8"cementitious plaster, on wood lath, on wood framed walls. The plaster was never of high quality and shows waves and movement. In areas it has begun to crack and spall. The worst cracks and the spalled areas should be repaired, and the plaster walls should be repainted.

E. Doors

- Construction – stained fir wood.
- Condition – (4) good.
- Note – the existing interior fir doors are rail and panel style, and many have historic edge grain fir for the rails. The typical nicks and scratches should be carefully touched up to a historic quality. The Door hardware should be replaced with HC accessible lever handles.

F. Washrooms

- Construction – sheet flooring, tile walls, plastic laminate counters, painted metal toilet partitions, and vitreous china fixtures.
- Condition – (3) average.
- Note – the washrooms are in average shape. During any extensive renovation of the building, they should be gutted to studs, and rebuilt with robust, modern finishes and fixtures that suite the historic style of the building.

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4 Architectural Analysis - Warehouse Building

4.1 Exterior

A. Roof

- Construction – asphalt shingles.
- Condition – (2) poor.
- Note – the asphalt shingles have past their expected service life, are curling and buckling, and should be replaced. During replacement, a new "snow and ice" underlay should be installed. A metal roof should be considered with "sno-gems" to hold snow in place and reduce build-up at the eaves. The ceiling vapour barrier and roof insulation should be improved to reduce or prevent ice damming on the roof and icicles on the eaves. Heat traced metal gutters with leave guards should be installed, and the heat tracing should be carried down the RWLs to the below grade frost level.

B. Fascias

- Construction – painted wood.
- Condition – (1) very poor.
- Note – the painted wood fascia boards are covered with organic growth and are subject toconstant icicle build-up. Likely they are decayed and should be replaced. The new fascia should be composed of a framing barge board piece, protected by a sacrificial decorative fascia. Greater longevity will be achieved by using factory painted cementitious (Hardie board) for the replacement fascia. Heat traced gutters and RWLs should be added (see Roof notes above).

C. Soffits

- Construction – painted 1x4 T&G wood (likely cedar).
- Condition – (3) average.
- Note – the existing T&G 1x4 wood soffiting is stained and peeling. Some decay is to be expected adjacent to the decayed fascia boards. The existing soffits should be scraped, sanded and repainted. Decayed pieces should be replaced with similar S4S cedar T&G1x4 soffiting.

D. Cladding

- Construction – painted cementitious gunite.
- Condition – (3) average.
- Note – typical cracks and minor amounts of spalling are evident. The cracks and spalling should be repaired with new crystalline cement product. The entire gunite surface should then be covered with a brush applied crystalline cement protective layer (such as a Kryton Krystol system).

E. Foundations

- Construction – concrete.
- Condition – (2) poor.

- Note– see the Structural Engineer's report. It is unlikely that the original concrete foundations have sufficient reinforcing steel to meet the current building code, nor tie-downs to the frame walls. The Structural Engineer noted that the foundations have subsided in some areas. All organic material adjacent to the foundations should be removed, and a minimum 8"clear concrete should be provided. Slope the hard and soft landscape a minimum 2% to drain away from the building.

F. Windows

- Construction – painted wood.
- Condition – (1) very poor.
- Note – the existing windows are single paned wood, with both casement and double hung sash versions. Most do not work. The exterior glazing putty is extensively cracked and spalling. The exterior wood trim and wood sills are cracked, peeling, and have extensive open wood grain. There are no head flashings, and incomplete sill flashings. The existing windows should be removed and replaced with modern, thermally broken double or triple paned windows. For a historic look, the replacement windows could be painted aluminum on the exterior, and stained wood on the interior. The current style with French panes could be replicated.

G. Exterior Doors

- Construction – a combination painted wood and painted metal.
- Condition – (2) poor.
- Note – the new overhead door at the basement level is too small, and should be replaced with a new door that is a minimum 9' wide. The existing painted basement door does not open, and should replaced with a similar new overhead door that is a minimum 9' wide. The existing metal entrance door is in reasonable shape.

H. Exterior Stairs

- Construction – concrete.
- Condition – (2) poor for the wood front stairs.
- Note – the concrete entrance stairs are beginning to spall and should be replaced. A concrete sloped apron should be installed at the basement doors.

I. Porticos

- Construction – painted wood.
- Condition – (3) average.
- Note – the entrance portico is in moderate shape. It should be re-roofed, and the painted wood trim and fascia boards should be replaced.

J. Sitework

- Construction – combination of asphalt, concrete and gravel.
- Condition – (2) poor.
- Note – the asphalt and concrete is cracking and areas should be replaced. ¾"clearcrush gravel should be installed around the perimeter of the building. Ground water typically enters the west (uphill) side of the building each spring during the melt, and has led to decay in the wood sill plates in at least two locations. A typical perimeter drainage system

should be installed to intercept the groundwater and Spring run-off. When exposed to install the drain-tiles, the foundation wall should be protected with two coats bitumen water-proofing, drain-mat, and a 12" chimney of clear crush gravel.

4.2 Interior

A. Flooring

- Construction – historic 2x6 fir on edge, sheet flooring, and concrete topping.
- Condition – (2) poor.
- Note – the existing 2x6 on edge flooring is robust and solid, but has shifted over the years and is so uneven that the staff has difficulty using hand dollies. This historic flooring should be planed smooth and stained. The sheet flooring should be removed, and only replaced in the office, new washrooms, and at the loading area.

B. Trim and Casework

- Construction – painted wood.
- Condition – (3) average.
- Note – there are very minor amounts of trim and casework.

C. Ceilings

- Construction – unpainted GWB.
- Condition – (2) poor.
- Note – the existing unpainted drywall should be removed and replaced with two layers of 5/8" Type X drywall to meet Code fire separation requirements. Paint finish.

D. Wall Finishes

- Construction – painted interior face of the gunite cladding.
- Condition – (2) poor.
- Note – there is no wall insulation or interior wall finishes. The existing exterior walls should be insulated with batt insulation (mineral wool or glass batt), a vapour barrier should be installed, and 5/8" Type X drywall with a paint finish.

E. Doors

- Construction – painted wood at the washroom and office.
- Condition– (3) average.
- Note – replace doors when the washroom and office are remodeled.

F. Washrooms

- Construction – sheet flooring, painted plywood walls, and vitreous china fixtures.
- Condition – (2) poor.
- Note – the washroom is in poor shape and is not HC accessible. During any extensive renovation of the building, it should be gutted to studs, and rebuilt with robust, modern finishes andfixtures that suite the historic style of the building.

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5 RECOMMENDATIONS

5.1 General

A central consideration for the maintenance or renovation of any older building is to prevent ongoing water penetration - to keep the outside out. This is particularly true of wood frame buildings which tend to be less robust than concrete or steel buildings. From a building maintenance perspective, ongoing water penetration in a wood frame building can lead to the decay and failure of key building components. From a building health perspective, ongoing water penetration can lead to mould growth inside the wall cavities. Mould is always present in our environment, but typically needs three triggers to grow in our buildings: food (i.e. wood studs, or paper-faced drywall), heat, and a minimum 19% moisture content.

Building owners need to understand the life-cycle status of their buildings so that they can budget for the anticipated repairs, can replace aging building components in a timely fashion before they fail, and can prevent ongoing water ingress and the mould growth that usually results.

Based on a visual review of the Office Building and Warehouse, it is evident that many of their key building components have either reached or are nearing their expected life-cycle. Doing nothing to these buildings will increase the deterioration of the building components and pose a potential health risk as ongoing water penetration will continue to decay the wood frame, and could allow mould to grow in the walls. As the building Owner, FortisBC needs to determine if they should either repair/replace these items or construct new buildings?

Industry Standard, considers recommendations from programs like the current province-wide seismic upgrade program for schools, in which the BC Government has established that a building should be replaced when the anticipated repair / upgrade costs exceed 70% of the expected replacement cost. Since the estimated cost of repair at the Generation Site is in excess of 100% of a new purpose-built facility, Fortis BC needs to carefully consider whether moving forward with repair/replacement is a prudent financial decision, and will provide your anticipated return on investment?

5.2 Office Building

A. Exterior:

- Roof System: replace the failing asphalt shingles with a new metal roof complete with a snow retention system, gutters, and a heat-traced rain water leader system to below the frost level. Replace the decayed painted wood fascia, and the peeled painted wood soffit. Install modern R40 roof insulation, a vapour barrier, and soffit baffles to reduce or eliminate ice damming. Provide proper soffit and attic venting.
- Cladding: the organic vines have formed part of the heritage look of the building, but current best building practices require that the vines and all other organic material be removed from the building's exterior envelope. If it is decided for heritage reasons that the existing stucco must be retained, then the cracks should be repaired with a primus and mesh system, and the existing stucco should be parged with a crystalline cementitious coating. Otherwise, the existing stucco should be removed to clean ship lap, new air barrier sheathing paper applied, and a modern vented rainscreen stucco system installed.
- Windows: the existing single paned windows have exceeded their expected life and should be replaced. Most do not open, they have cracked and peeling exterior paint and wood trim, and they do not provide a decent thermal resistance (typically only R1). There are many high quality heritage style windows available in BC (including both thermally broken aluminum and fiberglass options). These new windows can come in a painted exterior and stained wood interior appearance to match the historic "French Pane" look of the building, and also provide a much improved thermal resistance (up to R8) - a huge improvement over the existing windows.
- Doors: The doors are in better condition, and most do not have to be replaced. The swing on two Exit Doors should be reversed so that they open in the direction of travel, and the front wood door should be replaced with a more appropriate heritage style half-lite stained wood door. However, during a major renovation, the exterior metal doors would typically be replaced with new insulated metal doors and frames to provide another 40 years of life.
- Foundations: the concrete foundations should be repaired following the recommendations of the Structural Engineering Report. Architecturally we recommend while the foundations are exposed for structural repair, their performance be improved with new waterproofing, drain mat, perforated perimeter drainage system, and a 12" drainage chimney of 3/4" clear crush gravel.
- Site Works: most of the hard site works are at the end of their life and need to be replaced, including the cracked asphalt paving, and exterior concrete stairs.

B. Interior

- The interior of the Generation Office Building generally appears to be in better condition than the exterior, though many of the interior building components also require repair or replacement. A renovation is also an opportunity to create a more effective and healthier office environment. Only environmentally progressive, low or zero VOC materials and interior finishes should be used.
- Flooring: the historic fir-wood flooring should be refinished and re-stained. The carpet from the 1986 renovation should be removed and replaced with modern carpet tile, placed to reduce office noise and highlight the fir-wood. Existing sheet flooring should be replaced with current environmental flooring such as Marmoleum or Marmarette.
- Woodwork: the historic fir trim, paneling, and casework (especially in the two salons) should be carefully touched-up and retained to preserve it for another generation.
- Ceilings: any remnant plaster ceilings should be removed and replaced with textured 5/8" Type X drywall; existing drywall ceilings should be repainted; and the aging 2x4 t-bar ceilings should be replaced with new 2x2 t-bar that has a more historic, detailed look.
- Walls: given the extent of the required electrical upgrade work, it may not be possible to retain the existing plaster walls. If the plaster walls are to be retained, the cracks should be repaired with an imbedded mesh, and the walls repainted. More likely, the existing plaster and lathe will need to be removed to allow electrical work and window replacement. In addition, if a face-seal stucco cladding is retained for heritage reasons, then the stud wall cavities should probably be sealed with an air-tight, closed cell foam insulation from the interior. This will go a long way to improving the performance of the historic stucco. A new painted 5/8" Type X drywall finish will need to be installed.
- Doors: the historic stained fir-doors can be retained, touched-up, and have their hardware replaced with HC compliant lever door handles.
- Washrooms: During any extensive renovation of the building, the extra washrooms adjacent to each office should be removed. The washrooms that are retained should be gutted to studs, and rebuilt with robust, modern finishes and fixtures that suite the historic style of the building.

5.3 Warehouse

As with the Office Building, the central consideration for the maintenance or renovation of the Warehouse is to first repair the key building envelope components, and then upgrade or replace the interior finishes so that the building will last another generation as a functioning service building.

Since the two buildings were built in a similar era with similar materials, most of the observations for the repair and upgrade of the Office Building are also appropriate for the Warehouse.

A. Exterior:

- Roof System: replace the failing asphalt shingles with a new metal roof complete with a snow retention system, gutters, and a heat traced rain water leader system to below the frost level. Replace the decayed painted wood fascia, and the peeled painted wood soffit. Install modern R40 roof insulation, a vapour barrier, soffit baffles to reduce or eliminate ice damming. Provide proper soffit and rafter venting.
- Cladding: If it is decided for heritage reasons that the existing cementitious gunite must be retained, then the cracks should be repaired with a primus and mesh system, and the existing gunite should be parged with a crystalline cementitious coating. Otherwise, the existing stucco should be removed to clean ship lap, new air barrier sheathing paper applied, and a modern vented rainscreen stucco system installed.
- Windows: the existing single paned windows have exceeded their expected life and should be replaced. Most do not open, they have cracked and peeling exterior paint and wood trim, and they do not provide a decent thermal resistance (typically only R1). There are many high quality heritage style windows available in BC (including both thermally broken aluminum and fiberglass options). These new windows can come in a painted exterior and stained interior appearance to match the historic, "French Pane" look of the building, and also provide a much improved thermal resistance (up to R8) - a huge improvement over the existing windows.
- Doors: The exterior Warehouse large doors are in poor shape and should be replaced with new, insulated overhead doors properly sized for materials they need to handle today. During a major renovation, the exterior metal doors would typically also be replaced with new insulated metal doors and frames to provide another 40 years of life.
- Foundations: the concrete foundations should be repaired following the recommendations of the Structural Engineering Report. Especially on the up-slope side, we recommend while the foundations are exposed for structural repair, their performance be improved with new waterproofing, drain-mat, perforated perimeter drainage system, and a 12" drainage chimney of 3/4" clear crush gravel.

- Site Works: most of the hard site works are at the end of their life and need to be replaced, including the cracked asphalt paving, and exterior concrete stairs.

B. Interior

- The interior of the Generation Warehouse appears to be in rougher condition than the exterior, and many of the interior building components require repair or replacement. A renovation is also an opportunity to create a more effective and healthier office environment. Only environmentally progressive, low or zero VOC materials and interior finishes should be used.
- Flooring: the historic 2x6 on-edge fir-wood flooring should be refinished and re-stained. Existing sheet flooring should be replaced with current environmental flooring such as Marmoleum or Marmarette.
- Woodwork: There is very little interior wood trim or casework, and it should not be allowed to impact the efficiency of a renovation. Provide new, historically appropriate trim as necessary for the Work.
- Ceilings: the existing unpainted drywall ceiling should be removed, and a new double layer of painted 5/8" Type X drywall installed to provide the required fire separation at the floor assemblies. .
- Walls: if a face-seal gunite cementitious stucco cladding is retained for heritage reasons, then the stud wall cavities should probably be sealed with an air-tight, closed cell foam insulation. This will go a long way to improving the performance of the historic gunite stucco. A new painted 5/8" Type X drywall finish will need to be installed.
- Doors: there are no historic doors worth retaining. New, historically appropriate stained wood doors should be installed and provided with HC compliant lever door handles.
- Washrooms: The existing washroom is sub-standard and does not meet Code. At least two new washrooms should be provided with robust, modern finishes and fixtures that suite the historic style of the building.

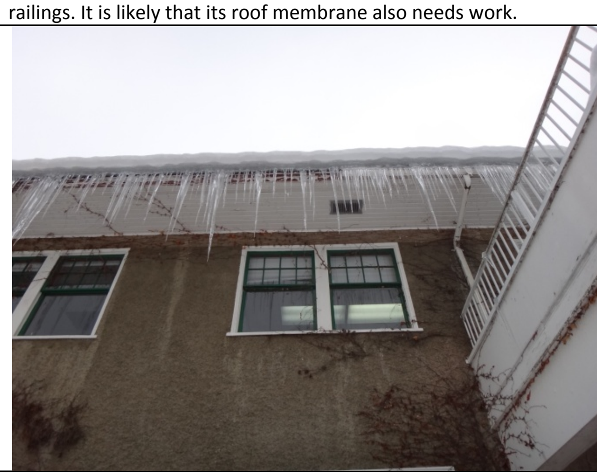
Photographs - Existing Condition

Generation Office Building - Exterior

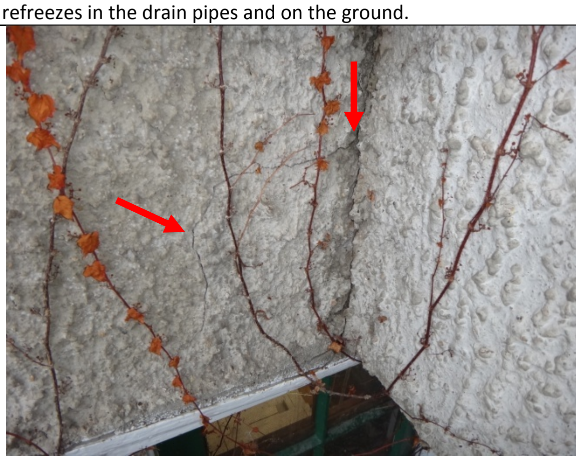
#1- Generation Office Building - Front Elevation

#2 - Entrance portico requires repairs to its fascia, soffit, stairs, and railings. It is likely that its roof membrane also needs work.

#3 - Much of the Office Building is covered with vines. Current best building practices hold that the vines should be removed.



#4 - There is an ongoing problem with icicles forming at the eaves. This is likely caused by insufficient attic insulation, allowing interior heat to melt the roof snow. The roof insulation should be increased, and a heat-traced gutter and rainwater lead system should be installed to take melt water away from the building.

	
#5 - Main Entrance Stairs are loose, worn, and should be replaced.	#6 - The original tongue and groove soffit was replaced during the 1986 renovation. Leaks and moisture has caused the paint to blister and the wood to decay. It should be replaced.
	
#7 - A small section of gutter has been installed above the Main Entrance. Because it does not have heat tracing, and is not connected to a storm water system, the melt water simply refreezes in the drain pipes and on the ground.	#8 - The stucco sides of the Main Entrance Stairs are cracked and have been repaired.
	
#9 - Note the cracks in the stucco.	#10 - Vines at typical window sill.

#11 - The vines are extensive on the cladding stucco.

#12 - icicles pose a danger on the Exit roofs.

#13 - Vine root system is cracking the site asphalt and concrete.

#14 - Vine root system is extensive.

	
#15 - Concrete threshold at an Exit door is cracked and spalling.	#16 - Organic splash has caused decay at the Exit door & frame.
	
#17 - The metal exterior Fire Exit Stairs are ice covered, dangerous, and have begun to rust.	#18 - A view of the north exterior Fire Exit Stairs shows them covered with ice, and dangerous to use.

#19 - A picture of the east side of the Office Buildign shows the extensive vines, icicles over the Exit Roofs, and snow on the Exit Route.

#20 - This picutre of the Main Entrance rain water leaders shows the problem of ongoing ice build-up from the roof melt.

#21 - The exhaust louver is loose from the buiding.

#22 - Organic growth have led to decay in the fascia of the rear Exit roof.

	
#23 - Note the peel paint at the portico soffit and beam, the organic vine growth on the building, and the decay in the window head trim.	#24 - Note the build-up of organic debris on the window sill, the decayed window jamb, and the cracked stucco.
	
#25 - At the landscape stairs, the concrete has begun to spall, and the railings rust.	#26 - The south metal Fire Exit Stairs shows similar issues of ice and rust. The stone retainign wall should be replaced with concrete.

#27 - Close-up of the landscape stair railing.

#28 - Close-up of a typical exterior wood window. Note the cracking and peeling paint, and the spalling glazing putty.

#29 - A section of failed stucco has been repaired with unpainted plywood.

#30 - The rear Fire Exit canopy requires re-roofing, and has decayed wood members that should be replaced.

#31 - Exit Stairs should have a side guard rail and even risers.

#32 - Exit canopy is covered in organic growth and icicles.

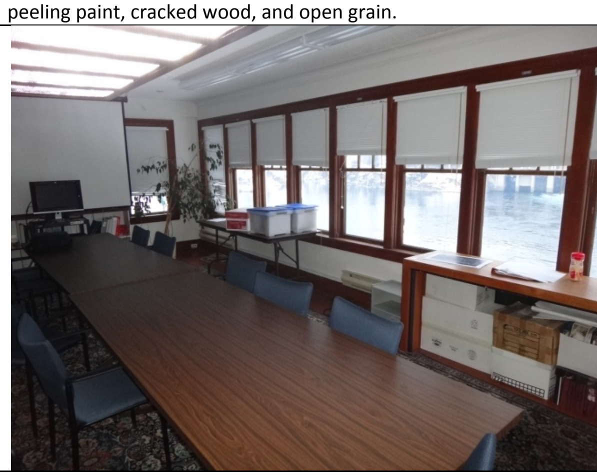
	
#33 - Typical window sill is cracked, with peeling paint, and spalling window putty. Most windows do not open.	#34 - Typical window in poor condition (paint, putty and cracking).

Generation Office Building - Interior

#35 - Typical interior windows have been caulked shut to reduce cold winter drafts.

#36 - Typical exterior window sills and jambs are in poor shape, with peeling paint, cracked wood, and open grain.

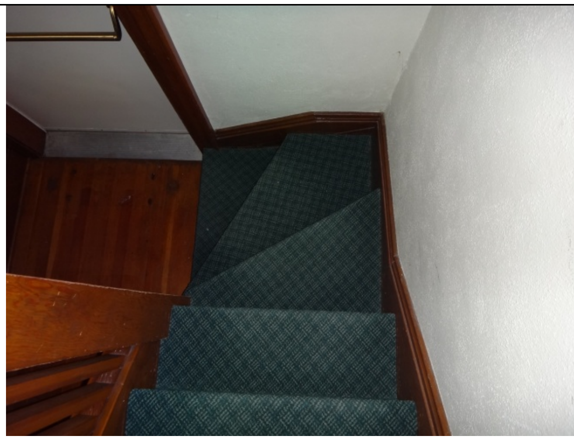
#37 - Historic salon has been converted into a reception.



#38 - Historic solarium has been converted into a meeting room.

#39 - Open central stairs require railings on both sides, and a fire separation between floors.

#40 - Stairs to the basement require railings on both sides, and are not permitted to have stairs without sidewalls.

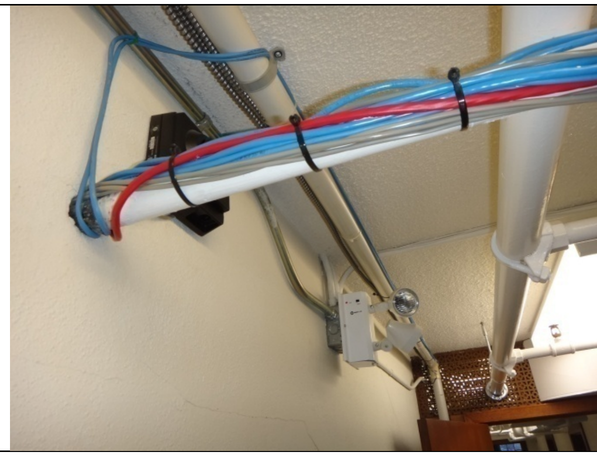


#41 - Winders are not permitted on Exit Stairs.

#42 - The rise and run of the Exit Stairs do not meet Code. The run in particular is too shallow, and becomes a tripping hazard.

#43 - This basement Exit corridor is too narrow. The minimum permitted width is 1100 mm (43.5").

#44 - This basement Exit door swings in, against the flow of traffic. It should swing out.

	
#45 - The plaster walls have begun to shift and crack with age. There is no simple way to repair plaster once it has debonded from the wall lathe.	#46 - Exposed pipes, electrical wiring, and data wires do not meet typical office standards. They are usually hidden by a t-bar drop ceiling.
	
#47 - The basement salon has been converted to a lunch room. While the view is lovely, the millwork should be replaced to meet current office and FBC standards.	#48 - The historic fir flooring is showing its age, and requires repair and refinishing.
	
#49 - Historic water stains are evident on this basement wall and	#50 - the existing washrooms require upgrading.

	
#51 - the existing fir-wood flooring requires refinishing.	#52 - the fir-wood trim requires touch-up work.
	
#53 - the plaster walls are in poor condition.	#54 - the historic hotel rooms are too large for a single office, and too small for a typical open office.

Generation Warehouse - Exterior

#55 - front entrance of the Warehouse, with the "Paint Storage Building to the left front.

#56 - rear or east facade of the Warehouse. Note the icicles and decayed fascia boards.

#57 - north facade of the Warehouse.

#58 - south facade of the Warehouse.

#59 - decayed wood fascia boards.

#60 - icicle build-up is typical through the winter.

#61 - retrofitted air conditioner

#62 - the historic Warehouse door does not open.

#63 - the wood windows are in very poor condition.

#64 - temporary attempt to intercept the melt-water.

<table>
<tr><td></td><td></td></tr>
<tr><td>#65 - window heads have no caulking, no head flashing, the wood is failing, and the gunite cracking.</td><td>#66 - the wood windows are in very poor condition.</td></tr>
<tr><td></td><td></td></tr>
<tr><td>#67 - if the walls are insulated, frost-free hose bibs will have to be installed.</td><td>#68 - the gunite is cracking at the corners, and in other locations.</td></tr>
</table>

	
#69 - cracked gunite cladding.	#70 - failed roofing and fascia boards.
	
#69 - cracked gunite cladding.	#70 - cracked gunite cladding.
	
#71 - cracked asphalt paving.	#72 - cracked asphalt.

	
#73 - loading ramp is in poor condition.	#74 - main entrance stair is in poor codition.
	
#75 - concrete stairs have begun to crack.	#76 - rust jacking from the steel handrails has begun to crackthe concrete.

Generation Warehouse - Interior

#77 - water ingress has decayed the wood bottom plate.

#78 - cracks in the gunite cladding are visible from the interior.

#79 - ongoing water penetration has stained the wood window framing.

#80 - 2x6 on-edge flooring is very uneven and requires planing and refinishing.

#81 - the existing stairs are open and do not meet Code.

#82 - upper wood flooring is very rough.

#83 - attic space is very rough.

#84 - the attic is partially insulated, but there appears to be no vapour barrier.

#85 - the existing washroom is in poor condition.

#86 - existing washroom, close-up.

#87 - interior of the uninsulated gunite cladding is chipped.

#88 - interior face of the roof decking is water stained.

#89 - interior face of the roof decking.

#90 - office is servicable, but ready for an upgrade.

#91 - wood stud is decayed from water ingress.

#92 - concrete slab is cracked.

#93 - wood bottom plate is decayed from water ingress.

#94 - low clearance at the lower floor warehouse.

#95 - the existing windows are in poor condition.

#96 - water staining on the Warehouse ceiling.

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Structural Report Generation Office & Warehouse

FORTIS BC,
South Slocan Generation Site
South Slocan, BC


Generation Office West View

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Project No: 13016
12 April 2013

CONTENTS

Appendices

1 Introduction

1.1 Report Methodology

Iredale Group Architecture (Iredale Group) was retained by Ms. Becky Richardson of FortisBC to provide a visually based condition assessment of the structural components of the Generation Office and Warehouse located in South Slocan, at their South Slocan Generation Site.

The purpose of our condition assessment is to help determine the current condition of the buildings, to analyze each main building component and where it is in its typical life-cycle, and to help determine the corresponding repair / replacement costs.

Iredale Group attended the site on January 22, 2013. The review was limited to a visual review of the existing structures and the review of existing documentation.

The structural assessment was performed by James Emery, Architect AIBC, MRAIC, P. Eng., Partner, Iredale Group Architecture.

1.2 Terms of Reference

Iredale Group is a firm of professional consultants practicing in the areas of architecture, structural engineering, heritage restoration, and building envelope consulting.

Iredale Group has prepared this report for FortisBC. The content reflects our best judgment in light of the information available at the time of preparation. Any use of this report by a third party or any reliance or decision made based on it is the responsibility of such third parties.

1.3 Scope of Work

- Visually assess the structural components of the buildings
- Review of structure as it applies to the current codes regarding lateral and gravity loading
- Provide a life-cycle analysis of the building components based on the visual assessments.

1.4 Life Cycle Analysis

The life cycle analysis used for the other building components assessed in companion documents to this one, can give a false impression of the condition of the structural components since there can be a disparity between the condition and the life expectancy. For example, a component that is in the last 25% of its life span would be rated as Poor even though it is performing adequately and has an expectation of exceeding its life span with little to no repair. Therefore the analysis in this structural report is presented differently. A Good rating means that the system is performing well and, with few to no repairs, will perform adequately even past its expected life time depending where the analysis falls on the life cycle of the component. A Fair rating means that the system is performing adequately, but some repairs are required to meet or increase its expected life span. A poor rating means that the system is no longer able to perform adequately and will require significant repairs or replacement.

2 Structural Review

2.1 Building History - Generation Office

- **Name:** Generation Office, South Slocan Generation Site
- **Location:** South Slocan, BC
- **History:** The facility was originally constructed in about 1930 as a hotel for the West Kootenay Power and Light Company employees and was designed by McCarter & Nairne Architects and Engineers. It eventually became a guest house for Cominco and in the 1980's was converted into an office building. It is now used as an office for FortisBC.
- **Description:** The facility is three storeys high but the land drops away to the east so that the lower floor is partially buried. It is constructed of light wood framing and is clad in unpainted stucco. The form is a simple rectangle with a rectangular build-out on the east side. The whole building is capped by a hip roof and has a large central chimney. The main entry is through a covered porch with a veranda on top.

2.2 Building History - Warehouse

- **Name:** Warehouse, Kootenay Power
- **Location:** South Slocan, BC
- **History:** The facility was originally constructed in about 1930 as a Warehouse for the West Kootenay Power and Light Company and appears to have been designed in-house. It has continued to function as a warehouse to the present day. In the 1940's the original wood frame loading ramp was replaced with a concrete ramp.

2.3 Structural System - Generation Office

Documentation for this building was limited and most of the structure was not accessible due to interior plaster finishes. The attic was accessible and there were some access panels to the crawlspace, but Confined Spaces approval was required prior to allowing entry.

- **Roof**: The roof is hipped and is constructed of 2x8 rafters at 24" o.c. with midpoint bearing using 2x8 @ 24" o.c. studs on 2x10 @ 24" o.c. ceiling joists. 2x8's are used for the ridge beams. The ceiling joists bear on the exterior walls and on the interior walls both sides of the central hall. Roof sheathing is 1x8 horizontal shiplap.
- **Upper Floor**: 2x12 joists at 16" o.c. with 1x8 diagonal shiplap supported by exterior walls and interior hall bearing walls.
- **Main Floor**: 2x12 joists at 16" o.c. with 1x8 diagonal shiplap supported by exterior walls and interior hall bearing walls and timber beams (size unknown) on 8x8 timber posts.

- **Basement:** a mix of crawlspace and concrete slab on grade. The crawlspace section of hte floor is constructed of 2x10 @ 16 joists supported by concrete foundation walls at about 8' o.c. with 1x8 diagonal sheathing. The slab-on-grade is 4" thick and reinforcing is unknown.
- **Foundation**: the foundation consists of perimeter reinforced concrete foundation walls are 12" thick. Spread footings are used for posts and strip footings and foundation walls are used for bearing walls. Also as noted in the previous point strip foundation walls (6" thick) are used for intermediate joist support for the basement wood framed floor. Strength values are not provided.
- **Walls**: The bearing walls are constructed of 2x6 at 16" o.c. Sheathing is unknown but expected to be diagonal ship lap.

2.4 Structural System - Warehouse

- **Roof**: 2x6 T&G decking on 6x6 and 4x6 purlins on timber trusses. The timber trusses spaced at 12' o.c. The timber trusses consist of 5-2x8 laminated top chord, 5-2x10 laminated bottom chord, 6x8 diagonal web compression web members, and vertical steel tension rod web members with diameters ranging from 3/4" diameter to 1 3/8" diameter for the centre web. The trusses are supported by 12x12 solid timber columns and have a 6x8 brace between the bottom chord and the column. The design loads specified are 40 psf for the roof load including framing plus suspended loads from the bottom chord of 5000 lbs for the centre panel point or 2500 lbs for each panel point. The resulting maximum compression loads for the top chord are 20 kips and for the diagonal webs are 6.5 kips. The tension loads are a maximum of 16.5 kips for the bottom chord and 11 kips for the centre tension rod.
- **Upper Floor**: 2x6 laminated floor deck spanning up to 13'-10", supported by the exterior wall framing and interior 12x12 beams. The beams span 12' and are supported by corbelled 12x12 posts. The corbels are 4' long.
- **Lower Floor**: 4" slab on grade reinforced with 5/8" diameter rods at 2' o.c. each way. Strength of concrete is not specified,
- **Foundation**: Column footings are 3'-3" x 3'-3" x 14" deep concrete reinforced with 1/2" diameter bars at 4" e/w. One 1" diameter by 15" dowel connects the posts to the footing. The column sits on a 14x14 pedestal about 5 1/2" high. The bottom of the spread footings are at 18" below top of slab. The perimeter strip footing is 2'-4" high by 14" wide with 4 - 5/8" diameter continuous rods at the top and 2 - 3/4" diameter rods at the bottom. Two rows of half inch diameter verticals are used at 3' o.c. The bottom of the footings sit at about 16" below grade. Strength of concrete is not specified,
- **Walls**: The perimeter walls are constructed of a mix of light wood and heavy timber framing which is generally designed to carry the 2" thick Gunite cladding load,

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2.5 Structural Condition - Administration

2.5.1 Structure:

Condition = Good   Expected Life = 100 years   Approx Age = 83 years

2.5.2 Concrete Foundation:

Condition = Good   Expected Life = 100 years   Approx Age = 83 years

2.5.3 Concrete Slab on Grade:

Condition = Good   Expected Life = 80 years   Approx Age = 83 years

2.5.4 Observations:

- The south east corner of the building is exhibiting considerable settlement. The basement floor slopes down to this corner and there are significant stress cracks in the plaster walls at this location. This translates to the main floor with similar cracking in the plaster evident at the same corner though the floor does not seem to slope. By the top floor, there is no evidence of settlement. Interestingly there is very little evidence of this on the exterior, such as cracking foundation concrete
- A number of vines are growing on the south side of the building. Good practice is to remove the vines.
- There are numerous plaster cracks, some of which have been repaired, throughout the interior of the building suggesting that the building experiences constant movement likely due to changing weather conditions and possible ground movements
- There are some pressure cracks in the glazing at the main level meeting room on the east side of the building
- Fire escapes have been added on at a later date. The deck mesh grating deflects considerably and is inadequate for the load
- Other than the noted items above the building appears to be performing adequately.

2.5.5 Recommendations:

1. South East corner - further investigation is required to determine cause. A geotechnical engineer review is required. Notwithstanding the geotechnical review, we expect that the following work will be required:
   1.1. Levelling of south/east corner of building
   1.2. Replacement of a portion of the concrete foundation with new in the settled area
   1.3. removal of existing fill and replacement with structural fill as required by the geotechnical engineer
2. Numerous cracks - this building exhibits movement over the seasons. No action required other than constant maintenance of the cracks
3. Pressure cracks in windows - see number 1

4. Replace deck grating with properly rated decking - this is a safety issue and should be addressed immediately

2.6 Structural Condition - Warehouse

2.6.1 Structure:

Condition = Good   Expected Life = 100 years   Approx Age = 83 years

2.6.2 Concrete Foundation:

Condition = Good   Expected Life = 100 years   Approx Age = 83 years

2.6.3 Concrete Slab on Grade:

Condition = Poor   Expected Life = 80 years   Approx Age = 83 years

2.6.4 Observations:

- In the attic there are a couple of locations where the web is pulling away from the end of the truss
- Quite a few nuts are missing from bolts that are used to tie the top and bottom chord laminations of the trusses together
- A number of heavy timber members are twisted and/or checked
- On the upper level some of the braces for the bottom chord of the truss to columns have pulled away from the column -
- In the lower floor there are numerous columns that have twisted and are checked
- In the south east section of the lower floor the slab has settled considerably (maximum of about 2 1/2") and shims have been placed under certain central columns. The foundation wall on the east side in that vicinity has also settled and shims and now there are gaps of up to 1 1/2" under the perimeter columns and wall framing in that location. Note that the perimeter concrete foundation wall is not exhibiting any cracking
- The slab on grade is exhibiting cracking throughout and appears in the settled area to be nearing the end of its life
- It is understood that in the spring thaw that a significant amount of water runs through the lower floor of the warehouse. This could be a cause of the settlement issues noted. It also raises other potential concerns around deterioration due to freeze-thaw activity in the concrete foundation system and rusting of reinforcing steel which can cause spalling of the concrete.

2.6.5 Recommendations:

1. Truss web loosening - tighten bolts
2. Missing nuts - provide new nuts and washers

3. Checking and twisting of truss members - no action required other than to monitor the checking - if it becomes possible to see through the members then some remedial action may be necessary
4. Braces pulling away - these should be tightened
5. Twisted and checked columns - no action required other than to monitor the checking - if it becomes possible to see through the column then some remedial action may be necessary
6. Settlement - a geotechnical review to determine the cause of settlement should be undertaken and then a course of action prepared to restrict further settlement. Shims should be placed under the perimeter wall columns where gaps exist between the bottom of the posts and the foundation wall.
7. Slab cracking and settling - replace slab
8. address water penetration in the spring thaw by providing proper waterproofing and drainage on uphill side of warehouse.

2.7 Gravity Loading - Generation Office

2.7.1 Observations:

Design loads were not provided in the documentation. The floor framing appears to be reasonable for the expected loading and exhibits no signs of distress. The roof framing is also not showing signs of distress, but is likely undersized for current code prescribed snow loading. The foundation walls seem to be well reinforced especially on the uphill side, but there is no information on footings.

2.7.2 Recommendations:

The building has performed adequately throughout its life. We do not recommend any gravity load upgrades.

2.8 Lateral Loading - Generation Office

2.8.1 Observations

A proper lateral load resisting structure will transfer lateral loads from the top of the structure to the foundation through a continuous load path. Components required for an effective lateral transfer mechanism are the following:

- Roof and floor diaphragms
- Chord elements at the perimeter of the diaphragms
- Proper connections to create continuity for a chord element
- Lateral resisting elements such as shearwalls, frames, or cross braces
- Drag struts to carry loads from diaphragms to lateral resisting elements (drag struts and chords can be the same thing)

- Proper connections between diaphragms and chords, diaphragms and drag struts, and diaphragms and lateral resisting elements
- Proper connections of lateral resisting elements to foundations

The floor and roof diaphragms have limited capacity. Their connection to perimeter chord elements is through two 2 1/2" nails per 8" wide board which is considered reasonable. It is unknown if there is a good connection to the walls which will act as shearwalls through the limited capacity of diagonal sheathing and stucco. Connections to the foundations are unknown, but for the most part it is expected that there is a nominal effective load path to the foundation. Overall there is some limited capacity to resist lateral movement in the existing structure.

2.8.2 RECOMMENDATIONS

The building has performed adequately through its entire life. We do not recommend any lateral load upgrades. If it is determined that this building will continue to function in a capacity that needs to be operable post disaster, then a lateral load upgrade will be required. This will include providing adequate roof and floor diaphragms, continuous chord elements, plywood shearwalls or cross-bracing, and proper connections between all the lateral load resisting elements.

2.9 Gravity Loading - Warehouse

2.9.1 OBSERVATIONS

The roof was designed for 40 psf which includes framing loads. The current code requires the roof to be designed to a roof snow load of 4.2 kPa (88psf) plus 0.1 kPa (2psf) rain load. With a ground snow load factor of 0.8 the total load the roof should be designed for is 3.46 kPa (72psf). Framing loads are to be added to this load and would normally be in the neighbourhood of 0.75kPa (15psf).

The floor design load is not given in the original drawings. Current code requirements suggest that for a warehouse the minimum uniform design load should be 4.8 kPa (100psf) and the minimum concentrated load should be 9 kN (2000 lbs), but of course needs to be designed for its intended use. In this case the warehouse requires hand-trucking of the storage items and as such forklift loads are not required to be considered. The upper floor seems to be mostly a hardware type storage. A recommended value for this type of storage is between 14 kPa (300psf) and 20 KPa (400 psf)[1].

A rough calculation of the capacity of the floor suggests that the laminated 2x6 joists provide a capacity of around 13.9kPa (270psf) and that the supporting beam and column system has a capacity of around 15.3 kPa (320 psf). Assuming a soil bearing capacity of 150kPa (3000 psf), the capacity of the overall system is limited to about 10.4 kPa (220 psf). Because of the low ceiling

[1] *Unified Facilities Criteria (UFC) - Storage Depots,* March 2005, Department of Defense, USA

height it may be determined that this capacity is sufficient for the needs of the warehouse despite the recommended values.

2.9.2 Recommendations

The building has performed adequately throughout its life and the capacity of the main floor structural system is commensurate with the expected loading for this level of the warehouse. We do not recommend any gravity load upgrades. However if the building is to be renovated to extend its life for a significant period of time (over 5 years) then it would be good to evaluate the actual or desired loading of the upper floor to see if some upgrading is in order. Possible work might include increasing size of spread footings, reinforcing existing wood beams, and reinforcing the existing wood floor.

2.10 Lateral Loading - Warehouse

2.10.1 Observations

A proper lateral load resisting structure will transfer lateral loads from the top of the structure to the foundation through a continuous load path. Components required for an effective lateral transfer mechanism are the following:

- Roof and floor diaphragms
- Chord elements at the perimeter of the diaphragms
- Proper connections to create continuity for a chord element
- Lateral resisting elements such as shearwalls, frames, or cross braces
- Drag struts to carry loads from diaphragms to lateral resisting elements (drag struts and chords can be the same thing)
- Proper connections between diaphragms and chords, diaphragms and drag struts, and diaphragms and lateral resisting elements
- Proper connections of lateral resisting elements to foundations

The roof diaphragm has very limited capacity. It may have sufficient connectivity to the perimeter chord element, but the chord is not properly connected to provide continuity. Once the load reaches the chord, there is nowhere for it to go since there are no shearwalls, limited frames, or no cross-bracing. In the east/west direction the braces between the bottom chord of the trusses and the posts do provide an element of frame action which will be sufficient to resist some lateral load. However these posts are not adequately tied down to the foundation.

The floor diaphragm has more capacity than the roof, but the remainder of the comments for the roof apply to the floor, except that there is no lateral resisting load mechanism at all for this level. It can be argued that the Gunite will provide some lateral resistance and certainly life-size shake tests at UBC have indicated that stucco can provide fair lateral resistance. However this Gunite is in very poor condition with large cracks forming in numerous locations and therefore it's lateral resisting capabilities are too compromised to rely on.

2.10.2 Recommendations

The building has performed adequately through its entire life. We do not recommend any lateral load upgrades. If it is determined that this building will continue to function in a capacity that needs to be operable post disaster, then a lateral load upgrade will be required. This will include providing adequate roof and floor diaphragms, continuous chord elements, plywood shearwalls or cross-bracing, and proper connections between all the lateral load resisting elements.

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3 Summary and Recommendations

3.1 Recommendations

We recommend items in 2.5.5.1, 2.5.5.4, and 2.6.5 be implemented within the next year. This work includes the following:

1. Geotechnical review for cause of settlement for both buildings
2. Leveling of south/east corner of building for generation office
3. Replacement of a portion of the concrete foundation with new in the settled area for both generation office and warehouse
4. Removal of existing fill and replacement with structural fill for both buildings as required by the geotechnical engineer
5. Replacement of settled concrete slab in warehouse
6. Replacement of settled footings under columns in warehouse
7. Truss web loosening - tighten bolts - warehouse
8. Missing nuts - provide new nuts and washers - warehouse
9. Checking and twisting of truss members - no action required other than to monitor the checking - if it becomes possible to see through the members then some remedial action may be necessary - warehouse
10. Braces pulling away - these should be tightened - warehouse
11. Twisted and checked columns - no action required other than to monitor the checking - if it becomes possible to see through the column then some remedial action may be necessary - warehouse
12. Slab cracking and settling - replace slab - warehouse
13. Provide proper waterproofing and perimeter drainage to uphill side of warehouse foundation

3.2 Conclusion

The buildings have performed well throughout their life. They are showing signs of continued seasonal movement and some significant localized settlement. The cause of settlement should be determined in the short term and corrected and the fire escape decking for the Generation Office should be replaced as soon as possible since it poses a safety risk.

IREDALE GROUP ARCHITECTURE

A. EXISTING CONDITION

GENERATION OFFICE

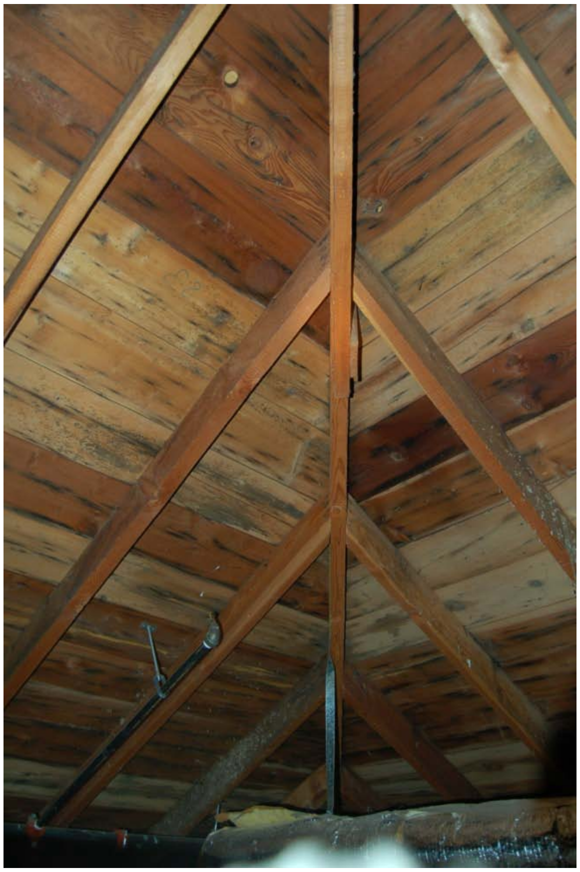
Figure 1: Roof framing at hip


Figure 2: Roof framing at intermediate support


Figure 3: Fire escape grating


Figure 4: Cracks in plaster

Figure 5: Crawlspace showing intermediate foundation wall

Figure 6: crawlspace showing support on foundation wall

Figure 7: Cracking in plaster at south-east corner

Figure 8: Typical Cracking

Figure 9: Glazing pressure crack

Figure 10: Glazing pressure crack

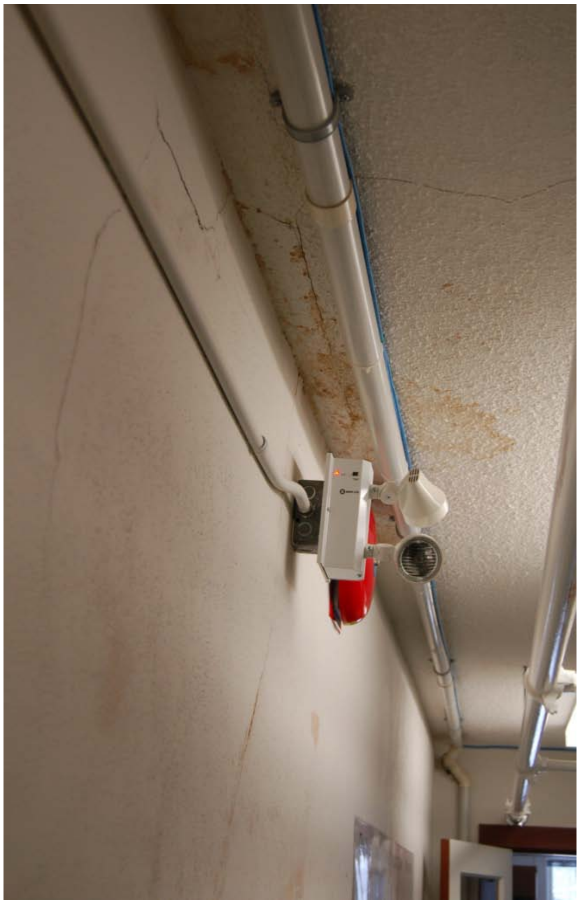
Figure 11: Typical cracking basement level


Figure 12: Typical cracking at opening corners

B. EXISTING CONDITION

WAREHOUSE

Figure 13: Missing bolts and washers on truss chord

Figure 14: Web member pulling away from truss top chord

Figure 15: Roof truss

Figure 16: Corbel detail for floor beam

Figure 17: East wall lower floor, gap under post in wall due to settlement

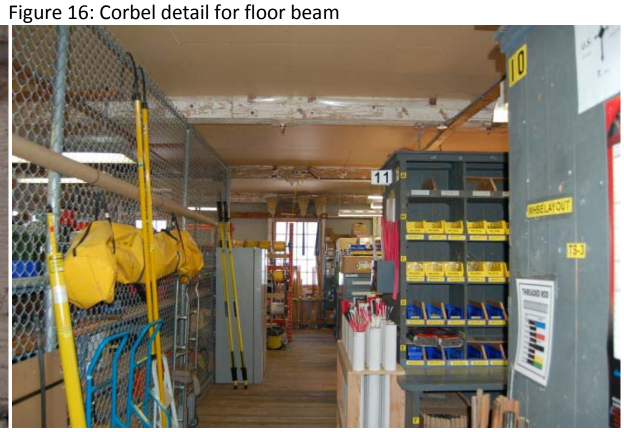

Figure 18: typical upper floor storage

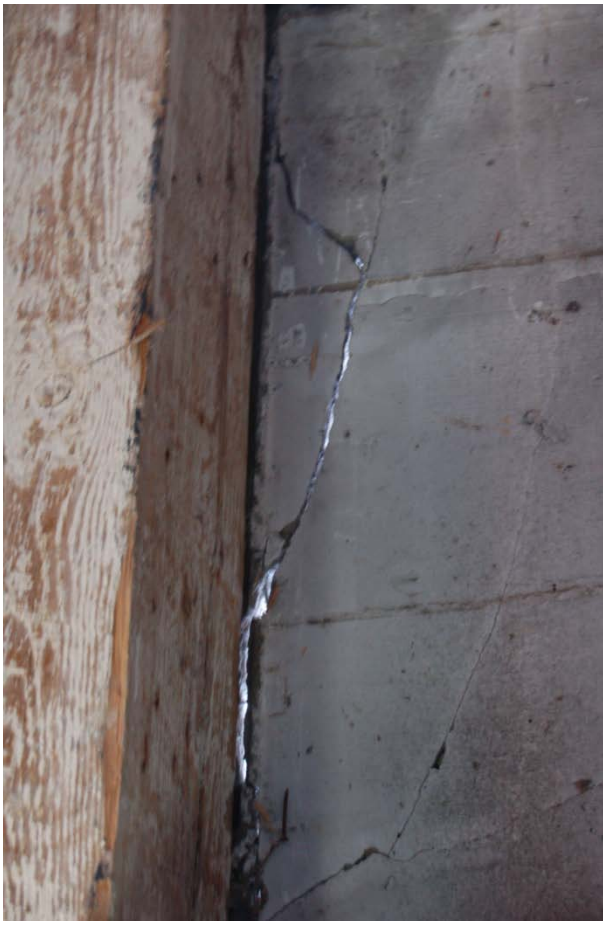

Figure 19: Typical Gunite condition

Figure 20: Typical checking

Figure 21: 2 1/2" Shim under lower floor column - note twist in column

Figure 22: Truss knee brace pulling away from post on upper level

Figure 23: Cracking of Gunite at north east corner

Figure 24: Repair where foundation has settled with respect to wall framing

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Innovative
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Mechanical Life-Cycle Report

for

FortisBC
Generation Office & Warehouse Buildings
South Slocan, BC

Prepared for:

Iredale Group Architecture

Prepared by:

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March 11, 2013

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EXECUTIVE SUMMARY

The Mechanical systems within the buildings were last updated within 30 years (1987) and may have been built in compliance with the Building, Plumbing and Fire Codes of the time. Subject to the current BC Building Code 2012, BC Plumbing Code 2012 and BC Fire Code 2012, there are items that are non-compliant.

The following are required or recommended maintenance actions:

GENERATION OFFICE BUILDING

1. Within 3 years:
    a. Replace entire Heating, Ventilation & Air-Conditioning (HVAC) system; in particular to eliminate equipment on pitch roof as it is impractical to service rooftop equipment in winter; fixing HVAC zoning and improve indoor air quality to meet current Code requirement.
    b. Replace domestic water distribution system.
    c. Install premises water service backflow preventer.
    d. Install backflow preventer to irrigation system to prevent cross contamination to domestic system.
    e. Replace sanitary drainage system.
    f. Decommission of unused showers and plumbing fixtures; or add automatic trap primers to fixtures.
    g. Add roof gutters complete with rainwater leaders and heat trace to prevent icicles built up at the edge of roof.
2. In 4 to 10 years:
    a. Replace existing ventilation fans.
    b. Replace plumbing fixtures.

GENERATION WAREHOUSE BUILDING

3. Within 3 years:
    a. Replace malfunction unitary window air-conditioning unit(s).
    b. Study exiting onsite water/fire service system to determine if existing infrastructure can support sprinkler system upgrade to the Generation Warehouse building (high fire risk than the General Office Building.)
    c. Install fire protection backflow preventer to prevent cross contamination from stagnated water in existing hose system.
    d. Replace domestic water distribution system.
    e. Install premises water service backflow preventer.
    f. Replace sanitary drainage system.
    g. Add roof gutters complete with rainwater leaders and heat trace to prevent icicles built up at the edge of roof.

4. In 4 to 10 years:
    a. Replace existing ventilation fans.
    b. Replace existing electric unit heaters
    c. Replace plumbing fixtures.

1.0 GENERAL

This report is provided at the request of Iredale Group Architecture. It is intended to provide a visual review of mechanical systems and life-cycle analysis of the Generation Office and Warehouse Buildings located at the FortisBC South Slocan Site.

1.1 INTRODUCTION

The site visit was carried out on January 22, 2013.

During the site visit, various components of the mechanical systems were visually reviewed. No testing of any system or verification of operation was carried out. The material in this report reflects our best judgment in light of the information available at the time of preparation. Some information is based existing documents available, including the followings:

- *FortisBC South Slocan Generation Office Building – Building Inspection Report, March 2007 prepared by Redwood Engineering Ltd.*
- *FortisBC South Slocan Generation Warehouse Building – Building Inspection Report, March 2007 prepared by Redwood Engineering Ltd.*
- *West Kootenay Power & Light Co. South Slocan Office – Mechanical Drawings M-1 to M-2 dated July 3, 1987 by Woodworth Ulrich Frie Architects & Engineers.*
- *West Kootenay Power & Light Co. South Slocan Office – Fire Protection Drawings SP-1 to SP-4 dated March 21, 1999 by M. W. Saunders Engineering Ltd.*

This report describes and addresses concerns related to the mechanical systems as found on the premises.

1.2 EVALUATION CRITERIA

The subject building was evaluated based on compliance with current Codes, Standards and Regulations which will include but not be limited to the followings:

- *British Columbia Building Code 2012*
- *British Columbia Fire Code 2012*
- *British Columbia Plumbing Code 2012*
- *Model National Energy Code for Buildings (MNECB)1997*
- *ASHRAE Standard 55-2004 Thermal Environmental Conditions for Human Occupancy*
- *ASHRAE Standard 62.1-2001 Ventilation for Acceptable Indoor Air Quality*
- *ASHRAE Standard 90.1-2004 Energy Standard for Buildings Except Low-Rise Residential Buildings*
- *NFPA 13-2007 Standard for the Installation of Sprinkler Systems*
- *American Society of Plumbing Engineers (ASPE) Handbooks and Guidelines*
- *British Columbia Safety Authority (BCSA) Directives and Safety Orders*
- *Work Safe BC Occupational Health and Safety (OHS) Regulations & Guidelines.*

Each major mechanical component or system was assessed and rated based on the following rating scale:

(1) Very Poor: The mechanical component has exceeded its expected life (100%). Failure has either already begun, or is imminent.

(2) Poor: The mechanical component is nearing the end of its expected life (75-100%), or is aging prematurely. Even with maintenance, the mechanical component is likely to fail within the next 3-5 years.

(3) Average: The mechanical component is approximately half way through its expected life (50%), and is performing as intended. Increased maintenance is required to achieve full life-expectancy.

(4) Good: The mechanical component is at the end of the first quarter of its design life (25%), and is performing as intended. With regular maintenance, full life-expectancy can be anticipated.

(5) Very Good: The mechanical component is new, or nearly new (0-10%), and is performing as designed. Only regular maintenance is required at this point in its life-cycle.

2.0 GENERATION OFFICE BUILDING

2.1 HVAC SYSTEMS

.1 Basement and Main floor Heating:

Condition = (1) Very Poor Expected Life = 20 years Approximate Age = 26 years

Observations: Basement and main floor are served by 3 electric heated furnaces installed in 1987. They were zoned to serve East; West; Staff Room/Conference. Outdoor air ventilation requirements are met by an outdoor air duct that supplies air primarily to the main floor which may leave the basement floor under ventilated.

Recommendations: Existing furnaces are operating at the end for their service life and are due to replaced within next 2 to 3 years. Equipment replacement should be planned. Consideration should be given to replace the existing furnaces with air-source heat pump or Variable Refrigerant Flow (VRF) systems with electrical heating back-up. Either Air-source heat pumps or a VRF system can provide both heating and air conditioning. They have higher coefficient of performance than traditional air-conditioning systems and are much more efficient that heating systems that employs electric heating coils. They also use environmentally friendly refrigerants. A new system would also include mechanically supplied outdoor air ensuring that indoor air quality meets current code and standards.

.2 Basement and Main floor air conditioning:

Condition = (4) Good Expected Life = 20 years Approximate Age = 8 years

Observations: Air-conditioning is provided by 3 condensing units located outside the mechanical room, exterior to the building on the basement level. These condensing units were installed in 2005/2006. Refrigerant used in the three condensing unit is R-22 which is classified as Hydrochlorofluorocarbons

(HCFCs) and is an ozone-depleting substance. It is currently being phase out and According to Environment Canada, by year 2015, annual allowable amount of HCFCs will be reduced by 90% of the baseline set in 1996. As a result of R-22 being phased out, the availability of R-22 refrigerant is diminishing and may lead to higher maintenance cost.

Recommendations: These condensing units are relatively new and are in good working condition. However, they work in conjunction with furnaces listed above and they use R-22 refrigerant. Consideration should be made to replace these units together with furnaces. Second Floor Heating and Air conditioning:

.3 Top floor air conditioning:

Condition = Not Reviewed Expected Life = 20 years Approximate Age = 20 years

Observations: Second floor is served by 2 packaged A/C Rooftop Units (RTU) with auxiliary electric heat. One unit is serving the east while the other unit is serving the west. Conditions of these two units were not reviewed due to unsafe winter conditions limiting access to the pitched roof. Refrigerant used in the two RTU is R-22 (based on model # provided in Redwood Engineering Report) which is classified as a Hydrochlorofluorocarbons (HCFCs) and is an ozone-depleting substance. It is being phase out. According to Environment Canada, by year 2015, annual allowable amount of HCFCs will be reduced by 90% of the baseline set in 1996. According to Work Safe BC regulations work on a pitched roof above a 4 to 12 slope requires the use of fall protection in the form of guardrails, fall arrest system or fall restraint system.

Recommendations: These RTU are operating towards their end of service life and are due to be replaced in next 2 to 3 years. Proper maintenance of these units should include the use of mobile lifts and roof anchors per Work Safe BC requirements. Maintenance during winter seasons is highly weather dependent and might render these units out of service for extensive time. Consideration should be made to replace these units with either air-source heat pumps or VRF systems. A new HVAC system should be designed as a single central system with all outdoor units located on ground for greater serviceability.

.4 Bathroom Ventilation Fans:

Condition = (1) Very Poor Expected Life = 20 years Approximate Age = 26 years

Observations: Each bathroom has its own ceiling exhaust fan which is ducted to the exterior of the building. Some exhaust fans are very noisy. Some fans have been replaced.

Recommendations: Bathroom fans shall be replaced as required with modern low sone (noise) exhaust fans.

.5 Staff Room (Basement) Exhaust Fan

Condition = (1) Very Poor Expected Life = 20 years Approximate Age = 26 years

Observations: An exhaust fan (Xpelair model: unknown) was installed on the south wall of Staff Room, near the coffee machine.

Recommendations: The exhaust fan should be cleaned and inspected on regular basis and be included in preventive maintenance schedule.

.6 Main Floor Conference Room Reversible Fan

Condition = (1) Very Poor Expected Life = 20 years Approximate Age = 26 years

Observations: The reversible fan (Xpelair model: WX9, 120V, 65W) installed on the east wall of the Conference Room can either supply outdoor air or extract room air to outside. However, the fan appears to have been neglected and not used in many years.

Recommendations: The reversible fan should be cleaned and inspected on regular basis and be included in preventive maintenance schedule.

2.2 Fire Protection System

Condition = (3) Average Expected Life = 30 years Approximate Age = 14 years

Observations: Observations: Sprinkler system was added in 1999 per NFPA-13 1996 with Double Check Detector Assembly (DCDA); Siamese connection; one dry zone for attic space complete with ¾ hp air compressor; one wet zone for all 3 levels. Test drains of zone valves have been routed to outside of the building. Fire extinguishers were provided through out and are being maintained.

Recommendations: Sprinkler system is in good working order and no visible deficiency was observed. The sprinkler system and fire extinguishers are maintained by Bradley Fire Protection. For separate fire alarm analysis see Electrical Life Cycle Report.

2.3 Plumbing Systems

.1 Storm Drainage:

Condition = (2) Poor Expected Life = 25+ years Approximate Age = unknown

Observations: There is no gutter around the pitch roof, except a small section over the entrance porch. Down sprout (Rain Water Leader) is to diverge water from entrance porch onto ground. Icicles were built up along edge of pitch roof and become potential hazard to workers.

Recommendations: Consideration should be made to install gutter and down sprouts (rain water leaders) system complete with heat trace to mediate formation of icicles at the edge of pitch roof. Down sprouts should be diverted to soft landscape area to prevent formation of ice on hard surface.

.2 Domestic Water System:

Condition = (1) Very Poor Expected Life = 25 years Approximate Age = 26 years

Observations: Domestic water is provided from a 30,000 gal storage tank located at high elevation; it is fed by a creek and serves the Fortis facilities via gravity. Filters and a UV purification system (UV Pure model: Hallett 30) were added recently. Incoming service is approximately 1" and undersized by current codes. All plumbing lines are copper and are un-insulated. Domestic hot water re-circulation system was installed. All piping was installed in 1987. There is an irrigation system installed but no cross-connection protection device was observed on site.

Recommendations: We strongly recommend installation of a backflow prevention device to CSA B64.10 to isolate the irrigation system from potable water system and prevent cross contamination. Premise backflow preventers to CSA B64.10 are required for new construction and major renovations. Any major renovation or upgrade to domestic water system shall include installation of premise backflow preventer.

.3 Domestic Hot Water Heaters

Condition = (3) Average Expected Life = 12 years Approximate Age = 6 years

Observations: Domestic Hot Water is produced by a 4.5kW, 284 litre (75 Gal) electric hot water heater (John Wood Model JW80SDE1; S/N: U0701-529006) installed inside the basement mechanical room.

Recommendations: The hot water tank seems to be in good working order with no visible defect observed. Replacement budget for domestic water tank shall be included in the overall life-cycle budget of the building.

.4 Sanitary Drainage:

Condition = (1) Very Poor Expected Life = 50 years Approximate Age = 87 years

Observations: Sanitary (sewer) drains are mostly original with the exception of a major upgrade (repair) in 1987. Sanitary drain is connected to a sewer treatment plant (maintained by Fortis BC) before being discharged to the creek.

Recommendations: Sanitary drains are well past their expected service life. Should major renovation to this building occur, consideration shall be made to replace the entire system. A review of on-site sewer treatment licence should be conducted before any major renovations.

.5 Plumbing Fixtures:

Condition = (3) Average Expected Life = 50 years Approximate Age = 26 years

Observations: Fixtures were installed in 1987 and have been replaced as required. Tank-type water closets were of 13 liter per flush variety (current Code: 6 liter per flush). Most showers are not being used; water in P-traps could be dry out. There is a significant hazard that sewer gas from sanitary drainage be pulled or diffused into occupied space from the shower p-traps

Recommendations: All shower drains should be capped and decommissioned or automatic trap primer should be installed. As the temporary measure, FortisBC shall manually fill the shower traps regularly; 1 litre of water shall be drained into each tub drain on a monthly basis. FortisBC should also review the use of all showers, water closets and lavatory's – any trap that is not being regularly used shall be decommissioned or have trap primer installed.

3.0 GENERATION WAREHOUSE BUILDING

3.1 HVAC SYSTEMS

.1 Unit Heaters

Condition = (2) Poor Expected Life = 35 years Approximate Age = 30+ years

Observations: The main floor and lower floor are each heated by 3 electric unit heaters; 15kW per heater.

Recommendations: All unit heaters are working and in poor condition but with no visible defect. Regular cleaning and inspection shall be included in preventive maintenance schedules.

.2 Window Type A/C Units

Condition = (3) Average /(2) Poor Expected Life = 20 years Approximate Age = 10+/20+ yrs

Observations: Two window type A/C units are installed in the office area. The newer one is not functioning while the older one is working fine. Window type A/C units are noisy.

Recommendations: We recommend replacing existing window type A/C units with split heat pump systems with environmentally friendly refrigerant.

.3 Exhaust Fan

Condition = (1) Very Poor Expected Life = 25 years Approximate Age = 30+ years

Observations: Attic space is un-heated but ventilated by a 30” dia., ½ hp axial fan (Dayton Model 3C146A – 30”). Intake on the opposite gable is dirty.

Recommendations: Intake shall be cleaned regularly and be included in preventive maintenance schedule. Exhaust fan is at the end of service life. Consideration shall be made to replace the fan.

3.2 FIRE PROTECTION SYSTEM

Condition = (1) Very Poor Expected Life = 50 years Approximate Age = Original

Observations: No Sprinkler system is installed. A 40mm (1-1/2”) Hose Reel system was installed. Fire Protection Hose Reel System and domestic water are connected without any cross-connection protection devices. Fire extinguishers were provided through out and have been maintained.

Recommendations: A Double Check Detector Assembly (DCDA) shall be provided to Hose Reel system to prevent domestic water being contaminated by stagnated water in hose system. Should sprinkler system be added, further study or review is required to ensure existing 30,000 gal tank is capable of providing minimum 30 minutes of operation of sprinkler system.

3.3 PLUMBING SYSTEMS

.1 Storm Drainage:

Condition = N/A | Expected Life = N/A | Approximate Age = N/A

Observations: There is no gutter around the pitch roof. Icicles were built up along edge of pitch roof and are a potential hazard to workers.

Recommendations: Consideration should be made to install gutter and down spouts (rain water leaders) system complete with heat trace to mediate formation of icicles at the edge of pitched roof. Down spouts should be diverted to a soft landscape area and drain into a gravel pit (or similar) to prevent formation of ice on hard surface.

.2 Domestic Water System:

Condition = (1) Very Poor | Expected Life = 25 years | Approximate Age = 83 years

Observations: Domestic water is provided from a 30,000 gal storage tank located at high elevation; it is fed by the creek and serves the Fortis facilities via gravity. Filters and UV purification systems (UV Pure model: Hallett 30) were added recently. Incoming service is approximately 1” and undersized by current codes. All plumbing lines are copper and are un-insulated. No premise backflow prevention device was observed on site.

Recommendations: Premise backflow preventers to CSA B64.10 are required for new construction and major renovations. Any major renovation or upgrade to domestic water system shall include installation of premise backflow preventer.

.3 Domestic Hot Water Heater

Condition = (3) Average | Expected Life = 12 years | Approximate Age = Unknown

Observations: Domestic hot water is produced by a small electric water heater (above the unisex W/R, inaccessible during the visit). No domestic hot water recirculation system is installed.

Recommendations: The hot water seems to be in a fair (average) working order with no visible defect observed. Replacement budget for domestic water tank shall be included in the overall life-cycle budget of the building.

.4 Sanitary Drainage:

Condition = (1) Very Poor | Expected Life = 50 years | Approximate Age = 83 years

Observations: Sanitary (sewer) drains are mostly original (1930) with the exception of a major upgrade (repair) in 1987. Sanitary drain is connected to a sewer treatment plant (maintained by Fortis BC) before being discharged to the creek. Any major renovation will violate existing grand-fathered sewer licence.

Recommendations: Sanitary drains are well passed their expected service life. Should major renovation to this building occurred, consideration shall be made to replace the entire system. A review of on-site sewer treatment licence should be conducted before any major renovations.

.5 Plumbing Fixtures:

Condition = (4) Good Expected Life = 35 years Approximate Age = <10 years

Observations: Fixtures seem to be reasonably new; probably being replaced as required. Tank-type water closets are 6 liter per flush. There is hot and cold water taps next to unisex W/R; however, there is no floor sink or drain served by the taps.

Recommendations: There are hot and cold water taps next to unisex W/R that shall be replace with a proper janitor sink and connect to a sanitary drain. Other fixtures seem to be relatively new with no visible defects.

4.0 GENERATION OFFICE BUILDING – FIELD NOTES

4.1 HVAC SYSTEMS

.1 Basement and Main floor heating:

- Basement and main floor are served by 3 electric heated furnaces installed in 1987:
  - Lennox – CB18-51-1P
  - These furnaces are currently functioning properly however they are nearing the end of their service life and are due to be replaced in the next 2-3 years.
  - Two of the three furnaces are dedicated to the second floor and one is split between the basement and first floor. This leaves the basement under ventilated
- Baseboard heaters are present at various places throughout the building and provide zone specific heat as required, they are not present in all rooms and appear to have been installed as required
- There is no mechanically supplied outdoor air to the building resulting in stale air conditions. The outdoor air supply does not meet Ashrae 62.1 requirements. A small amount of air makes its way to the furnaces via the mechanical room by entering through the decommissioned mechanical room combustion make up air opening

One of three existing furnaces complete with cooling "A-Coil" section

Exterior condensing units. Each of the three outdoor units is paired with an "A-Coil" and corresponding indoor furnace

.2 Basement and Main floor air conditioning:

- Air-conditioning is provided by 3 condensing units located outside the mechanical room which are connected to "A-Coil" cooling sections on top of the furnaces
  - York – H1RD0xxS25

- Installed in 2006, these units are in good condition
- Use outdated R-22 refrigerant which is currently being phased out as it is recognized as a HCFC
- The availability of R-22 is diminishing as it is phased out in favour of more environmentally friendly R-410A

.3 <u>Top floor air conditioning & heating:</u>

- Second floor is served by 2 packaged A/C Rooftop Units (RTU) with auxiliary electric heat
  - Trane – TCC060F300BC (source Redwood Engineering Report, 2007)
  - The units were not accessible during the service due to unsafe winter conditions

    According to WorkSafe BC regulations either fall protection, fall restraint or handrails are required when working on a roof above 4 to 12. To achieve this, at a minimum engineered anchors need to be present. To provide year round access an appropriate roof top hatch and walkway system would need to be installed.
  - Use outdated R-22 refrigerant which is currently being phased out as it is recognized as a HCFC
  - The availability of R-22 is diminishing as it is phased out in favour of more environmentally friendly R-410A
  - Units are zoned to serve the East and West side of the building respectively. This is problematic as each unit serves both North and West aspects which see significantly different heating and cooling loads. This leads to problems maintaining a comfortable temperature throughout the building.
- Baseboard heaters are present at various places throughout the building and provide zone specific heat as required, they are not present in all rooms and appear to have been installed as required

Rooftop unit can be seen perched on the roof

.4 Bathroom Ventilation Fans:

- Each bathroom has its own ceiling exhaust fan which is ducted to the exterior of the building.
    - Various makes and models
    - Some exhaust fans are very noisy
    - Some fans have been replaced

Upgraded Bathroom Exhaust Fan

Original Bathroom Exhaust Fan

.5 Staff Room (Basement) Exhaust Fan

- An exhaust fan is present on the South wall of the Staff Room – near the coffee machine
    - Expelair – model unknown
    - The fan should be cleaned but is in good condition

Staff Room Exhaust Fan

.6 Main Floor Conference Room Reversible Fan

- A reversible exhaust fan is installed on the East Wall of the Conference Room
  - Xpelair – Model WX9
  - The exhaust fan is reversible so it can either provide supply air or exhaust air
  - When the fan was turned on large amounts of dust and debris were expelled however it appears to be in good working order

Reversible Fan Controls Unit

Reversible Fan

4.2 Fire Protection System

- Sprinkler system was added in 1999 per NFPA-13 1996
- Double Check Detector Assembly (DCDA); Siamese connection both observed on site
- There are two zones serving the building
    - There is one dry zone for attic space complete with ¾ hp air compressor
    - There is one wet zone for all 3 levels.
    - Test drains of zone valves have been routed to outside of the building.
    - Fire extinguishers were provided through out and are being maintained.

Fire Extinguisher

Sprinkler piping in good condition

Sprinkler Valve Station

Double Check Detector Assembly

4.3 Plumbing Systems

.1 Storm Drainage:

- There is a gutter around the entrance area roof
  - The down spout diverts storm water away from the entrance way
- There is no gutter around the main building
  - Icicles have built up and are at risk of falling off – posing a potential danger to workers

Down Spout from the gutter around the entrance way

Icicle build up

.2 Domestic Water System:

- Domestic water is provided from a 30,000 gal storage tank located at high elevation
  - Tank is fed by a creek and serves the Fortis facilities via gravity
- Incoming water pressure is ~45psi
- Filters and a UV purification system (UV Pure model: Hallett 30) were installed recently
- Incoming service is approximately 1" and undersized by current codes
- All plumbing lines are copper and are un-insulated
- Domestic hot water re-circulation system is present
- All piping was installed in 1987
- There is an irrigation system installed but no cross-connection protection device was observed on site.

- No premise backflow prevention device was observed on site

Irrigation Controls

Hallett Filtration System

.3 Domestic Hot Water Heaters

- Hot Water is produced by a 4.5kW, 284 litre (75 Gal) electric hot water heater
  - John Wood - JW80SDE1
  - Installed inside the basement mechanical room
  - The tank appears to be in good condition with no visual damage

Hot Water Tank

.4 Sanitary Drainage:

- Sanitary (sewer) drains are mostly original
  - There was a significant upgrade (repair) in 1987.
- Property is on a private sewer system
  - Sanitary drain is connected to a sewer treatment plant (maintained by Fortis BC) before being discharged to the creek.

.5 Plumbing Fixtures:

- Fixtures were installed in 1987 and have been replaced as required
- Tank-type water closets are 13 liter per flush (current Code: 6 liter per flush)
- Most showers are not being used
  - P-traps can dry out exposing the occupied space to sewer gases
  - Miscellaneous other fixtures may also not be in use leading to dry p-traps

Shower not in use

Residential Style Plumbing Fixtures

5.0 GENERATION WAREHOUSE BUILDING

5.1 HVAC SYSTEMS

.1 Unit Heaters

- There are three electric unit heaters for each of the two floors
  - 15kW each
  - Fair, working condition with no visible defect

Electric Unit Heater

.2 Window Type A/C Units

- Two window type A/C units are installed in the office area
- The newer one is not functioning
- Older one is working fine
- Window type A/C units are noisy

Non-Functional Window Type AC Unit

Operational Window AC Unit

.3 Exhaust Fan

- There is a 30” dia, ½ hp axial fan located in the attic
  - Dayton – Model 3C146A – 30”
  - Intake opposite the gable is dirty
  - Attic space is unheated
  - Fan is functioning however it is near end of life

Attic Exhaust Fan

5.2 FIRE PROTECTION SYSTEM

- No Sprinkler system is installed
- A 40mm (1-1/2”) Hose Reel system is present
- Fire Protection Hose Reel System and domestic water are connected without any cross-connection protection devices
- Fire extinguishers were provided through out and have been maintained

Fire Hose Reel

Siamese Connection

Fire Extinguisher

5.3 PLUMBING SYSTEMS

.1 Storm Drainage:

- There is no gutter around the building
  - Icicles have built up and are at risk of falling off – posing a potential danger to workers

Icicle Build Up

Hallett Filtration System

.2 Domestic Water System:

- Domestic water is provided from a 30,000 gal storage tank located at high elevation
  - Tank is fed by a creek and serves the Fortis facilities via gravity
- Incoming water pressure is ~45psi
- Filters and a UV purification system (UV Pure model: Hallett 30) were installed recently
- Incoming service is approximately 3/4" and undersized by current codes
- All plumbing lines are copper and are un-insulated
- All piping was installed in 1987
- No premise backflow prevention device was observed on site

.3 Domestic Hot Water Heater

- Domestic hot water is produced by a small electric water heater
  - Unit could not be accessed to identify the make/model
  - Located above the unisex W/R

- No domestic hot water recirculation system is installed

.4 Sanitary Drainage:

- Sanitary (sewer) drains are mostly original
  - There was a significant upgrade (repair) in 1987.
- Property is on a private sewer system
  - Sanitary drain is connected to a sewer treatment plant (maintained by Fortis BC) before being discharged to the creek.

.5 Plumbing Fixtures:

- Fixtures seem to be reasonably new; probably being replaced as required
  - Various makes and models
  - Tank-type water closets are 6 liter per flush
  - There are hot and cold water taps next to unisex W/R; however, there is no floor sink or drain served by the taps.

6LPF Water Closet

Lavatory

End of Mechanical Life-Cycle Report

MCW Consultants Ltd.

Innovative
Thoughtful
Proven
The MCW Group of Companies

Electrical Life-Cycle Report

for

FortisBC
Generation Office & Warehouse Buildings
South Slocan, BC

Prepared for:

Iredale Group Architecture

Prepared by:

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March 11, 2013

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EXECUTIVE SUMMARY

The electrical systems within the buildings were last updated within 30 years (1987) and may have been built in compliance with the Building and Electrical Codes of the time. Subject to the current British Columbia Building Code 2012 and Canadian Electric Code 2012, there are items that are non-compliant.

The following are required or recommended maintenance actions:

GENERATION OFFICE BUILDING

1. Within 3 years:
    a. Test electrical grounding system.
    b. Test and replace as required branch panel circuit breakers.
    c. Replace and upgrade fire alarm system to comply with Building Code.
    d. Supplement emergency lighting in required areas to comply with Building Code.
    e. Add required exit signs in specific locations to comply with Building Code.
    f. Upgrade interior and exterior lighting fixtures to comply with Energy Code (ASHRAE 90.1).
    g. Conduct infra-red thermographic scans of electrical distribution equipment.

2. In 4 to 10 years:
    a. Modernize electrical distribution system.
    b. Replace and upgrade data communications cabling system.
    c. Replace branch circuit wiring and provide additional power receptacles in offices.
    d. Replace security system.

WAREHOUSE BUILDING

The following are required or recommended maintenance actions:

3. Within 3 years:
    a. Test electrical grounding system.
    b. Test and replace as required branch panel circuit breakers.
    c. Review requirements for a fire alarm system by a Code Consultant.
    d. Add emergency lighting; currently inadequate and does not comply with Building Code.
    e. Add required exit signs to comply with Building Code; none existing.
    f. Upgrade interior and exterior lighting fixtures to comply with Energy Code (ASHRAE 90.1).
    g. Add lighting to improve safety and working conditions.
    h. Conduct infra-red thermographic scans of electrical distribution equipment.

4. In 4 to 10 years:
    a. Modernize electrical distribution system.
    b. Replace and upgrade data communications cabling system.
    c. Replace original antiquated branch circuit wiring where existing.
    d. Replace and upgrade security system.

1.0 GENERAL

This report is provided at the request of Iredale Group Architecture. It is intended to provide a visual review of electrical systems and life-cycle analysis of the Generation Office and Warehouse Buildings located at the FortisBC South Slocan Site.

1.1 INTRODUCTION

The site visit was carried out on January 22, 2013.

During the site visit, various components of the electrical systems were visually reviewed. No testing of any system or verification of operation was carried out except where specifically noted. The material in this report reflects our best judgment in light of the information available at the time of preparation. Some information is based on existing documents available, including the followings:

.1 *FortisBC South Slocan Generation Office Building – Building Inspection Report, March 2007 prepared by Redwood Engineering Ltd.*
.2 *FortisBC South Slocan Generation Warehouse Building – Building Inspection Report, March 2007 prepared by Redwood Engineering Ltd.*
.3 *West Kootenay Power & Light Co. South Slocan Office – Electrical Drawings E-1 to E-6 dated July 3, 1987 by Woodworth Ulrich Frie Architects & Engineers.*

This report describes and addresses concerns related to the electrical systems as found on the premises.

EVALUATION CRITERIA

The subject building was evaluated based on compliance with current Codes, Standards and Regulations which will include but not be limited to the followings:

.4 *British Columbia Building Code (BCBC) 2012*
.5 *CSA C22.1HB-12 – Canadian Electrical Code (CEC), Part I 2012*
.6 *CAN ULC-S524-06 Installation Of Fire Alarm Systems*
.7 *BC Safety Regulation*
.8 *ASHRAE Standard 90.1-2004 Energy Standard for Buildings Except Low-Rise Residential Buildings*
.9 *British Columbia Safety Authority (BCSA) Directives and Safety Orders*
.10 *WCB Occupational Health and Safety Regulations.*

Each major electrical component or system was assessed and rated based on the following rating scale:

(1) Very Poor: The electrical component has exceeded its expected life (100%). Failure has either already begun, or is imminent.

(2) Poor: The electrical component is nearing the end of its expected life (75-100%), or is aging prematurely. Even with maintenance, the electrical component is likely to fail within the next 3-5 years.

(3) Average: The electrical component is approximately half way through its expected life (50%), and is performing as intended. Increased maintenance is required to achieve full life-expectancy.

(4) Good: The electrical component is at the end of the first quarter of its design life (25%), and is performing as intended. With regular maintenance, full life-expectancy can be anticipated.

(5) Very Good: The electrical component is new, or nearly new (0-10%), and is performing as designed. Only regular maintenance is required at this point in its life-cycle.

2.0 GENERATION OFFICE BUILDING

2.1 Electrical Systems

.1 Electrical System - Electrical Service and Distribution

Condition = (2) Poor Expected Life = >30 years Approximate Age = 26 years

Observations: Main incoming service is a 600A 120/208V 3ph/4w fed from an exterior pad mounted FortisBC 300kVA transformer. Distribution equipment is in poor condition due to present age. Branch circuit panels are relatively full and have limited to no capacity to add circuits. Feeders are copper and noted to be wires in conduit or armoured cables. There is one pre-1940 screw-in fuse style panel observed at one location on Upper Flr in very poor condition.

Recommendation: Equipment should be modernized as the equipment is nearing end-of-life. If modernization is not immediate, all branch circuit panel breakers less than 100A should be tested and replaced if required with new of the same rating due to degradation of performance from age. In the immediate time frame, an infra-red thermographic scan should be conducted on all major electrical distribution equipment to identify any hot spots due to poor electrical connections at cable terminations points. FortisBC staff not aware of any testing done within the last 10 years. Equipment to be scanned should include:

i. Main fused service switch.
ii. Main incoming electrical bus.
iii. Main distribution panel A.
iv. All feeder terminations at branch circuit panels.

Ensure fuse-style panel is de-energized and not in use. If none to minimal exposure to ACM, remove this panel.

.2 Electrical System – Electrical Grounding

Condition = (1) Very Poor Expected Life = 30 years Approximate Age = 40+ years

Observations: Unable to clearly review electrical grounding system due to system being buried. Based on age estimation, the grounding system may have experienced severe corrosion and prone to ineffective grounding.

Recommendation: Locate position of grounding rods and/or metallic plumbing pipe forming portion of the grounding system. Conduct an earth electrode resistance test to confirm the integrity of the grounding system.

.3 Electrical System – Electrical Branch Wiring and Receptacle devices

Condition = (1) Very Poor Expected Life = >25 years Approximate Age =20-50 years

Observations: Branch wiring within plaster wall partitions; assumed renewed with copper wiring in 1987 during last renovations. Small quantity of original (pre-1950) wiring in crawl space. Receptacles renewed in circa 1987. Observed inadequate quantities in offices leading to major use of extension cords and power bars to increase quantity of outlets. The very poor rating is based on the combination of the original building wiring (small amounts) that had not been replaced with updated wiring and the wiring that was updated during the last renovations.

Recommendations: Replace remaining old non-metallic sheathed cables insulated with cloth or plasticized rubber sheathing (in crawl space) with new NMD or armoured cable - this insulation is susceptible to failure from aging and rodents and could lead to electrical fires. Provide additional receptacles in offices.

.4 Electrical System – Interior Lighting

Condition = (1) Very Poor Expected Life = 25 years Approximate Age = +15 years

Observations: Combination of recessed 2x4 ceiling, surface mounted fluorescent luminaires and fixtures in ceiling coves of varying ages. Lamps consist of a mixture of inefficient T12 and T8 linear fluorescent lamps. Future availability of T12 fluorescent lamps will curtail due to current Energy Codes and discontinuation by manufacturers. Incandescent lamps in porcelain lamp holder used in maintenance and closet spaces, are also subject to market supply. Non-automated lighting control system does not meet ASHRAE 90.1.

Recommendation: Any proposed renovation work affecting lighting is required to comply with ASHRAE 90.1 2004 and will require new luminaires with higher energy efficiencies, utilize less power to produce more lighting and employ lamps that are or in foreseeable future, not on the banned manufacturing list. Upgrade will require automatic lighting control system. Check and ensure all light fixtures are seismic restrained as mandated by BCBC.

.5 Electrical System – Exterior Lighting

Condition = (1) Very Poor	Expected Life = 20 years	Approximate Age = 25+ years

Observations: Surface mounted and recessed soffit HID HPS luminaires. Housings appear in average condition for the environment and the application, slight discoloration of lenses. Observed use of incandescent lamps in unprotected (no wireguard) surface mounted fixtures at two egress locations. Based on suspected age of luminaires, ballasts and lamps may not meet current Energy Code.

Recommendation: Monitor operation of exterior lights for lamp and/or ballast failure. When replacement required, luminaires to meet ASHRAE 90.1. Remove vines from surrounding luminaire.

.6 Electrical System – Fire Alarm

Condition = (1) Very Poor	Expected Life = 20 years	Approximate Age = 26 years

Observations: Outdated fire alarm system subject to difficult maintenance issues. Fire alarm zone annunciation requirements are in non-compliance with BCBC sentence 3.2.4.8 2)b)i. Missing code-required manual stations at two Lower Flr corridor egress locations and at top of Upper Flr stair locations. Central vacuum system not tied to fire alarm system as required. FA system was last verified in August 2012.

Recommendation: The fire alarm code deficiencies (proper zone annunciations and additional manual stations at exits) should be rectified to be Code compliant. The existing fire alarm panel is recommended to be replaced due to the age of the system as commented above.

.7 Electrical System – Data/Comm Wiring and Equipment

Condition = (1) Very Poor	Expected Life = <10 yrs (aged technology)	Approximate Age = 20 years

Observations: Data/comm cables concealed within wall partitons on Main and Upper Flrs. In Lower Flr, majority of cabling are strapped exposed on surface walls, ceilings and mechanical piping – no protection of important means of data transmission. Data cables are early generation – CAT5 with some CAT5e. Placement of sensitive IT equipment (UPS, UPS batteries, cable termination patch panels) highly susceptible to damage. Existing cables are outdated with modern technology available. Equipment are vintage and do not meet current industry standards.

Recommendation: Provide additional protection for cabling and equipment in the room. Comm equipment and cables are dated and should be overhauled and upgraded – subject to intent and continued use and application of the network. Provide cooling/ventilation if doors are to be closed to provide additional security.

.8 Electrical System – Emergency Lighting

Condition = (3) Average	Expected Life = 25years	Approximate Age = 15 years

Observations: EM lighting provided by independent DC battery units. Adequate EM illumination of egress routes at stairs and corridors but lacking in larger central floor areas and rooms. No visible tags indicating system tested annually.

Recommendation: Provide additional EM battery lighting in select areas on the Upper, Main and especially Lower floors. Retain services of a qualified testing agency to certify proper operation of the existing emergency battery and heads; tag with verification tag.

.9 Electrical System – Exit Signage

Condition = (2) Poor Expected Life = 25years Approximate Age = 26 years

Observations: The exit signs are near their expected life expectancy. The exit signs are in proper locations to provide guidance of occupants to exits. Two locations in Lower Flr (Staff Lunch Rm and Document Storage) are noted to be without exit signs above doors to exterior.

Recommendation: Replace all existing with new higher efficiency LED-lamped exit signs. Provide Exit signage at two door locations to exterior on Lower Flr as required by Code.

.10 Electrical System – Security System

Condition = (1) Very Poor Expected Life = 20years Approximate Age = 25 years

Observations: Existing security panel is a DSC Maxsys multizone system with motion detectors providing coverage on the Lower Flr areas. There are no door contact zones. Coverage is limited and does not appear that the system is heavily relied upon.

Recommendation: Assess requirement of the system and augment to provide better coverage of windows and doors with the addition of magnetic contacts in addition to the current coverage via the installed motion detectors. Recommend replacement of existing system with new due to excessive age.

3.0 WAREHOUSE BUILDING

3.1 Electrical Systems

.1 Electrical System - Electrical Service and Distribution

Condition = (1) Poor Expected Life = >30 years Approximate Age = 30 years

Observations: Main power service (400A 347/600V 3ph/3W) and distribution upgraded within apprx 20-30 years in poor condition based on its estimated age. Main feeders are copper. The service feeds power to the Warehouse building as well as the adjacent Paint and Oil Storage building. There is another subfeed (10kVA transformer) to another building identified as “Storage Can”.

Recommendation: Equipment should be modernized as the equipment is nearing end-of-life. If modernization is not immediate, all branch circuit panel breakers less than 100A should be tested and replaced if required with new of the same rating due to degradation of performance from age. For the immediate time frame, an infra-red thermographic scan should be conducted on all major electrical distribution equipment to identify any hot spots due to poor electrical connections at cable terminals breaker connection terminals and cable junction points. Equipment to be scanned should include:

i. Main fused service switch.
ii. Feeders at transformer terminals.
iii. Transformer internal windings.
iv. Main 600V distribution panel.
v. All branch circuit panels.

.2 Electrical System – Electrical Grounding

Condition = (1) Very Poor   Expected Life = 30 years   Approximate Age = 40+ years

Observations: Unable to clearly review electrical grounding system due to system being buried. Based on age estimation, the grounding system may have experienced severe corrosion and prone to ineffective grounding. Staff reports no past issues.

Recommendation: Locate position of grounding rods and/or metallic plumbing pipe forming portion of the grounding system. Conduct an earth electrode resistance test to confirm the integrity of the grounding system.

.3 Electrical System – Electrical Branch Wiring and Receptacle devices

Condition = (1) Very Poor   Expected Life = >25 years   Approximate Age =20-50 years

Observations: Building electrical wiring has been updated from pre-1940 original wiring. Current installation in average condition in dry and clean environment. Power circuit installation consists of surface mounted wiring in conduit, Teck and armoured cable to surface mounted receptacle outlets. Very little original wiring observed. The very poor rating is based on the combination of the original building wiring (small amounts) that had not been replaced with updated wiring and the wiring that was updated during the last renovations.

Recommendations: If still live and in use, replace non-metallic cloth sheathed or metallic sheathed power wiring in loft - this insulation is susceptible to failure from aging and rodents and could lead to electrical fires. Replace with armoured cable or wiring in conduit.

.4 Electrical System – Interior Lighting

Condition = (1) Very Poor Expected Life = 25 years Approximate Age = 15-25 years

Observations: On Main Flr, adequately illuminated with a combination of chain-hung industrial 2-lamp fixtures and newer 1x4 2-lamp fixtures. Lamps are predominantly outdated T12 fluorescent lamps with few installed with T8 fluorescent lamps. Future availability of T12 fluorescent lamps will curtail due to current Energy Codes and discontinuation by manufacturers. Lower floor inadequately illuminated with outdated ineffective shrouded luminaires with compact fluorescent lamps mounted high in aisle locations. At base of stairs (two), concentration of T8 lamped fixtures of varying age. Lighting in the Loft provided by incandescent lamp holders providing minimal illumination levels.

Recommendation: Any proposed renovation work affecting lighting is required to comply with ASHRAE 90.1 2004 and will require new luminaires with higher energy efficiencies, utilize less power to produce more lighting and employ lamps that are or in foreseeable future, not on the banned manufacturing list. Upgrade will require an automatic lighting control system. Check and ensure all light fixtures are seismic restrained as mandated by BCBC.

.5 Electrical System – Exterior Lighting

Condition = (1) Very Poor Expected Life = 20 years Approximate Age = 25+ years

Observations: Consists of a HPS wall-cube surface mounted high at south end of the building and bracket-mounted flood lights at underside of building gutter line at the corners. Main door entrance lighting provided from a socket lamp holder with a compact fluorescent lamp mounted to underside of soffit. A surface mounted HPS wall-cube near the entrance, together with the soffit light was illuminated at 11:00AM suggesting a control issue.

Recommendation: Upgrade luminaires to improve illumination levels in Lower floor of warehouse to suit associated warehousing task. Improve lighting with additional lighting in the Loft. Monitor operations of exterior lights for lamp and/or ballast replacement upon failure. Check timing controls of exterior lighting fixtures for appropriate times of on/off operation.

.6 Electrical System – Fire Alarm

Condition = No fire alarm system

Observations: Requirement of a fire alarm and detection system is subject to determination by a Code Consultant.

Recommendation: Abide by BCBC code ruling.

.7 Electrical System – Data/Comm Wiring and Equipment

Condition = (1) Very Poor Expected Life = <10 yrs (aged technology) Approximate Age = 20 years

Observations: Very limited amounts of data/comm cabling. Incoming underground telephone service appears to enter from south end of building exterior. Only area of data/comm connectivity required is the office on the Main level. Existing cables are outdated with modern technology available. Equipment are vintage and do not meet current industry standards.

Recommendation: Current provision adequate for intended usage.

.8 Electrical System – Emergency Lighting

Condition = (3) Average Expected Life = 25years Approximate Age = 15 years

Observations: Observed only one set of double-heads in the Loft and Lower floor level and two double-heads on the Main floor. Emergency illumination coverage inadequate in the event of a power outage; does not meet requirements of BCBC 3.2.7.3.

Recommendation: Provide additional EM battery lighting in select areas on the Loft, Main and Lower floor to meet the minimum Code requirements. Retain services of a qualified testing agency to certification operation of the existing emergency battery and head units; tag with verification tag.

.9 Electrical System – Exit Signage

Condition = (1) Very Poor/Code Violation Expected Life = 25years Approximate Age = NA

Observations: There are no Exit signs within the warehouse. BCBC 3.4.5.1.1) mandates the requirement of exit signs in a building more than 2-storey in building height.

Recommendation: Provide LED illuminated Exit signs as per BCBC.

.10 Electrical System – Security System

Condition = (1) Very Poor Expected Life = 20years Approximate Age = 25 years

Observations: Existing security panel is a DSC PC2550 multizone system with motion detectors providing coverage with the following zones: Main, Lower Flr, Office, Line Shop, Entrance, Front Door . There are no door or window contact zones.

Recommendation: Assess requirement of the system and augment to provide better coverage of windows and doors with the addition of magnetic contacts in addition to the current coverage via the installed motion detectors. Recommend replacement of existing system with new due to excessive age and current limited coverage.

4.0 GENERATION OFFICE BUILDING – FIELD NOTES

4.1 Electrical Systems

.1 Electrical System - Electrical Service and Distribution

Main power service (600A 120/208V 3ph/4w) and distribution was upgraded in 1987. Feeders are copper. System is in poor condition due to the system age. Main electrical room is clean and dry. Equipment layout is in compliance with CEC (Canadian Electrical Code). Remaining antiquated fuse-style panel on Upper Flr adjacent to Pnl D; use of screw-in fuses in this panel cannot properly ensure that correctly rated fuses are protecting circuit wiring. Branch circuit panels are 95 to 100% filled; little to no capacity for additional circuits. Peak power demand observed to be 85.2kW ie. 49% of Electrical Code allowable for the existing equipment service size.

FortisBC meter, CT cabinet & Main Switch

Upper Flr Pnl D & old screw-in fuse style panelboard

.2 Electrical System – Electrical Grounding

Unable to observe routing and/or location of electrical grounding system (did not open any electrical distribution panel or bus wire way to confirm sizing or existence of grounding conductor). FortisBC staff not aware of ground condition nor if any testing done within 10 years.

.3 Electrical System – Electrical Branch Wiring and Receptacle devices

Original wiring is wiring in conduits. Observed existence of old non-metallic cables with cloth sheathing (in crawl space). Combination of NMD (non-metallic dry) cables, BX (armoured cable) or wire in EMT conduit are primarily in use for circuit wiring in the building. Observed newer wiring (NMD) in corridor ceiling space is inadequately supported per CEC. Branch circuit wiring in aging receptacle outlets observed to be copper. Inadequate quantity of receptacles within offices – observed excessive use of extension cords and power bars.

.4 Electrical System – Interior Lighting

Combination of recessed 2x4 ceiling and surface mounted fluorescent luminaires of varying ages. Lamps consist of a mixture of T12 and T8 linear fluorescent lamps. Observed some use of incandescent lamps in porcelain lamp holder in maintenance and closet spaces. Majority of luminaires utilize inefficient T12 4-foot fluorescent lamps/ballast. T12 lamps are no longer manufactured, banned from manufacturing due to energy inefficiency. T12 lamps on store shelves are last stock available. Lighting levels in general are adequate in offices, storage areas and corridors. Power lighting densities in offices range from apprx 2.5 to 3.9 watts/sf; this exceeds the ASHRAE 90.1 2004 (BCBC 2012) of 1.1 watts/sf. Observed on Upper Flr corridor and offices that 2x4 recessed ceiling fluorescent fixtures are not seismic restrained. No automatic lighting shutoff control in offices (enclosed rooms) as required per ASHRAE 90.1 2004 (BCBC 2012).

Upper Flr Technical Library/Office

Typical recessed 2x4 office/corridor luminaire

.5 Electrical System – Exterior Lighting

Exterior luminaires observed in day light conditions – not illuminated. Consists primarily of surface wall mounted and recessed soffit HID HPS luminaires. Housings appear in average condition, little discoloration of lense. Observed use of incandescent lamps in unprotected (no wireguard) surface mounted fixtures at two egress locations. Timer controlled. Noted vine overgrowth around wall mounted luminaires.

Exterior wall-mounted HID luminaire

Main entrance with recessed HID luminaire

.6 Electrical System – Fire Alarm

Fire alarm system is an analogue Edwards EST1 – 2Z3, with 6 active zones (Lower Flr, Main Flr North, Main Flr South and Upper Flr, Sprinkler Wet, Sprinkler Dry, AC Shutdown); there are two spare zones. Components include single-stage manual stations, 10" dia fire alarm bells, heat and smoke detectors, sprinkler flow and tamper switches; there is no tamper-switch on the double check main water supply valves – chain locked only. The annunciation of the zones do not comply with BCBC 3.2.4.8 2)b)i – specifically, separate zone annunciation is required for the Upper Flr and cannot be combined with the Main Flr South. Sprinkler zones should annunciate by floor level; current installation does not provide this specific floor identification. There are no manual stations at the doors exiting the building via Lower Flr Hallway 25 or Conf/Staff lunchrm, and no manual stations at top of Upper Flr stairs leading to Main Flr as required per BCBC. System is out of production and adequate for current use but parts will be more difficult to acquire. Maintenance issues may escalate as components fail at this stage in equipment near end-of-life. System last verified in Aug 2012. Central vacuum system is required (per BCBC 3.2.4.13) to be interconnected to the fire alarm system to shut-down upon fire alarm. No indication that this is done.

Fire Alarm Control Panel at Main Lobby

Typical 10” fire alarm bell

.7 Electrical System – Data/Comm Wiring and Equipment

Data/comm cables (CAT5 + 5e) on Main and Upper Floors concealed within walls. In Lower Flr, wiring exposed suspended and strapped to wall and ceiling surfaces – subject to damage. Installation does not conform to accepted practice per TIA/EIA-568-C, Commercial Building Telecommunication Standards. Passage of cables at wall partitions without benefit of conduits for mechanical protection. Cables in Comm Rm subject to damage due to placement and wide open accessibility (non-locked room and passage to a Storage Rm). Cabling currently serves occupants adequately but with newer technology, CAT5 cabling has bandwidth limitations. Server Rm has no cooling or ventilation. Placement of equipment (UPS, backup batteries) susceptible to damage. Bonding to ground of communication cabinet is not evident.

Comm Room on Lower Flr

Exposed unprotected data cables

.8 Electrical System – Emergency Lighting

Emergency battery heads not wired to illuminate with failure of local lighting circuits as is good engineering practice. Not all areas of the Lower Flr (Document Storage, Drafting, Fireline/Records, Hallway to First Aid, Lunch Rm) provided with emergency heads. Upper and Main Floors provided with EM heads at top entrances onto stairs but central floor areas (Reception area, Technical Library) lacking. No tags on EM battery units to indicate date of last testing. Spot test of a few battery units indicate fully charged and operational battery/head combinations.

Typical DC battery emergency double-head

.9 Electrical System – Exit Signage

Exit signage are early generation LED and in general, provided at required locations at above stairs and above Exit doors to exterior. Two locations in Lower Flr (Staff Lunch Rm and Document Storage) should have Exit signs above doors to exterior. General placement of exit signs for guidance to exit door locations within floor areas appears adequate. Unable to verify connection to DC circuits.

Exit sign Upper Flr South Corridor

Staff Lunch Room with no Exit signage

.10 Electrical System – Security System

Existing security panel is a DSC Maxsys multizone system with motion detectors providing coverage on the Lower Flr areas. There are no door contact zones. Coverage is limited and does not appear that the system is heavily relied upon.

Security panel below FACP in Main Lobby

5.0 WAREHOUSE BUILDING - FIELD NOTES

5.1 Electrical Systems

.1 Electrical System - Electrical Service and Distribution

Main power service (400A 347/600V 3ph/3W) and distribution upgraded within apprx 20-30 years. Feeders are copper. System is in poor condition due to the equipment age. The distribution consists of a 600V 400A main fused disconnect switch, a 50kVA transformer, a 10kVA transformer, CT cabinet, FortisBC revenue meter . Equipment situated in a clean, dry location with Code required adequate maintenance space. Power distribution from the warehouse feeds the Paint and Oil Storage Bldg (70A-2P 120/208V 1-ph 3-wire service) to the west and a Storage facility (50kVA service) to the east. Equipment layout is in compliance with CEC (Canadian Electrical Code). Three branch circuit panels in the building with approx. 12ccts available in total. Peak demand at 100.96kW; 30.4% of Electrical Code allowable value for the existing equipment service size.

Main switch, meter, CT cabinet & distribution panel

Transformers in background

.2 <u>Electrical System – Electrical Grounding</u>

Unable to observe routing and/or location of electrical grounding system (did not open any electrical distribution panel or bus wire way to confirm sizing or existence of grounding conductor). FortisBC staff not aware of ground condition nor if any testing done within 10 years.

.3 <u>Electrical System – Electrical Branch Wiring and Receptacle devices</u>

Warehouse area in general has had original wiring updated with wire-in-conduit (some conduits aptly reused for new wiring installation) or armoured cable. Interior space wiring appears to be copper wiring. Dated installed electrical cables (apprx 40yrs old) still in use in minimal quantities. All wiring are exposed and surface-mounted directly to wood structure. Observed very small quantity of old (50+ yrs) non-metallic cloth sheathed (knob-and-tube) or metallic sheathed power wiring in loft; unable to determine if these are energized and currently in use.

Typical installation of receptacles

Branch panel with security panel above

.4 Electrical System – Interior Lighting

On the Main floor, combination of new and old chain-hung industrial fluorescent luminaires provides high level of illumination (+60FC average). Observed a light fixture with no protective housing of the ballast and internal wiring. Lamps consist of a mixture of inefficient T12 (majority) and more efficient T8 linear fluorescent lamps. In Loft area, noted use of incandescent lamps in porcelain lamp holders; lighting level is low and marginally adequate for a warehouse storage space. In Lower floor, low illumination levels provided from inadequate quantity and inappropriate types of pendant luminaires in various areas. Pendant fixtures equipped with compact fluorescent lamps mounted at high ceiling level provide poor and inadequate illumination levels for the type of task conducted in the warehouse aisles. There are groups of T8 fluorescent-lamped luminaires at the base of stair areas but due to the mounting heights (at ceiling), the light levels are low and could be augmented with additional fixtures (there are failed lamps and/or ballasts within these fixtures).

Majority of luminaires utilize inefficient T12 4-foot fluorescent lamps/ballast. T12 lamps are no longer manufactured, banned from manufacturing due to energy inefficiency. T12 lamps on store shelves are last stock available.

Suspended luminaires on Main Floor

Lower Floor with poor illumination levels

.5 Electrical System – Exterior Lighting

Majority of exterior luminaires observed in day light conditions – not illuminated. Consists primarily of surface mounted HPS wall-cubes and bracket-mounted flood lights at underside of building gutter line. A compact fluorescent lamp in a porcelain lamp holder provides illumination at the underside of the main entrance. A surface mounted HPS wall-cube near the entrance, together with the soffit light was illuminated at 11:00AM suggesting a control schedule issue. Luminaire housings appear in average condition, little discoloration of lenses. All exterior lights appear to be timeclock controlled as exterior lighting turned on upon our departure from site at 4:00PM.

Warehouse main entrance

Bracket mounted flood light at building perimeter

.6 Electrical System – Fire Alarm

There is currently no fire alarm system in the Warehous. Requirement of a fire alarm and detection system is subject to Major Occupancy classification of the warehouse and applicability of clause BCBC 3.2.4.1.4)h).

.7 Electrical System – Data/Comm Wiring and Equipment

Very limited amounts of data/comm cabling. Incoming underground telephone service appears to enter from south end of building exterior. Only area of data/comm connectivity required is the office on the Main level.

Incoming tel/comm service adjacent to door

Termination/distribution of tel/comm at BIX block

.8 Electrical System – Emergency Lighting

Current installation of emergency DC battery heads for emergency egress illumination is not adequate on each of the three levels. Observed only one set of double-heads in the Loft and Lower floor level and two double-heads on the Main floor. BCBC 3.2.7.3. mandates minimum requirement of 10lux/1FC at tread level along principal routes to exits; existing DC head provisions do not meet this requirement.

Emergency DC battery heads on Lower Floor

Double-heads in Loft by stairs

.9 Electrical System – Exit Signage

There are no Exit signs within the warehouse. BCBC 3.4.5.1.1) mandates the requirement of exit signs in a 3-storey building such as this one.

.10 Electrical System – Security System

Existing security panel is a DSC PC2550 multizone system with motion detectors providing coverage with the following zones: Main, Lower Flr, Office, Line Shop, Entrance, Front Door . There are no door or window contact zones.

Security panel adjacent to office entranceway

Security motion sensor

End of Electrical Life-Cycle Report

Appendix C

CASTLEGAR FACILITY LIFE-CYCLE REPORT

Facility Life-Cycle Report

FORTIS BC, CASTLEGAR
1037 Columbia Ave
Castlegar, BC V1N 1H5

Side Elevation of FortisBC Castlegar

prepared for:

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Project No: 11106
2 April 2012

CONTENTS

Appendices

1 Introduction

1.1 Report Methodology

Iredale Group Architecture (Iredale Group) was retained by Ms. Becky Richardson of FortisBC to provide a visually based condition assessment of the architectural components of the building located in Castlegar, at 1037 Columbia Avenue. A parallel visual analysis of the Mechanical and Electrical components of the building was conducted by Prism Engineering.

The purpose of our condition assessment is to help determine the current condition of the building, to analyze each main building component and where it is in its typical life-cycle, and to help determine the corresponding repair / replacement costs.

Iredale Group and Prism Engineering attended the site on January 10-11, 2012. We reviewed all of the exterior facades, and each of the major interior components. No destructive testing was performed.

The assessment team consisted of:

- Graham Coleman, Architect, MAIBC, Partner, Iredale Group Architecture
- Casey Gaetz, Associate, Prism Engineering
- Iram Green, Mechanical Engineer, Prism Engineering
- Alex Chin, Electrical Engineer, Prism Engineering

1.2 Life-Cycle Analysis

Building Condition Assessments and Life-Cycle Analysis provide vital information to a facility Owner. As a building ages, these periodic assessments allow the Owner to budget for regular maintenance and repair. Building systems have different inherent life-cycles, and require repair and / or replacement at different intervals. For instance, exterior caulking should be replaced every 5 years, interior office floor finishes typically wear out in 7-10 years, an SBS roof system will last 20-25 years, and a current metal cladding system will last for 40 years.

Through regular Building Condition Assessments, the Owner is able to properly maintain a building in good working condition during its expected life-span, and then properly budget for the building's replacement once its effective life has passed.

Regular assessments of a building's mechanical and electrical systems, before the end of equipment life helps identify issues that could impact occupant comfort, productivity and safety if services are in poor working order. For example, an unscheduled power loss to a building that is disruptive to business operations can be avoided by early identification of an improperly maintained or outdated electrical distribution system.

It is important to note that even with regular maintenance, there comes a point in a building's life when the cost of repairing / replacing worn components outweighs the cost of replacing the building as a whole.

Another important aspect of a Life Cycle Analysis for a building is to consider whether the facility continues to meet the programmatic needs of the Owner. How we conduct business - both the technology we use and the ways we interact with our clients - has changed significantly over the past decades. Many buildings become obsolete even before their core components reach the end of their effective life span. Given that renovation typically costs more per square foot than new construction, there comes a point in every building's life when we have to ask a key question: if we renovate, will we have the building we need?

1.3 Terms of Reference

Iredale Group is a firm of professional consultants practicing in the areas of architecture, structural engineering, heritage restoration, and building envelope consulting.

Iredale Group has prepared this report for FortisBC. The content reflects our best judgment in light of the information available at the time of preparation. Any use of this report by a third party or any reliance or decision made based on it is the responsibility of such third parties.

1.4 Scope of Work

1.4.1 Visually assess the architectural components of the building.
1.4.2 Visually assess the mechanical components of the building.
1.4.3 Visually assess the electrical components of the building.
1.4.4 Provide a life-cycle analysis of the building components based on the visual assessments.
1.4.5 Provide an order of magnitude budget to repair / replace the building components based on the life-cycle analysis.

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1.5 Graphic Life-Cycle Analysis

Legend:
Building component is within its expected life cycle
building component has exceeded its expected life cycle

	1962 Built	1970	1980	1989 Reno	2002 Report	2012 Report	2022	Expected Life	Years in Service
Structural System & Concrete									
Typical Steel Frame Structure								70	50
Interior 5" Reinforces Concrete Slab								45	50
Original Exterior Concrete								30	50
Renovation Exterior Concrete								30	23
Exterior Buildng Envelope systems									
Metal Cladding								40	50
Brick Cladding								70	50
Dbl Paned Aluminum windows								25	23
Exterior Insulated Man Doors								30	23
Exterior Overhead Shop Doors								30	23
Roof System									
Metal Roof & Flashings								40	50
Metal Fascia & Soffits								40	50
Ceiling System									
T-Bar								20	23
Painted Drywall								15	23
Tile (shower)								50	23
Vinyl								15	23
Office Systems									
Fixed Millwork								30	23
Office Furniture								15	23
Washroom Fixtures								30-40	23
Floor Coverings									
Carpet								8-10	6
Resilient Flooring								20	6
Entrance Floor Tile								45	23
Wall Coverings									
Office - Drywall & Vinyl								15	23
Shop - Painted Wood & Vinyl								15	23
Site Work									
Fencing and Retaining								35	50
New Bollards								30	23
Asphalt								30-35	23

Mechanical & Electrical Systems:									
	1962 Built	1970	1980	1989 Reno	2002 Report	2012 Report	2022	Expected Life	Years in Service
Heating Systems									
Unit Heater (Truck Bay)								18-20	4-5
Electric Duct Heater (Office)								>30	8-10
Electric Fan Force Heater (Vestibule)								>20	8-10
Air Distribution Systems									
Air Handler (Mezz)								18-20	50
In-Line Fan (Mezz)								18-20	2-3
Exhaust Ventilation Systems									
Exhuast fan (U/A Washroom)								10	Unknown
Controls And Instrumentation									
Heat trace controls								>20	4
Other HVAC Systems And Equipment									
Air Source Heat Pump								18-20	3
Plumbing									
Plumbing Fixtures								>30	50
Domestic Water Distribution								>30	50
Domestic Water Heaters								10	8-10
Electrical									
Electrical Service And Distribution								>30	50
Branch Wiring								>20	50
Lighting									
Interior Lighting								>30	50
Exterior Lighting								>30	50
Low Tension									
Radio System								>20	15
Telephone Systems								>20	40
Server/Computer Systems								5-7	8-10
Security Systems								>20	8
Electrical Emergency									
Emergency Light Systems								10	8-10
Exit Light Systems								>20	8-10
Emergency Power & Generation Systems								20-25	10
Other Electrical Systems									
Heating Cables								>10	5
Motorized Gate and Scanner								>10	8
Other									
Fire Protection								10	Unknown

2 Building Summary

2.1 Building History

- Name: Castlegar Operations Centre
- Location: 1037 Columbia Avenue, Castlegar, BC, V1N 1H5
- History: The facility was originally constructed in 1962 and was used by another owner for nearly 30 years. In 1989 the building was purchased and renovated for use as an electrical operations centre. The renovation switched the location of the overhead doors, changed out the aluminum windows, added the entrance vestibule and gable roof, and renovated the General Offices. At a later date as FortisBC's program continued to increase, a large portion of the mezzanine storage and the additional quonset style storage hut were added. A 2002 facility inspection report identified several deficient items that have been replaced in the past 4-6 years including the Office flooring and missing luminaires. Ice damming on the south roof remains an ongoing problem as does exhaust from the Shop seeping though into the Office area. The electrical distribution system, telephone systems, some older fluorescent luminaries and the plumbing fixtures and pipes are original to the building. The majority of all other electrical and mechanical equipment have been replaced or modified since the building's construction.

2.2 Building Area:

Office	2100 sf	
Shop	3775 sf	
Mezzanine	756 sf	Composed of two wooden mezzanines
Additional storage	1950 sf	Fabric clad Quonset style storage hut
Gross Area	**8581 sf**	

2.3 Building Description:

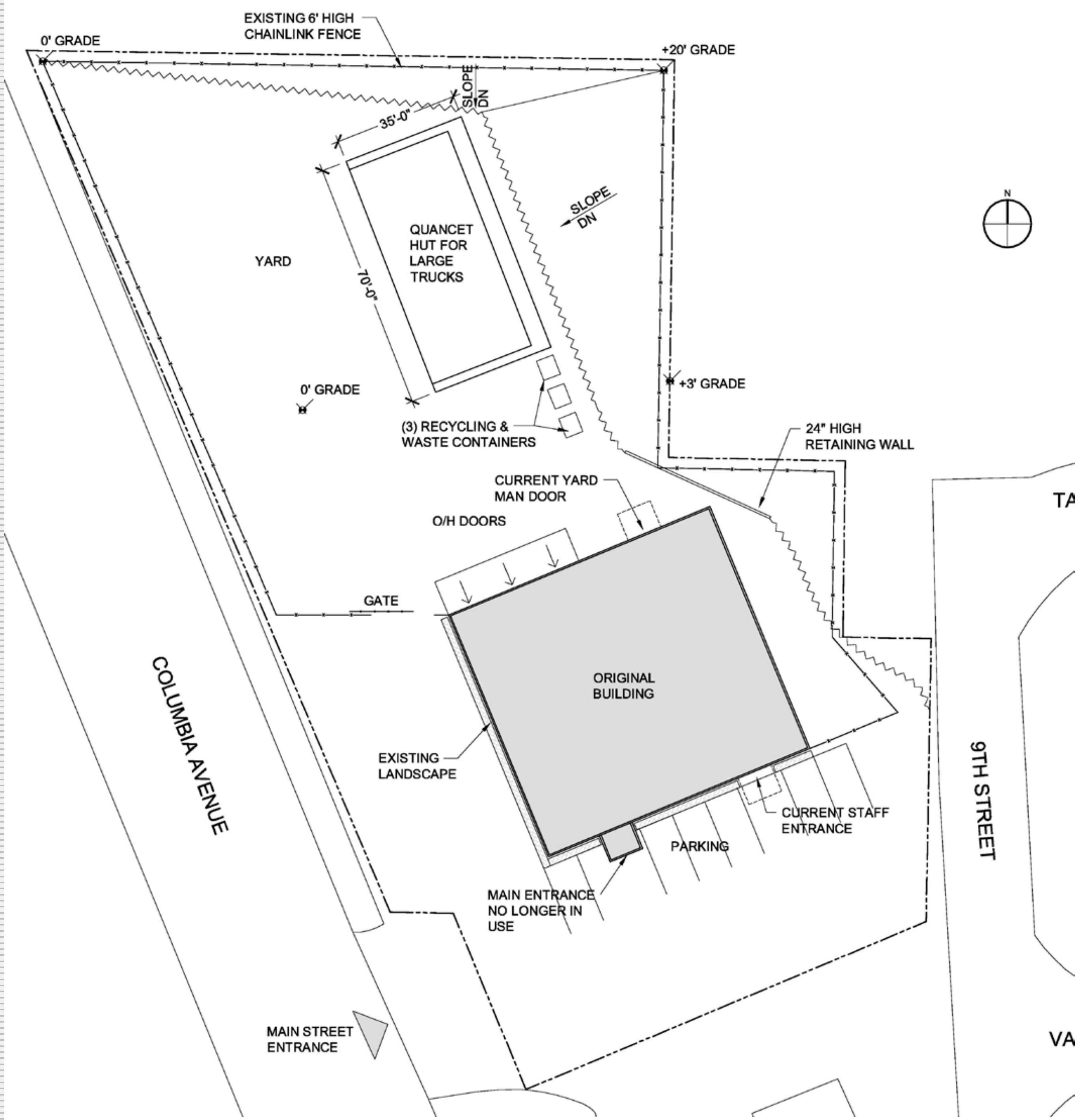
- The building is a structural steel system, with metal cladding, metal roofing, double paned aluminum windows, and a concrete slab on grade.
- The office areas are finished with typical interior finishes - carpet and resilient flooring, painted drywall (GWB) walls, 2x4 t-bar ceilings with acoustic panels, 2x4 fluorescent lighting, and typical office millwork.
- The doors are metal in pressed steel frames - some are rated and some are not rated.
- There are three 12'x12' overhead truck doors on the north side of the Shop.

- The building electrical service is rated at 400 Amp, 120/208 Volt, 3 phase, 4 wire and is fed from utility pole mounted transformers on an incoming over line.
- The office lighting is primarily provided by fluorescent systems while the shop and exterior areas are illuminated by metal halide systems.
- Ventilation to the offices area is provided by two all electric air handler units located in the mezzanine space above the garage.
- An air-source heat pump provides heating and cooling for the offices using a DX coil installed in AHU1. Additional heating sources include an electric duct heater for the office space, a fan force heater in the main entrance vestibule and a horizontal gas-fired unit heater for the garage space.
- An electric hot water tank provides hot water for the male and female washrooms, men's shower and the staff lunchroom.

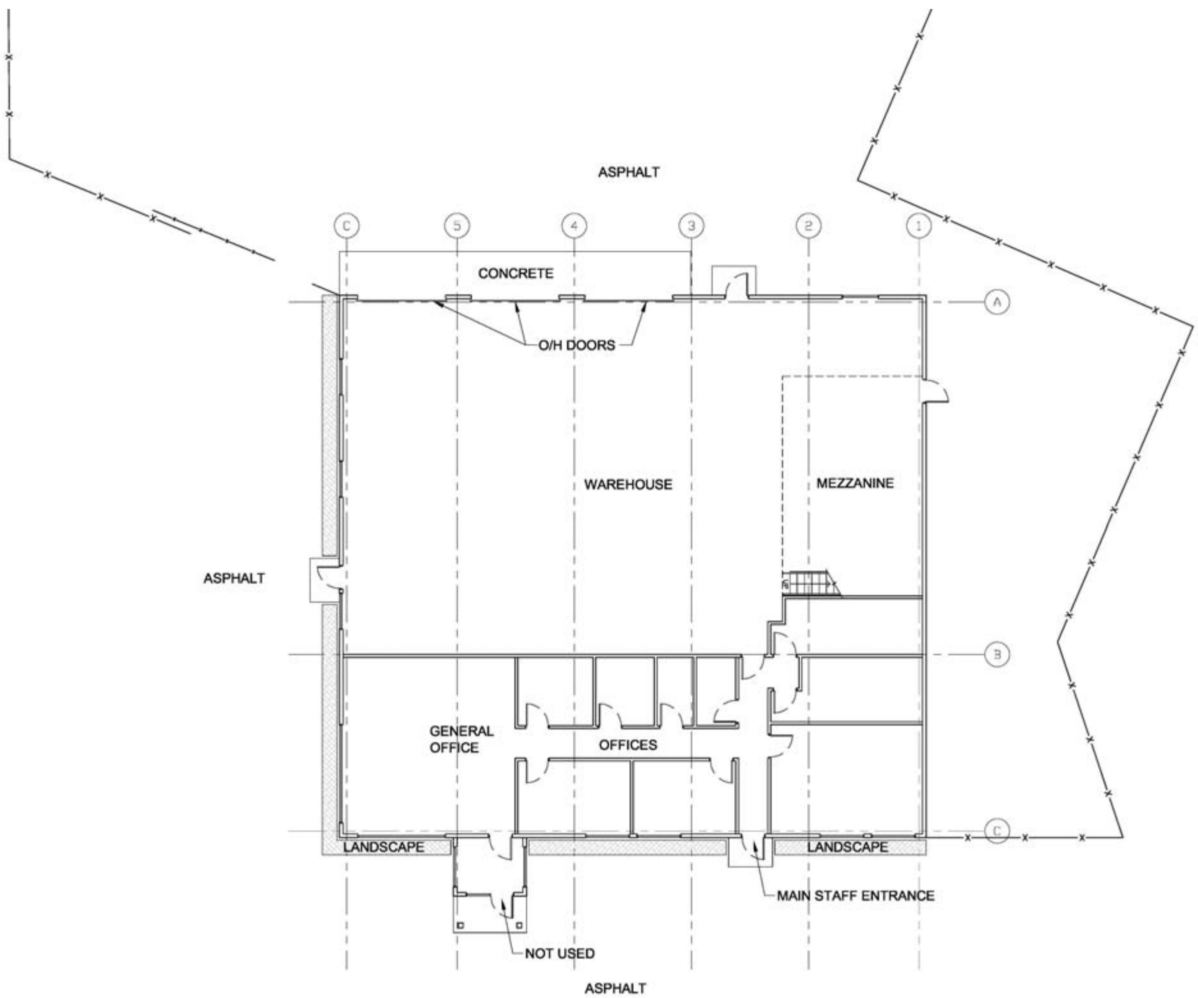
2.4 Building Program:

Through discussions with the staff and observations during my field review, it has become clear that the current facility does not effectively fulfill FortisBC's current program for the site. The overhead doors are too small for the current service trucks, the general offices are too small for the current staff, there is no lunch room for the staff, and the "main entrance" is no longer used and is permanently locked. Of particular concern are the staff reports that the odour of truck exhaust can be readily smelled in the Dispatch Office Area. This speaks to an incomplete air and smoke separation between these two different Occupancies. Finally, both the male and female staff note that the mechanical system does not create a comfortable, temperate work environment.

2.5 Site Plan:


EXISTING 6' HIGH CHAINLINK FENCE
0' GRADE
+20' GRADE
SLOPE DN
35'-0"
70'-0"
QUANCET HUT FOR LARGE TRUCKS
YARD
SLOPE DN
0' GRADE
+3' GRADE
(3) RECYCLING & WASTE CONTAINERS
24" HIGH RETAINING WALL
CURRENT YARD MAN DOOR
O/H DOORS
GATE
ORIGINAL BUILDING
COLUMBIA AVENUE
EXISTING LANDSCAPE
CURRENT STAFF ENTRANCE
PARKING
MAIN ENTRANCE NO LONGER IN USE
9TH STREET
MAIN STREET ENTRANCE
N

2.6 Floor Plan:



3 Building Components

The following section reviews the seven main architectural components of the building, and for each breaks out the principal sub-components. The condition of each component is noted in a five point system: very good, good, fair, poor, failing. The Expected Life is given for each sub-component, and its approximate age to date. A summary of the Mechanical and Electrical components is also included from the accompanying M&E report in Appendix C.

3.1 Structural System and Concrete

- Structure:
  Condition = good Expected Life = 60-80 years Approx Age = 50 years
  Observation: The structural steel system is composed of 8" deep perlins, on 36" deep beams, on steel posts, on concrete pedestals. The steel shows no signs of rust, and the visible concrete pedestals show no visible cracking. However it is important to note that we have had multiple updates to the Building Code, including increased snow load and seismic requirements, since this facility was built. Structurally analyzed today, the steel structure would likely not meet the current BC Building Code.
  Recommendation: No remedial structural work is required.

- Interior Concrete Slab:
  Condition = poor Expected Life = 40 years Approx Age = 50 years
  Observation: The Shop concrete slab floor is sloped to a central grated French drain. The concrete slab shows numerous cracks, and the metal drain cover is bent with use. Because interior concrete slabs are not subject to freeze-thaw, they tend to last longer than exterior slabs. However, use by heavy trucks does tend to shorten their effective life span.
  Recommendation: The cracking in the Shop slab will gradually get worse based on normal use by the heavy work trucks, as the edges of the cracks spall away. Patching is unlikely to be of any help due to the weight of the trucks. Monitor, and then replace when the slab becomes dangerous or unusable. Remaining life expectancy is +/- five years.

- Exterior Concrete:
  Condition = fair / poor Expected Life = 30 years Approx Age = 23 / 50 years
  Observation: The exterior concrete pads at the various entrance doors are cracked. The pads at the three overhead doors were installed during the 1989 renovation, and are in somewhat better condition.
  Recommendation: Once established, cracks in exterior concrete worsen much more rapidly due to the freeze-thaw cycle during the Spring and Autumn. We recommend that the concrete slabs are monitored closely, and the damages slabs be replaced within the next three to five years.

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3.2 Exterior Building Envelope Systems

Maintenance of the exterior envelope systems is essential for a properly functioning building. The envelope affects the longevity of the other building components, the energy efficiency of a building as a whole through air leakage and radiant heat loss; and the comfort and health of the workers by creating a temperate work environment with good air quality. When the building envelope fails, all of these key elements are negatively affected.

- Metal Cladding

Condition = poor Expected Life = 40 years Approx Age = 50 years

Observation: Most of the exterior walls are composed of vertical metal cladding on steel studs. In numerous locations, the paint has peeled off the cladding, but it has not yet begun to rust. The metal cladding is dented in many locations through use and accidents.

Recommendation: On such an old building it is not worth replacing the metal cladding. Monitor and patch paint any rusty areas.

- Brick Cladding

Condition = good Expected Life = 70+ years Approx Age = 50 years

Observation: At the front "Dispatch Office", the cladding is brick, which appears in good repair with only minor visible efflorescence.

Recommendation: Monitor and if the efflorescence gets worse, clean with an approved muriatic acid and clear coat.

- Aluminum Windows

Condition = fair to poor Expected Life = 30-40 years Approx Age = 23 years

Observation: The windows all appear to be double paned aluminum retrofit windows installed during the 1989 Renovation. The installation detailing does not meet current best practices, with no head flashing, no end dams, broken window stops, and cracked caulking.

Recommendation: It is unlikely that the windows are performing well, and are near the end of their effective lifespan. However, there are so many points of air leakage through the cladding, the cost of global window replacement will not be recovered through reduced energy loads. Review and replace the exterior window caulking on an annual basis. Replace the windows as they fail.

- Exterior Man-Doors:

Condition = poor Expected Life = 30 years Approx Age = 23 years

Observation: The exterior man-doors are insulated metal in pressed steel frames. At least one is missing a threshold, the paint is peeling and faded on all of them, and the head flashing detail is poor.

Recommendation: At the very least the exterior metal man-doors should be painted to prevent rusting and re-detailed with replaced weather stripping and repaired thresholds.

- Exterior Overhead Doors:

Condition = good Expected Life = 30 years Approx Age = 23 years

Observation: There are three insulated, 12'x12' metal overhead doors with vision panels to the Shop. They appear to be in good repair, except one has been damaged by a vehicle.

Recommendation: The current Electrical Service trucks require higher bays. If the building is retained, at least one of the overhead doors should be replaced with as high an overhead door as is possible within the constraints of the current structure (likely 13' high) to allow the larger service trucks to easily entre the Shop. If the building is replaced, all of the new overhead doors should be at least 14' high. The current structure will not allow a 14' high door.

3.3 Roof System

- Metal Roof & Flashings:

Condition = fair Expected Life = 40 years Approx Age = 50 years

Observation: The roof is low sloped metal, on metal perlins, on the steel structure. The metal roofing is faded and peeling. There is a history of ice-damning at the south side of the building with icicles breaking off and hitting the windows below - this has been addressed in a temporary fashion by laying heat-tracing in loops on the leading edge of the roofing. The roof insulation appears to be 1 1/2" of semi-rigid. The cap flashing appeared in reasonable repair.

Recommendation: As with the aged metal cladding, it would be a long cost recovery to replace the metal roofing. The roofing should be patched as leaks develop, and a leaf-guard gutter should be installed on the south side of the building.

- Fascia & Soffits:

Condition = poor Expected Life = 40 years Approx Age = 50 years

Observation: The metal fascia are faded and chalky - this is usually an indication that the metal paint system is beginning to fail and is at the end of its lifespan. The soffits on the west side are in very poor condition, while the other soffits are okay.

Recommendation: The failed soffit should be replaced. The chalky fascia should only be replaced if it fails and leaks, or if the metal wall cladding is replaced.

3.4 Ceiling System

- T-Bar

Condition = good Expected Life = 20-25 years Approx Age = 23 years

Observation: Much of the ceiling in the Office area consists of 2x4 t-bar with typical acoustic panels. There are some minor chips and scrapes, but otherwise the t-bar ceilings are in reasonable condition.
Recommendation: ongoing maintenance only.

- Painted Drywall (GWB)

Condition = fair Expected Life = 15 years Approx Age = 23 years
Observation: The washroom ceilings are painted GWB, which is experiencing some tape delimitation, but is otherwise in fair condition with typical nicks, scrapes and dings caused by normal use.
Recommendation: Patch and paint as required.

- Tile

Condition = good Expected Life = 50 years Approx Age = 23 years
Observation: The tile in the men's shower looks clean and in good repair. There are no broken tiles, and the grout is generally fair - with some cracks in the corners.
Recommendation: Caulk corners. Seal grout.

- Vinyl

Condition = poor Expected Life = 15 years Approx Age = 23 years
Observation: The vinyl covered ceiling insulation in the Shop is ripped and discontinuous. It does not provide a continuous vapour / air barrier. With only 1.5" of semi rigid batt insulation, the effective R-value of the Shop roof is only R6 (approximately 40% of the current Code required R15 roof insulation for a metal building).
Recommendation: If the building is going to be retained over the long run, the Shop ceiling covering should be removed, the insulation should be improved to current Code requirements, a continuous vapour / air barrier included, and a more durable covering should be installed.

3.5 Office Millwork

- Office Millwork

Condition = fair Expected Life = 30 years Approx Age = 23 years
Observation: The Office millwork was installed during the 1989 Renovation, and is beginning to show wear.
Recommendation: Refurbish or replacement in 5-7 years.

- Office Furniture (including Muster Staff Work Stations)

Condition = fair Expected Life = 15 years Approx Age = 23 years
Observation: The Office Furniture is showing wear.
Recommendation: Replacement as required to provide ergonomic work stations.

- Washroom Fixtures

Condition = fair Expected Life = 30-40 years Approx Age = 23 years
Observation: In fair condition, some washroom fixtures should be replaced (i.e. sink the women's washroom), and some should be upgraded for improved water efficiency.
Recommendation: Replacement as required to maintain sanitary washroom facilities.

3.6 Floor Coverings

- Carpet

Condition = fair Expected Life = 7-10 years Approx Age = 6 years
Observation: The carpet in the Office is beginning to show wear. It was installed 6 years ago and has 4-5 years remaining life.
Recommendation: Regular maintenance, and then replacement in 4-5 years.

- Resilient Flooring

Condition = fair Expected Life = 20 years Approx Age = 6 years
Observation: The resilient flooring was also installed 6 years ago, is in generally good repair, though it is showing wear under chairs and in high traffic areas.
Recommendation: Regular maintenance. High traffic areas will need to be replaced in approx 5 years, while low traffic areas will last 15 years.

- Entrance Floor Tile

Condition = good Expected Life = 50 years Approx Age = 23 years
Observation: Tile in the Main Entrance is in good repair.
Recommendation: With regular maintenance, the entrance floor tile should last the life of the building.

3.7 Walls and Partitions

- Office Vinyl Wall Coverings

Condition = fair Expected Life = 15 years Approx Age = 23 years

Observation: The wall partitions in the Reception Area are vinyl, and show a moderate level of staining and peeling.
Recommendation: Within five years the vinyl wall coverings should be removed and replaced with a new, more environmentally friendly wall covering.

- Painted Drywall (GWB) Walls:

Condition = fair Expected Life = 15 years Approx Age = 23 years
Observation: The wall partitions in the small offices are painted GWB, and show typical ware, nicks, and stains.
Recommendation: The GWB walls require patch and paint.

- Painted Shop Walls

Condition = failing Expected Life = 15 years Approx Age = 23 years
Observation: The painted particle board wall coverings in the Shop are in poor shape and should be replaced.
Recommendation: The entire wall covering assembly, including the batt insulation and vapour / air barrier has failed and should be replaced immediately.

- Vinyl Shop Walls

Condition = failing Expected Life = 15 years Approx Age = 23 years
Observation: The vinyl covered wall insulation in the Shop is ripped and in very poor condition. It does not provide a continuous vapour / air barrier. With only 1.5" of semi rigid batt insulation, the effective R-value of the Shop walls is only R6 (approximately 30% of the current Code required R19 wall insulation for a metal building).
Recommendation: If the building is going to be retained over the long run, the Shop wall coverings should be removed, the insulation should be improved, a continuous vapour / air barrier included, and a more durable covering should be installed.

3.8 Site Work

- Retaining Wall

Condition = failing Expected Life = 30-40 years Approx Age = 50 years
Observation: The retaining wall at the rear of the site has collapsed.
Recommendation: The collapsed site retaining wall should be replaced immediately with a new concrete, or engineered "Allan Block" retaining wall.

- Bollards

Condition = fair Expected Life = 30-40 years Approx Age = 50 years

Observation: The bollards are rusty.
Recommendation: The bollards require immediate maintenance painting to prevent the surface rust from causing structural damage to the steel.

- Parking Asphalt

Condition = failing / fair Expected Life = 30-35 years Approx Age = 50 years
Observation: The asphalt to the north and west of the building is in very poor condition. It is broken into numerous cracks and pieces, and should be replaced. The asphalt in the yard is better condition.
Recommendation: The asphalt to the north and west of the building should be replaced.

3.9 Mechanical Systems

For additional mechanical systems information, please see Prism Engineering's report bound separately as Appendix C.

- Heating System - Unit Heater (Truck Bay)

Condition = good Expected Life = 18-20 years Approx Age = 4-5 years
Observation: Fairly new unit with no observed problems. Existing unit heater removed but combustion air intake vent left in place.
Recommendation: Replace unit heater thermostat with new programmable thermostat for energy savings.

- Heating System - Electric Duct Heater (Office)

Condition = good Expected Life = >30 years Approx Age = 8- 10 years
Observation: Unit in good condition.
Recommendation: Replace thermostat with new programmable thermostat for energy savings.

- Heating System - Electric Fan Force Heater (Vestibule)

Condition = good Expected Life = >20 years Approx Age = 8- 10 years
Observation: No known problems.
Recommendation: General maintenance.

- Air Distribution Systems - Air Handler (Mezz)

Condition = good Expected Life = 18-20 years Approx Age = 40 years
Observation: Filter uncleaned but is replaced frequently. Ductwork with insulation appears in good condition. Comments made on site from office workers inhaling exhaust fumes from the trucks.

Recommendation: Fan control settings should be adjusted to operate continuously for continuous fresh air to enter the space (fan ON rather than fan AUTO). By creating a positive pressurization in the office space, this should help alleviate the truck exhaust fumes from entering into the space.

- Air Distribution Systems - In-Line Fan (Mezz)

Condition = good Expected Life = 18-20 years Approx Age = 2-3 years
Observation: Fairly new unit with no observed problems. Rotary style timer is operational but old.
Recommendation: General maintenance

- Exhaust Ventilation Systems - Washroom Exhaust Fan

Condition = fair Expected Life = 10 years Approx Age = unknown years
Observation: Although operating beyond its rated life, the exhaust fan is in working condition.
Recommendation: Replace exhaust fan as a capital measure.

- Controls And Instrumentation - Heat trace controls

Condition = good Expected Life = >20 years Approx Age = 4 years
Observation: Heat trace controls set to operate cables continuously. No known problems.
Recommendation: Install snow sensor and recommission system. Program thermostat setpoint is not higher than +3 degrees Celsius to reduce energy use.

- Other HVAC Systems And Equipment - Air Source Heat Pump

Condition = good Expected Life = 18-20 years Approx Age = 3 years
Observation: Insulation on electrical feeder slightly damaged.
Recommendation: Inspect coolant line for corrosion. Replace insulation to maintain protection - approximately 5' section. Insulation type should be of weatherproof and wildlife proof jacket.

- Plumbing System- Fixtures

Condition = fair Expected Life = >30 years Approx Age = 40 years
Observation: Plumbing fixtures generally in good condition. Continuous flush type urinals are in use. Ladies washroom sink finish is damaged but faucet is in working condition.
Recommendation: Install occupancy sensor to control solenoid valve on urinals for water savings. Replace or refinish ladies sink with matching. Provide new crane sink and faucet to match existing.

- Plumbing System - Domestic Water Distribution

Condition = good Expected Life = >30 years Approx Age = 40 years
Observation: Uninsulated copper hot water pipes from tank. Condition of pipes appears good.
Recommendation: General Maintenance. Insulate hot water pipes for energy savings. Provide insulation around exposed section of hot water pipe (approximately 20').

- Plumbing System - Domestic Water Heaters

Condition = good Expected Life = 10 years Approx Age = 8-10 years

Observation: Electric hot water tank. No known problems.

Recommendation: Replace hot water tank in 1-3 years.

3.10 Electrical Systems

For additional electrical systems information, please see Prism Engineering's report Bound separately as Appendix C.

- Electrical System – Electrical Service and Distribution

Condition = fair Expected Life = >30 years Approx Age = 40 years

Observation: Panels and distribution equipment are dusty and not maintained. Corrosion found on exterior mounted meter enclosure.

Recommendation: Maintenance cleaning should be performed on electrical equipment. A thermal scan should be conducted as soon as possible on all panels and distribution equipment to ensure they are not exceeding NETA (InterNational Electrical Testing Association) recommended operating temperature guidelines.

- Electrical System – Electrical Branch Wiring

Condition = fair Expected Life = >20 years Approx Age = 40 years

Observation: Luminaire branch wiring is considered residential grade wiring. Exterior feeder to motorized gate has damaged outer jacket.

Recommendation: Replace all non-metallic sheathed cables with new cables and conduits as a capital measure. Repair exterior feeder jacket sheathing to maintain weatherproof protection.

- Lighting System – Interior Lighting

Condition = poor-good Expected Life = >30 years Approx Age = 40 years

Observation: T12 fluorescent luminaries have broken lenses, lampholders and are dirty while T8 systems are typically in good condition. Light levels in some areas are too high. Metal halide wallpack lenses are yellowing from UV radiation.

Recommendation: Retrofit all T12 lighting to T8 lighting as soon as possible to improve energy efficiency and ensure replacement lamps and ballasts are readily available for maintenance (T12 lamps and ballasts will be unavailable due to government legislature). Delamp centre lamp in office fluorescent luminaires to reduce energy usage and light levels. Replace metal halide wall pack lens cover. Confirm and reanchor luminaire seismic restraint chains for safety.

- Lighting System – Exterior Lighting

Condition = poor Expected Life = >30 years Approx Age = 40 years

Observation: The metal halide wallpack lenses are yellowing due to UV rays emitted from the lamps. Lenses are generally dirty. Exterior downlights for front entrance missing lens cover. Many are exposed to insects (wasp hives).

Recommendation: Replace downlights and bay light lens. Baylight lens replacement should be tempered glass.

- Fire Protection

Condition = good Expected Life = 10 years Approx Age = unknown

Observation: Fire extinguishers placed by exits (2 in truck bay exit, 1 by each office exit). Checked in 09/08/11.

Recommendation: Continued maintenance checks.

- Low Tension Services - Radio System

Condition = fair Expected Life = >20 years Approx Age = 15 years

Observation: No known problems.

Recommendation: General maintenance.

- Low Tension Services - Telephone Systems

Condition = fair Expected Life = >20 years Approx Age = 40 years

Observation: Staff have reported that it is difficult to hear on the existing phone system.

Recommendation: Consider replacing phone system.

- Low Tension Services - Server/Computer Systems

Condition = good Expected Life = 5-7 years Approx Age = 3-5 years

Observation: 48 port Netgear switch with 24 port patch panel (Rated CAT5).

Recommendation: General maintenance. Update equipment and cable standards to CAT6A to accommodate future growth as a capital measure.

- Low Tension Services - Security Systems

Condition = fair Expected Life = >20 years Approx Age = 7 years

Observation: Note on site indicates battery installed in 2009. All door contacts appear to be working.

Recommendation: General maintenance.

- Emergency Systems - Emergency Lighting

Condition = good Expected Life = 10 years Approx Age = 8-10 years
Observation: Used test button on remote heads and confirmed lamps are working.
Recommendation: Replace battery packs with new in 3-5 years. Continue annual maintenance checks.

- Emergency Systems - Exit Lighting

Condition = good Expected Life = >20 years Approx Age = 8-10 years
Observation: Working condition. General lack of emergency exit signage above doors.
Recommendation: Install 4 additional LED exit signs above doors and connect to standby generator this year.

- Emergency Systems - Emergency Power & Generation

Condition = fair Expected Life = 20-25 years Approx Age = 9 years
Observation: Generator has corrosion on unit and mount.
Recommendation: Remove rust on base, repair and repaint with corrosive resistive paint.

- Other Electrical Systems - Heating Cables

Condition = good Expected Life = >10 years Approx Age = 4 years
Observation: Staff indicates cables have mitigated the issue of the ice dams.
Recommendation: General maintenance.

4 Staff Comments

4.1 Office Staff:

- The smell of the work truck exhaust often penetrates from the Shop into the Office. "Some days it is really bad in here."
- The wall between the Shop and the Office seems poorly insulated. Often the Office is quite cold.
- Water from the roof pours down on the ground below. It would benefit from a proper gutter system.
- The office staff questions the air quality, they feel they have more sneezing and headaches.
- There is often an unpleasant smell from the Men's Washroom.
- In the summer it gets too hot in the Office, even with the AC turned up.
- The Lunch Room is regularly used for meetings, and for the men's workstations - leaving no place for the female Office staff to have their lunch.

4.2 Shop Staff:

- Need better controls for the HVAC (heating and cooling) in the small offices. The problem is exacerbated in the winter when the office staff want the space warmer, and the small offices get uncomfortably hot.
- Need a new phone system - often it is very hard to hear.
- The overhead doors into the Shop are too low. 12' clearance is the bare minimum - even a little snow build-up will cause the truck to hit the door head.
- Feel that a better security fence around the yard would be helpful. At present it is only 6' high, and there are several places where site-works makes it easy to climb over.
- Need better lighting in the Yard, both for winter working and for security.
- The Lunch Room is regularly used for meetings, and for the men's workstations - leaving no place for the Shop staff to have their lunch.
- It is often difficult for the large trucks to turn onto Columbia Ave.

5 Summary and Recommendations

5.1 Architectural Components

Structure: the structural steel system appears to be functioning as intended, but the interior and exterior concrete slabs are nearing the end of their lifespan.

Building Envelope: the condition of the exterior envelope components varies considerably. The large extent of metal cladding is extensively peeled and dented, while the small area of brick cladding appears in reasonable repair. The aluminum windows are poorly detailed and likely leak air, but have not yet failed. The overhead truck doors are in good shape but are too small, and the insulated metal man-doors are faded and aged. Most of these systems are near the end of their lifespan.

Roof System: the metal roofing, fascia, and soffit are old, peeling, and nearing the end of its lifespan. The roof insulation is far less than current standards. With good maintenance and carefully monitoring for leaks, the roofing system should last another three to five years.

Ceiling System: the t-bar ceiling in the Office area is in reasonable repair, showing some scrapes and broken corners. At the washrooms, the painted drywall ceilings require some patch and paint repair, and the shower ceiling tile needs grout sealant and caulking in the corners. With ongoing maintenance, the Office ceilings can be maintained. The Shop vinyl covered ceiling is under-insulated, but is in better shape than the vinyl on the Shop walls.

Floor Coverings: in the Shop the concrete slab is cracked but serviceable. The carpet in the office was replaced approximately six years ago, and likely has 3-5 more years of life in it. The resilient flooring in the remaining spaces was also replaced approximately six years ago, and is showing wear under the chairs and in high traffic areas.

Walls and Partitions: for the most part the Shop walls are painted particle board, are in poor shape and require replacement. The vinyl wall coverings in the Office evidence some stains and peeled seams. While the remaining drywall walls would benefit from a patch and paint.

Site Work: The asphalt on the south and west of the building is in very poor condition and should be replaced. The exterior concrete pads are cracked, and should be replaced if they pose a safety hazard or risk to the equipment. The landscaping is very simple and seems to require very little maintenance.

5.2 Mechanical Components

Mechanical HVAC Systems: Overall, the mechanical equipment appears to be in good condition. Minor repairs are recommended for the heatpump coolant line. Energy savings can be achieved by replacing the thermostats and programming them to automatically set back temperatures during unoccupied periods. Air quality in the Office can be improved by adjusting the air-handling unit supply fan setting from “auto” to “on” during occupied periods. This will result in an improvement to the air quality

Plumbing Systems: The hot water tank and pipes appear to be in good condition, while plumbing fixtures generally appear to be in fair order. Installation of an occupancy sensor on the urinal water tank will reduce water consumption. The ladies washroom sink is damaged and could be considered for replacement.

For additional mechanical system information, please see Prism Engineering's report bound separately as Appendix C.

5.3 Electrical Components

Electrical Distribution Systems: The majority of the electrical distribution appears to be original to the building, and appears to be in good to fair condition. General maintenance should be conducted on the equipment to remove dust build-up and thermal scans should be performed to ensure recommended operating temperatures are not exceeded.

The general branch wiring is in good to fair condition. The exterior cable connected to the motorized gate has a damaged outer jacket and should be replaced.

Electrical Lighting Systems: Lighting in office areas is provided by various types of fluorescent luminaries while the shop areas are lit by metal halide luminaires. The various areas are generally overlit, and energy savings can be achieved by retrofitting the fluorescent luminaries with more current lamps and ballasts. Many exterior luminaries require lens replacement or are damaged and require replacement.

Emergency Systems: Staff reports indicate that the back-up diesel generator appears to function as expected, though the generator enclosure mount is corroding. Maintenance is required on the generator mount, and the facility appears to be missing required exit signs.

Fire Alarm Systems: The facility is not sprinklered, and does not have a fire alarm system. Fire extinguishers located at the various building entrances appear to be inspected on an annual basis which meets building code requirements.

Communication Systems: The communication systems consist of the intercom, data and telephone systems. The system appears to be functioning, although Staff said they find that it is difficult to hear on the phone system.

For additional electrical system information, please see Prism Engineering's report bound separately as Appendix C

Conclusion:

Architectural

From our field review observations, and taking into account that the existing building was built 50 years ago, we do not believe that the systemic repairs required at the facility will be cost effective. Many of the key building components are nearing or have reached their life expectancy. Furthermore, even if the failing components were replaced, the repaired building would not effectively meet the new and changing program of FortisBC. Rather, we recommend that the facility be replaced in the next 3-5 years following a careful program and location analysis. In the meantime, the facility should receive basic maintenance to keep it as a safe working environment.

Mechanical & Electrical

Based on our site assessment and the age of the building being 50 years old, we do not believe that the systemic repairs required will be cost effective. Many of the key building components such as the electrical panels and the lighting are nearing or have reached their life expectancy.

IREDALE GROUP
ARCHITECTURE

Appendix A

BUILDING ELEVATIONS

BUILDING ELEVATIONS

Front Elevation

Side and Rear Elevations

Appendix B

Existing Condition

EXISTING CONDITION

Bollards are rusted and require repainting.

Metal cladding above the doors has been dented by the trucks.

Metal overhead door has been dented by the trucks.

Exterior rear of the Shop

The metal cladding is dented and peeling.

The rear retaining wall has collapsed.

Peeling paint on metal cladding

South Elevation - not poor condition of asphalt, no gutter on roof.

South asphalt is crack and beginning to break.

South asphalt is very cracked and pot holes are forming.

West asphalt is very cracked and pitted.

Minor efflorescence on the brick cladding.

Peeling paint on metal soffits.

The exterior metal man-doors require repainting.

Peeling paint on metal cladding.

Poor detailing at retrofit aluminum windows.

Peeling paint on metal cladding.

Cracks in the Shop concrete floor.

Interior of the Shop.

Interior of the Shop.

Vinyl wall covering on the interior of the Shop is ripped and the overlaps allow air leakage.

Insulation and poly vapour / air barrier is incomplete at much of the Shop.

	
Insulation and poly vapour / air barrier is incomplete at much of the Shop - in particular around the steel columns.	Similar condition at anther steel column.
	
Some interior finishes require repair.	The washrooms require some work and upgrades.

	
The grouted corners of the tile in the Men's Washroom is cracked and requires repair / caulking.	
	
The older portions of the existing fence are quite rusted.	Paint is peeling from the metal cladding - especially where highly exposed to the weather.

	
Poor detailing at the retrofit windows.	Vinyl wall coverings at the office show stains and peeling.
	
A quansit hut is required to park the large truck, because it is too large to fit inside the Shop.	Paint is peeling from the metal cladding - especially where highly exposed to the weather.

Appendix C

MECHANICAL AND ELECTRICAL REPORT

- **Prism Engineering, March 5, 2012**

MECHANICAL AND ELECTRICAL SYSTEM REVIEW V1.1

FORTIS BC CASTLEGAR FACILITIES
Prepared for: Graham Coleman, MAIBC, MRAIC, LEED AP, Iredale Group Architecture
Prepared by: Casey Gaetz, LC, Associate
Project No.: 2012144 Date: March 5, 2012

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1. PROJECT OVERVIEW

This report summarizes the review, analysis and recommendations for the mechanical and electrical systems in the Fortis BC facility at 1037 Columbia Avenue in Castlegar, BC. The facilities include offices, washrooms, storage and a garage space, with a combined area of approximately 5,875 ft sq. The building systems are old and a capital replacement plan is required to ensure reliable operation and overall comfort conditions in the building.

The site review was based on systems observation only. No destructive or invasive testing was performed.

1.1 Building Description and Occupancy

The building is a single story facility for Fortis BC line crew. The occupancy is generally from 7AM (or earlier) to 3PM, Monday to Friday.

2. MECHANICAL AND ELECTRICAL SYSTEMS OVERVIEW

The scope of work will be based on a review of the existing mechanical and electrical systems. Systems to be reviewed include the following:

- Mechanical HVAC systems equipment
- Plumbing system equipment
- Electrical distribution equipment
- Electrical lighting systems and controls
- Emergency systems
- Fire alarm system (if applicable)
- Communication system

Detailed description of the equipment is provided in the attached table along with proposed action items and costing.

2.1 Mechanical HVAC Systems

Description

The building is ventilated by two air handlers located in the mezzanine space above the garage. The ¾ horsepower air handler services the office space and is ducted to 2’x2’ ceiling diffusers. This unit is controlled by a programmable thermostat located in the office space.

A new heat pump, mounted outside on the base of the east wall is connected to the air handler servicing the office space to provide heating and cooling. Additional heating sources include an electric duct heater for the office space, a fan force heater in the main entrance vestibule and a horizontal gas-fired unit heater for the garage space. These units are controlled by electromagnetic thermostats.

Washrooms utilize stand-alone exhaust fans to eject and refresh the air. These are controlled by an electromechanical rotary timer or interconnected with the light switch.

Observations

Ventilation to the offices area is provided by two all-electric air handler units located in the mezzanine space above the garage.

The main air handler (AHU1) equipped with a ¾ HP supply fan, DX coil and electric duct heaters provides conditioned air through a duct system to 2’x2’ ceiling diffusers in the office spaces. This unit is controlled by a programmable thermostat located in the office space corridor.

A 5 ton air-source heat pump, mounted outside on the base of the east wall was installed in 2009. The heat pump provides heating and cooling through a DX coil installed in AHU1. Additional heating sources include an electric duct heater for the office space, a fan force heater in the main entrance vestibule and a horizontal gas-fired unit heater for the garage space. These units are controlled by electromagnetic thermostats.

There is also an in-line fan installed in the mezzanine. This unit is utilized as the exhaust fan for the men's washroom and kitchen. A rotary style timer controls this unit.

The exhaust fan in the ladies' washroom is provided by a ceiling mounted exhaust fan. This unit is interlocked with the light switch.

Recommendations

The mechanical equipment, in general, appears to be in good shape. We recommend repairing the insulation around the heatpump coolant with weather and wildlife (bird) proof insulation to maintain its longevity.

For energy savings we would recommend replacing the electromechanical thermostat for the unit heater and electric duct heater with a digital programmable thermostat to automatically set back the temperature during unoccupied periods.

We recommend adjusting the AHU1 supply fan setting from "auto" to "on" during occupied periods and to "auto" during unoccupied periods. This would ensure a constant supply of fresh air to the occupied space and will also provide positive pressurization in the office area. The pressurization is expected to prevent fume leakage from the garage.

Presently, based on our site review, we speculate that the office space is in a "negative" pressurization because the supply fan is set to run in "auto" mode. As a result, air (along with other contaminants such as exhaust fumes) is drawn from other spaces such as the garage into the office space as "supply" air.

We anticipate that the constant supply of fresh outdoor air would also mitigate the "hot" temperatures felt during the summer.

As a capital measure, the ladies' washroom exhaust fan can be replaced.

2.2 Plumbing Systems

Description

Domestic hot water is provided by a 184 litre electric hot water tank heater located in the mezzanine space above the garage. Pipes extending from the electric hot water tank are copper.

The men's washroom has shared shower facilities with continuous flush urinals and two water closets. A secondary, private washroom for the ladies is located in the office space. The building plumbing system also includes the lunchroom sink and a basin sink in the garage.

Observations

The hot water tank and pipes appear to be in good shape. The ladies washroom sink was observed to have a damaged finish but the facet still operates. All other fixtures appear to be in fair shape.

Recommendations

We recommend the installation of an occupancy sensor with an electronic valve on the urinal water tank minimize water waste. This unit will only flush after an occupant is sensed.

As a capital measure, we also recommend refinishing (if possible) or replacing the ladies' washroom sink.

2.3 Electrical Distribution System

Description

The electrical service is 400 Amp, 120/208V 3Ph 4W. The electrical service from the utility pole mounted transformers on an incoming overhead line and feeds into a 400 Amp main switch. The switch distributes out to three panelboards – for general plugs, office loads and generator backup loads. There is an additional six circuit panelboard that feeds the furnace.

A mixture of cable types is used for the branch wiring. Armoured cable (AC90) is used throughout the garage space. Wiring used outdoors has a similar metallic sheath but includes a liquid-tight jacket to protect the cable from the weather. A majority of the office space cables, in particular, the feeder to the office panel, and drops to the luminaires are non-metallic sheathed cables. Other conductors were routed through rigid PVC or metallic conduit.

Observations

The majority of the electrical distribution equipment appears to be original to the building. Panelboards and distribution equipment (feeders, splitters) are generally dusty but no signs of corrosion (rust) were observed. Corrosion was observed, however, on the meter enclosure located on the outside of the building.

Blank spaces for additional circuitbreakers on the panelboards are covered to prevent exposure to live busbars. Aside from one incident of a breaker tripping, for the AHU (as reported on the mechanical service card), no other known incidents have been reported.

Voltage read through receptacle is at 124V at service and 122V at end-of-line and is slightly higher than nominal 120V.

Branch wiring is generally in good to fair condition. Only the exterior cable connected to the motorized gate was identified as having a damaged outer jacket. Although no signs of damage were observed for the non-metallic sheathed cable, it should be noted that this cable and conductor gauge (#14/3) is generally used as residential wiring.

Recommendations

There were no observations that suggest the electrical distribution needs to be replaced. General vacuuming to remove dust is recommended to prevent build up inside the units.

We also recommend conducting a scan of the equipment and panels to ensure electrical equipment are operating at temperatures as recommended by NETA (InterNational Electrical Testing Association).

The non-metallic sheathed branch wiring is not considered commercial grade. We would recommend, as a capital measure to replace all these wires with non-metallic sheathing.

2.4 Electrical Lighting Systems and Controls

Description

The electric lighting in the office area is a mixture of recessed and surface mounted fluorescent luminaires. Recessed luminaires are equipped with three, linear, 4’ T8 lamps operating on an instant-start electronic ballast. Luminaires with linear T12 lamps operate on a rapid start magnetic ballasts. The majority of these units are controlled by line switches located by the entrances to the space. The lunchroom lighting is controlled by a ceiling mounted PIR occupancy sensor along with line switches.

Additional downlights with compact fluorescent lamps are located in the corridors and vestibule. The corridor downlights are uncontrolled and the vestibule downlights are controlled by a line switch.

The garage is illuminated by metal halide explosion proof luminaires as well as surface mounted and suspended fluorescent luminaires with a mixture of T8 and T12 lamps.

Exterior luminaires are typically HID wallpacks mounted around the perimeter walls and downlights.

Observations

Light levels measured through the space indicate that areas are generally overlit. **Table 1** outlines the measured light levels as compared to recommended target levels. Measurements were taken at desk height or 30” off the floor and measured in the units of footcandles (fc).

Table 1: Summary of Light Level

Area Description	Measured Light Level	IESNA* Target Light Levels	WCB required Light Levels
General Offices	53 – 101 fc	30 – 50 fc	30 – 50 fc
Private Offices	84 fc	30 – 50 fc	30 – 50 fc
Corridors	40 fc	10 – 30 fc	10 fc
Washrooms	5 – 15 – 70 fc	10 – 30 fc	10 fc
Lunchroom	101 fc	10 – 30 fc	10 fc
Garage Space	8 – 10 fc	10 fc	9 fc
Storage Spaces	70 – 80 fc	10 – 30 fc	11 fc

*IESNA (Illuminating Engineering Society of North America) is a governing body who provides guidelines to proper lighting levels

The recessed T8 luminaires are generally in good condition, with clean lenses and reflective surfaces and minimal burnout lamps. A majority of the T12 luminaires are in fair to poor condition based on conditions such as cracked lampholders, dirty and cracked lenses, and old ballasts. Of the new recessed luminaires installed, one unit was identified to not have their seismic-restraint chain anchored onto structure.

Exterior luminaires were not turned on during the inspection period as these are generally controlled by photosensors. Wallpacks with polycarbonate lens are yellowing as a result of the UV light emitting from the metal halide lamps.

The majority of the lenses for the exterior downlights are missing and as a result, insects have inhabited the fixture housing.

Recommendations

For energy savings, we would recommend delamping the luminaires from three to two lamps and retrofitting the T12 luminaires with 28 watt energy saving T8 lamps and high efficiency electronic ballasts. Along with this retrofit, we would recommend a general cleaning of reflective surfaces and replacing all lampholders in T12 luminaires with new lampholders.

Exterior luminaires have missing or damaged lenses. We would recommend replacing the lenses for the bay lights (back area). We would recommend having these luminaires be replaced eventually but is not considered an urgent item.

2.5 Emergency Systems

Description

The facility has a 35kW diesel back-up generator connected to an automatic transfer switch. The back-up system appears to feed into a panel consisting of the garage loads (lighting, unit heater, radios, and security).

Emergency battery packs with dual halogen heads and an LED exit sign are provided in the office space.

Uninterruptable power supplies (UPS) of varying sizes are seen connected to various computer stations in the office spaces to maintain power in the event of a power failure.

Observations

The back-up generator is reported to be maintained on a monthly basis. Based on conversations with staff, this generator operates without any issue. The diesel generator enclosure mount is corroding.

Emergency battery packs in the office space were reviewed by using the test button to ensure headlamps were not burnt out. These units appear to be in good operating condition.

There is one LED exit sign that provides direction on the path of egress to exit the building.

Recommendations

We recommend repairing and repainting the generator mount with corrosion resistive paint to ensure its longevity.

There appears to be a lack of exit signs available for the space to direct occupants to exits. We recommend installing an exit sign above the North and West doorways in the garage as well as the main entrance. An additional directional ceiling mount exit sign is recommended to be installed at the opposite end of the corridor.

2.6 Fire Alarm Systems

Description

No fire alarm system was identified on site. Fire extinguishers are located by the main entrance, side entrance and by two entrances in the garage. Extinguishers were received their annual check on September 08, 2011.

Observations

The fire extinguishers are placed by exits and have been check 4 months ago. There were no issues identified at this time.

2.7 Communication Systems

Description

The existing communication system consists of the intercom, data and telephone.

The intercom system appears to be in operating condition with no reported issues.

A 48 port data switch with a 24 port CAT5 patch panel is located in the server room office space to route the data.

There is a mixture of data cable types used to service computer and network equipment including CAT5 CMR.

The telephone service demarcation is located by the main electrical equipment in the garage. Comments from the shop staff indicate that it is difficult to hear on the telephone system.

Observations

The data equipment in use has no identified issues at this time. As a capital measure, we would recommend replacing the system to meet augmented category 6 (CAT6A) standards to ensure that the system will handle future growth.

The telephone system is outdated and should be considered for replacement.

3. PROJECT SUMMARY

3.1 System Conditions

The majority of the mechanical and electrical systems that we reviewed on site were in fair to good condition.

The HVAC and plumbing systems were identified to be well maintained. Recommendations are generally made for energy savings and maintenance improvements.

The electrical including lighting, distribution and emergency back-up systems are in fair shape. A majority of the exterior lights are in poor condition and are recommended for replacement. Recommendations are made to upgrade the existing interior luminaires equipped with T12 technology with a more energy efficient T8 lighting. The installation of additional LED exit signs are also recommend to provide a clear direction to safely exit the building during an emergency situation.

The distribution system appears to be old. A thermal scan was recommended to identify components or connections that are operating hotter that typical conditions. A general cleaning of the equipment including inside the enclosures will also help with its longevity.

3.2 Financial Details

The estimated budget cost for the recommended action in the first five years is $20,500 not including engineering design fees.

The estimated replacement value for the building's mechanical and electrical systems is estimated at $142,500 not including engineering design fees.

APPENDIX A: M&E REVIEW TABLE

Prism Engineering M&E Assessment Review

Prism Project Number		***2012144***
Site	Fortis BC Castlegar	
Address	1037 Columbia Street	
Size	5875 Sq.Ft.	
Date of Assessment	January 10-11, 2012	

Overall Condition

Good	No visible signs of deterioration, system operating
Fair	Showing signs of deterioration, system operating
Poor	Many signs of deterioration, systems frequently operating
Critical	System no operating and needs to be replaced

Options	Options
This Year	Not Specified
1 to 3 years	Replacement
3 to 5 years	Repair
5 to 20 years	Maintenance
	Study
	Install

Discipline	Equipment	Equipment Description (Make, Model, Location, Service)	Equipment Commentary (Condition, Age, Picture)	Overall Condition	Age of Equipment	Recommended Action (Brief Description)	Action Commentary (Limitations, Conditions to meet)	Urgency of Action?	Action Type	Action Cost	Average Life Expectancy	Remaining Life Expectancy	Equipment Replacement Value
Services - HVAC	Heating System	250 MBH Reznor Horizontal, Gas-Fired, Unit Heater (Truck Bay) on Electromechanical T-Stat	Fairly new unit (Installed in 2007) with no observed problems. Existing unit heater removed but combustion air intake vent left in place. Set point at 19.5°C	Good	4 - 5 years	Replace unit heater thermostat with new programmable thermostat	New programmable thermostat shall have unoccupied setback for energy savings	This Year	Install	$200	18 - 20 yrs	~ 15 years	$1,500
Services - HVAC	Heating System	4.0 kW Thermolec Electric Duct Heater (Office) on Electromechanical T-Stat	Unit in good condition. Set point at 20.5°C	Good	8 - 10 years	Replace thermostat with new programmable thermostat	New programmable thermostat shall have unoccupied setback for energy savings	This Year	Install	$200	> 30 yrs	~ 20 - 30 years	$500
Services - HVAC	Heating System	4.0 kW Chromolox Electric Fan Force Heater (Vestibule) c/w built-in Electromechanical T-Stat	No known problems	Good	8 - 10 years	General maintenance				$0	> 20 yrs	~ 10 - 20 years	$800
Services - HVAC	Air Distribution Systems	3/4 HP Bryant Air Handler (Mezz)	Filter uncleaned but is replaced frequently Ductwork with insulation appears in good condition Comments made on site from office workers inhaling exhaust fumes from the trucks	Good	40 years	Adjust fan control on thermostat	Fan settings should be adjusted to operate continuously for continuous fresh air to enter the space. By creating a positive pressurization in the office space, this should help alleviate the truck exhaust fumes from entering into the space.	This Year	Maintenance	$200	18 - 20 yrs	~ 10 - 20 years	$1,000
Services - HVAC	Air Distribution Systems	440 CFM Panasonic In-Line Fan (Mezz) for men's washroom and kitchen exhaust. Controlled by rotary style timer	Fairly new unit with no observed problems. Rotary style timer is operational but old	Good	2 - 3 years	General maintenance					18 - 20 yrs	~ 20 years	$800
Services - HVAC	Exhaust Ventilation Systems	Broan washroom exhuast fan (U/A Washroom) Controlled by light switch	Working condition	Fair	Unknown	Replace exhaust fan	Replace exhaust fan with new to match existing	3 to 5 years	Replacement	$500	10 yrs	~ 3 - 5 years	$500
Services - HVAC	Controls And Instrumentation	Heat trace controls set to operate cables continuously	Installed in 2008. No known problems	Good	4 years	Install and recommission	Recommend to have snow sensor if there isn't one and ensure thermostat setpoint is not higher than 3 degrees celsius above 0	This Year	Install	$500	> 20 yrs	~ 15 years	$200
Services - HVAC	Other HVAC Systems And Equipment	5 Tons (Nominal) York Air Source Heat Pump (Exterior by Generator)	New unit installed in 2009. Insulation on electrical feeder slightly damaged. Efficiency ratio 15 is higher than minimum recommended ratio of 13.5	Good	3 years	Inspect coolant line for corrosion. Replace insulation to maintain protection - approximately 5' section.	Insulation type should be of weatherproof and wildlife proof jacket	This Year	Repair	$100	18 - 20 yrs	~ 15 years	$4,000
Services - Plumbing	Plumbing Fixtures	- Toto toilets (3) 1.6 gpf/6.0 lpf - Crane sinks (3) - Showers (3) - Crane Urinals (2) - Cambridge Brass Lunchroom Sink (1)	Plumbing fixtures generally in good condition. 2nd toilet installed in men's 10 years ago. Continuous flush type urinals in use. Ladies washroom sink finish is damaged but faucet in working condition	Fair	40 years	Install occupancy sensor for urinals for water savings Replace or refinish ladies sink with matching	Provide new crane sink and faucet to match existing. Remount and reconnect to existing pipes.	3 to 5 years	Replacement	$1,400	> 30 yrs	~ 20 years	$12,700
Services - Plumbing	Domestic Water Distribution	Copper pipes	Uninsulated copper hot water pipes from tank Pipes condition looks good	Good	40 years	General Maintenance Insulate hot water pipes for energy savings	Provide insulation around exposed section of hot water pipe (approximately 20')	This Year	Maintenance	$250	> 30 yrs	~ 20 years	
Services - Plumbing	Domestic Water Heaters	3kW John Wood Pro Electric hot water tank (Mezz) - (184 litres, 240V)	No known problems	Good	8 - 10 years	Replace hot water tank	Replace to match existing	1 to 3 years	Replacement	$1,000	10 yrs	1 - 3 years	$1,000
Services - Electrical	Electrical Service And Distribution	The electrical service is 400 Amp, 120/208V 3Ph 4W Distribution description is as follows: 1. Utility pole transformers (50kVA) incoming overhead line 2. Feeds 400 Amp, main switch (manuf. Federal Pioneer). 3. Distributes to 200 Amp, 42 Circuit, 120/208V 3Ph Square D panel with main breaker. (New panel) 4. Distributes to 6 circuit federal pioneer panel (size unknown) 5. Distributes to 200 Amp, 30 circuit panel with 100A main lockable dsconnect - this is the standby back up panel 6. Distributes to 200 Amp, 3P disconnect switch for Automatic Transfer Switch 7. Distributes to a 125 Amp, 32 circuit, 120/240V 1Ph Square D panel in server room	Electrical panels are old with no lockable door (except back-up panel) Panels and distribution are generally dusty and not maintained but no signs of corrosion was observed. Corrision found on exterior mounted meter enclosure. All blank spaces are covered without exposing bus. Voltage read through receptacle is at 124V at service and 122V at end-of-line and is slightly higher than nominal 120V. Service card for mechanical systems indicate nuissance tripping for breakers.	Fair	40 years (new generator panel installed)	Maintenance cleaning Conduct a thermal scan of all electrical equipment for overheated contact spots	Conduct a scan of equipment and panels to ensure electrical equipment are operating at temperatures as recommended by NETA (InterNational Electrical Testing Association)	This Year	Study	$3,000	> 30 yrs	~ 20 years	$20,000
Services - Electrical	Branch Wiring	AC90 cables used in warehouse Wiring to luminaires in the office are all NMD90 #14/3 300V FT1 Feeder to panel A is loomex cable Exterior cables are weatherproof type with liquid-tight jacket	Luminaire branch wiring is considered residential grade wiring. Although building is <6,000 sq. feet, which, under Part 9 of BCBC allows residential wiring, it is not recommended per fire rating.	Fair	40 years	Replace all non-metallic sheathed cables with new conduits and conduits. Use AC90 cables for drops down to luminaires or switches	Remove existingn wiring and install 250' of branch cables and feeders to Air Handler and Office panel to be replaced.	3 to 5 years	Replacement	$1,250	> 20 yrs	~ 10 - 20 years	$3,000
Services - Lighting	Lighting Equipment	- 26 Fluoresccent DCP Troffer with 3 T8 lamps (32 watts) on centium NBF instant start ballast (offices, lunch room, ladies w/r, office) - 27 Fluoresccent wraps with 2 T12 lamps (34 watts) on electromagnetic rapid start ballast (offices, lunch room, ladies w/r, office) - 8 - Explosion proof HID with 250 watt metal halide lamp (Truck bay) - 8 Fluorescent wraps 2 lamp T8 (Truck bay) + 1 Fluorescent wrap above electrical room - 6 Fluorescent wraps 2 lamp (Men's W/R)) - 3 elec w/th T8, 3 mag T12 - 2 - 8' striplight with 4 lamp T8 on electronic ballasts - 1 - 8' striplight with 2 lamp T12 (60W slimline) on electronic ballasts - 1 Metal Halide Wallpack 1-250W lamp - 7 recessed downlight with 2-13 watt compact fluorescent lamps - 1 lampholders with 27W screw in lamps - 1 downlight with PAR 30 lamp - 2 downlights with 27 watt screw-in compact fluorescent lamp - 2 shower lights with 60 watt incandescent lamp	Light levels in general measure too high, Metal halide wallpack lenses are yellowing due to UV rays from the lens. Fluorescent luminaires with T8 lamps installed in 2004 Shop lights installed in 2007	Good	7 - 8 years (T8 lights) 5 years (Shop lights) 40 years (Others)	Retrofit all T12 lighting with T8 lighting Replace T12 slimline with 8' striplight with 4 lamp T8 on electronic ballasts Replace metal halide wall pack lens cover Confirm and reanchor seismic restraint chains for safety	Delamp centre lamp from office luminaires. T12 fluorescent luminaires to be retrofitted or replaced with T8 lamps and electronic ballasts to match existing equipment.	This Year	Replacement	$2,750	> 30 yrs (housing) 5 - 10 yrs (lamps and ballast)	> 30 yrs (housing) 5 - 10 yrs (lamps and ballast)	$18,750
Services - Exterior Lighting	Lighting Equipment	- 4 Metal Halide (250 watts) wallpacks with button photocell - 1 Halogen floodlight on security motion sensor - 5 Metal Halide (150 watts) recessed downlights	Metal halide wallpack lenses are yellowing due to UV rays from the lamps. Lenses are generally dirty. Exterior downlights for front entrance missing lens cover. Many are exposed to insects (wasp hives)	Poor	2008 (Bay lights) 40 years (Downlights)	Replace downlights Replace bay light lens	Downlights should match existing. Baylight lens replacement should be tempered glass	This Year	Replacement	$1,600	3 - 5 yrs (lamps and ballast and lens)	~ 1 - 3 years	$4,000
Services - Fire Protection	Other Fire Protection Systems	4 Fire extinguishers placed by exits (2 in truck bay exit, 1 by each office exit)	Checked in 09/08/11	Good	Unknown	Continued maintenance checks		This Year	Maintenance	$400	10 yrs	Unknown	
Services - Low Tension	Radio System	Cisco ME3400 series FT4	No known problems	Fair	1997	General maintenance				$0	> 20 yrs	~ 20 years	$3,500
Services - Low Tension	Telephone Systems	Existing BC Tel bix blocks	Difficulties with hearing on the phone systems	Fair	40 years	Replace telephone system		1 to 3 years	Replacement	$3,500	> 20 yrs	~ 10 - 20 years	$3,500
Services - Low Tension	Server/Computer Systems	48 port Netgear switch with 24 port Amp patch panel (Rated CAT5). Cables utilized are CAT5E CMR.	Switch ports utilized are 1-22, 26, & 31. There are 24 ports available. Patch panel ports utilized are 1,3-13,15 & 16. There are 10 ports available.	Good	8 - 10 years	General maintenance Update equipment and cable standards to CAT6A	300' of CAT6A cables, connectors and switch and patch panels	3 to 5 years	Replacement	$4,000	5 - 7 yrs	~ 3 - 5 years	$4,000
Services - Low Tension	Security Systems	DSC MAXSYS PC4020 DSC MAXSYS PC4820 (Truck Bay)	Note on site indicates battery installed in 2009 All door contacts appear to be working	Fair	2005	General maintenance				$0	> 20 yrs	~ 10 - 20 years	$1,500
Services - Electrical Emergency	Exit & Emergency Light Systems	Ready-lite battery pack with two halogen headlamps (Office and back exit hall) Edwards battery pack with four halogen headlamps (Truckbay)	Used test button on ready-lights on site and lamps are working	Good	8 - 10 years	Replace battery packs with new Continue annual maintenance checks	Replace battery packs with new to match existing	3 to 5 years	Replacement	$750	10 yrs	~ 1 - 3 years	$750
Services - Electrical Emergency	Exit & Emergency Light Systems	LED Thermoplastic Exit Sign	Working condition General lack of emergency exit signage above doors	Good	8 - 10 years	Install 4 additional LED exit signs above doors	LED exit signs shall be connected to standby generator	This Year	Install	$400	> 20 yrs	~ 10 years	$500
Services - Electrical Emergency	Emergency Power & Generation Systems	Kohler Diesel Standby Generator (35 kW, 120/240V output) Kohler 200A Transfer switch	Generator was relocated from Warfield site last year Some corrosion on unit and mount Notes indicate service in Oct 2011 with 77 hours runtime Powers heating, lighting and security	Fair	2003	General maintenance Repair base with corrosion resistive paint	Remove rust on base, repair and repaint with corrosive resistive paint	This Year	Repair	$1,000	20 - 25 yrs	~ 20 years	$35,000
Services - Electrical	Other Electrical Systems	Heating Cables on roof for ice dams. Located on south and west walls	Staff indicates cables have mitigated the issue of the ice dams	Good	2008	General maintenance					> 10 yrs	~ 7 - 10 years	$10,000
Services - Electrical	Other Electrical Systems	Chamberlain motorized gate with Kantech security scanner	Exterior feeder in weatherproof (liquid tight) jacket but observed to be down. Observed that jacket is damaged in one area.	Fair	2005	Repair jacket sheathing to maintain weatherproof protection	Disconnect cable and provide a new insulation wrap around metallic jacket to maintain liquid tight	This Year	Repair	$1,000	> 10 yrs	~ 5 - 10 years	$15,000
Project Financial Total										$24,000			$142,500

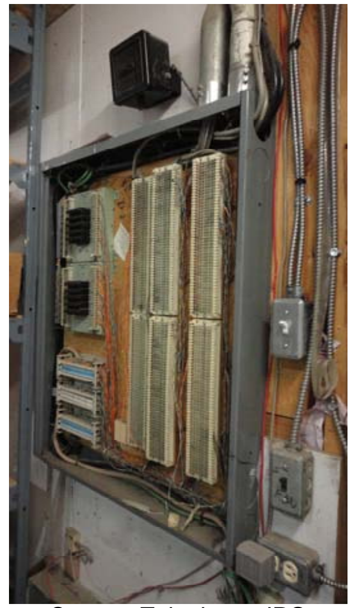
Definition

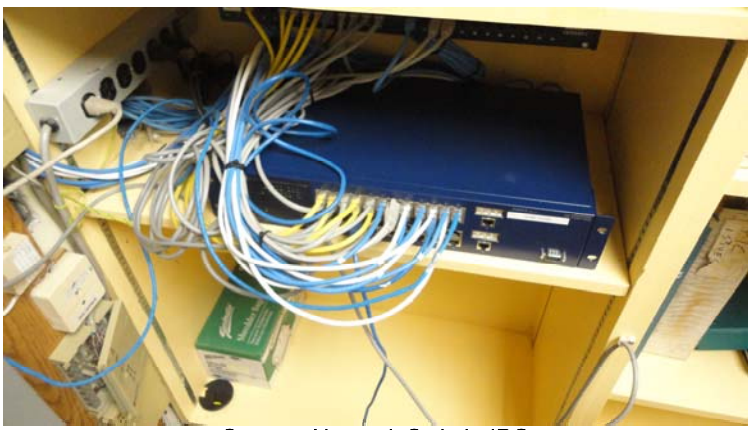
Urgency of Action?	Indicates when the action should be completed
Average Life Expectancy	The average life expectancy for the equipment based on normal use and conditions. This does not take into account any abuse or accidental damage
Remaining Life Expectancy	This is an estimated of the remaining useful life of the equipment based on the normal use, age and average life expectancy
Equipment Replacement Value	This is an estimated cost to replace the equipment based on today's market values.

APPENDIX B: PHOTOLOG

1. Photos of Existing Equipment
2. Photos of Existing Equipment showing damaged areas

Comm - Intercom.JPG


Comm - Telephone.JPG


Comm - Network Switch.JPG

Elec - Back Up Generator.JPG

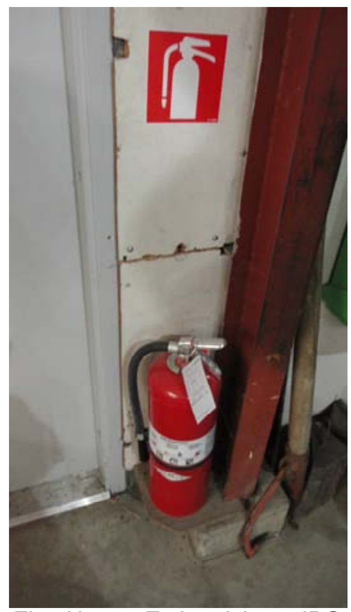

Comm - Security.JPG


Elec - Electrical Distribution.JPG


Elec - Exterior Lighting.JPG

Emergency - Exit and Lighting.JPG


Elec - Garage Lighting.JPG


Fire Alarm - Extinguishers.JPG


Elec - Heat Cables.JPG


Mech - Air Handler.JPG


Mech - Air Source Heat Pump...


Plumbing - Elec Water Tank.JPG


Mech - Exhuast Fan.JPG


Plumbing - Showers.JPG


Mech - Gas Fire Unit Heater.JPG


Plumbing - Sinks.JPG


Plumbing - Toilets.JPG


Plumbing - Urinals.JPG


1. Exterior Motorized Gate Feeder.JPG


4. Exterior Downlight with Missing Lens and Infestation.JPG


2. Exterior Wallpack with Yellowing Lens.JPG


7. Feeder Cables.JPG


3. Uninsulated copper pipes.JPG


8. Ladies Washroom Sink with Damaged Finish.JPG


10. Damaged Coolant Line.JPG


9. Exterior Generator Mount with Corrosion.JPG

5. Old T12 Electromagnetic Ballast.JPG


6. Luminaire with Seismic Chains not Anchored to Structure.JPG

Appendix D

REPLACEMENT ORDER OF MAGNITUDE BUDGET

- **LTA Consultants Inc, May 11, 2012**

FORTIS BC, CASTLEGAR OPERATIONS, CENTRE, CASTLEGAR, BC

PROGRAM ESTIMATE

May 11th, 2012

LTA Consultants Inc
Professional Quantity Surveyors
& Construction Cost Consultants
905 – 1708 Dolphin Avenue
Kelowna, BC V1Y 9S4
T: (250) 868-8800
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Prepared for:

Mr. Graham Coleman
Architect, Partner
IREDALE GROUP ARCHITECTURE
202 – 1 Alexander Street
Vancouver, BC V6A 1B2

TABLE OF CONTENTS

INTRODUCTION

Fortis BC is looking at various options for re-planning its existing operations in the Kootenay's, BC.

LTA Consultants Inc has been retained by Iredale Group Architecture to prepare a program estimate/conceptual estimate for the demolition and replacement of a mixed shop/storage and office operations facility located in Castlegar, BC.

The proposed new single storey building will comprise a 6,000ft2 shop component as well as an attached 2,500ft2 office component. The shop building will include a 600ft2 mezzanine structure. Based on our discussions with the Architect, we have assumed that approximately 10% of the shop area will be finished as office space, with a further 10% of the area finished as a change room locker facility. Site development work will include demolition and removal of the existing hard paving's and improvements to suit the new program layout.

Please note, we have assumed a fully serviced site and have excluded all off site construction and off-site utility upgrade work. No allowance has been included for natural gas pumps. We have assumed that all on-site racking and equipment will be relocated by Fortis BC own forces.

Please refer to the executive summary and estimate detail in the backup of the report for further information. Details of the specific items and allowances included can be found on Pages A1 to A4 in the back-up to this report.

We have also included a Main Cost Summary Page S1, which outlines the various costs for the following specific items, as per the Fortis Capital Summary for this project. These specific costs are:

- Building Cost (Item 11 on the Fortis Capital Summary)
- Site Work (Item 5 on the Fortis Capital Summary)
- Demolition Costs (Item 13 on the Fortis Capital Summary)

DOCUMENTATION & INFORMATION

Iredale Group Architecture Architects has provided us with the following drawing documentation for the preparation of this program estimate:

- Brief summary program contained in an e-mail dated April 30th, 2012;
- Preliminary site layout plan A103 dated May 10th, 2012.

This drawing documentation and information has been supplemented with additional verbal and written information from the Architect.

As the project is at a very preliminary feasibility stage, no engineering sub-consultants have been retained.

BASIS OF THE ESTIMATE

Budget Estimate

We have met with the client, visited the site and reviewed the drawing documentation and information provided to establish the scope and extent of the work.

From the documentation and information provided, we have prepared the enclosed program estimate using area unit rates based on similar projects and building conditions.

Project Procurement and Pricing

Pricing for this project is based upon our opinion of current May 2012 standard construction industry market costs for this size and type of institutional project in Castlegar, BC. It has been assumed that the project will be procured on a fixed stipulated 'lump sum' contract basis, from a competitive bidding field of at least six competent General Contractors. It has also been assumed that a competitive bidding field of at least five competent sub-contractors for each trade will tender for the work and that there will be no 'sole source' bids.

This conceptual estimate attempts to establish a fair and reasonable price for the proposed work and is not intended to be a prediction of 'low bid'.

Contingency Reserves

A Design Contingency Allowance of 10% has been included in this estimate. This allowance is a reserve of funds in the construction estimate to cover unforeseen items during the design phase that do not change the project scope. This allowance is ultimately absorbed into the designed and quantified work as more detailed information becomes available and is, therefore, normally reduced to zero at the tender stage.

An Escalation Contingency Allowance of 6% has been included in this estimate. This allowance is a reserve of funds in the construction estimate to cover price increases in construction costs due to changes in market conditions between the date the estimate is prepared and the date the tender is called.

A Construction Contingency of 5% is included in this estimate. This allowance is a reserve of funds in the construction estimate to cover unforeseen items during the construction period which will result in change orders. This contingency is not intended to cover changes in the scope of the work.

Market Conditions

We are noticing considerable de-escalation in the construction industry in the Interior of BC. It is very difficult for us to assess the cuts in profit and labour margins that contractors and sub-trades are willing to make in order to secure future work. Recent indications are that tender values are as much as 20% lower than the fourth quarter of 2008. In some cases, contractors and sub-trades are bidding work at costs, which can lead to problems for owners during the construction phase.

Level of Accuracy

This is a preliminary class 'D' opinion of probable cost estimate with a level of accuracy of -15%/+25% 18 times out of 20.

HST

HST has been **specifically excluded** from this program estimate.

Excluded Items

The following items are **specifically excluded** from this program estimate:

- Land Costs;
- All project soft costs including, design fees, permits and development cost charges;
- HST;
- Removal and/or remediation of hazardous materials.
- Special foundations and/or Ground Improvement Work ;
- Natural Gas Pumps
- Off-site service and utility upgrades;
- All Equipment, including Projectors, Screens, Appliances, Video Monitors, Control Room Console Relocations, Map Table, Training Consoles and Back Bar;
- Workstations and systems furniture;
- Loose furniture, furnishings and equipment;
- Relocation of Existing Racking and Site Equipment;
- Portering, relocation and temporary accommodation;
- LEED™ certification and registration costs.

MAIN COST SUMMMARY

MAIN SUMMARY OF ESTIMATED CONSTRUCTION COSTS

			m^2	ft^2
		Gross Floor Area	836.12	9,000
Description		**Estimated Value**	**$/m^2$**	**$/ft^2$**
Net Building Cost (Fortis Capital Summary Item 11)		$1,595,125	$1,907.77	$177
Site Development (Fortis Capital Summary Item 5)		$360,733	$431.44	$40
Demolition Costs (Fortis Capital Summary Item 13)		$64,850	$77.56	$7
ESTIMATED CONSTRUCTION COSTS (Excluding HST)		**$2,020,708**	**$2,416.77**	**$225**
HST	12.00%	$242,485	$290.01	$27
ESTIMATED CONSTRUCTION COSTS (Including HST)		**$2,263,193**	**$2,706.78**	**$251**

SUMMARY
& ESTIMATE DETAIL

MAIN SUMMARY OF ESTIMATED CONSTRUCTION COSTS

Description	Estimated Value Operations Office Building Functions	Estimated Value Shops & Warehouse Functions
BUILDING		
Building	$402,964	$684,225
Building Lump Sum Allowances	$0	$0
General Contractors Overhead	$48,356	$82,107
General Contractors Fee	$31,592	$53,643
Phasing Allowance	$0	$0
Design Contingency Allowance	$48,291	$81,998
Escalation/Inflation Contingency Allowance	$31,872	$54,118
Construction Contingency Allowance	$28,154	$47,805
Location Factor	$0	$0
ESTIMATED BUILDING COST	**$591,229**	**$1,003,896**
SITE DEVELOPMENT		
Site Development and Servicing		$290,065
General Contractors Overhead		$34,808
General Contractors Fee		$22,741
Phasing Allowance		$0
Design Contingency Allowance		$34,761
Escalation/Inflation Contingency Allowance		$22,943
Construction Contingency Allowance		$20,266
Location Factor		$0
ESTIMATED SITE DEVELOPMENT COSTS		**$425,584**
ESTIMATED CONSTRUCTION COSTS		**$2,020,708**

Item	Description	Addition or Renovation	Level of Renovation	Quantity	Unit	Gross Floor Area (ft^2)	Gross Floor Area (m^2)	Lump Sum Allowance	Demolition Unit Rate	Structural Unit Rate	Architectural Unit Rate	Mechanical Unit Rate	Electrical Unit Rate	Total Unit Rate	ESTIMATED CONSTRUCTION COST
	BUILDING COSTS														
	Base Building Costs														
1	Shop Building (single storey 16' high ceiling)	New				6,000	557.41		0	450	300	150	100	1,000	$557,414
2	Shop Building - Mezzanine Structure	New				600	55.74		0	300	200	100	75	675	$37,625
3	Office Building (single storey) - Base Building	New				2,500	232.26		0	400	500	180	100	1,180	$274,062
4															
5	**Functional Spaces (Tenant Improvement)**														
6	Warehouse - Office/Copy/Print Component	New				600	55.74		0	0	300	120	80	500	$27,871
7	Warehouse - Lockers/WC	New				600	55.74		0	0	400	550	150	1,100	$61,315
8	Office Building - Fit Out	New				2,500	232.26		0	0	325	130	100	555	$128,902
9															
10	**Sub-Total**														**$1,087,189**
11	**Building Lump Sum Allowances**														
12	Nil	New		1				$0						-	$0
13															
14	**Sub-Total**														**$1,087,189**
15	General Contractors Overhead													12.00%	$130,463
16	General Contractors Fee													7.00%	$85,236
17	Phasing Allowance													0.00%	$0
18	Design Contingency Allowance													10.00%	$130,289
19	Escalation/Inflation Contingency Allowance													6.00%	$85,991
20	Construction Contingency Allowance													5.00%	$75,958
21															
22	**ESTIMATED BUILDING COST**														**$1,595,125**
23	Location Factor													0.00%	$0
24															
25	**ESTIMATED BUILDING COST**														**$1,595,125**

Item	Description	Addition or Renovation	Level of Renovation	Quantity	Unit	Gross Floor Area (ft^2)	Gross Floor Area (m^2)	Lump Sum Allowance	Demolition Unit Rate	Structural Unit Rate	Architectural Unit Rate	Mechanical Unit Rate	Electrical Unit Rate	Total Unit Rate	ESTIMATED CONSTRUCTION COST
	ON SITE AND OFF SITE COSTS														
26	Demolition and Site Clearance													-	$0
27	Demolish existing Shops Building, including Office Component and Mezzanine Floor			616	m^2			$60.00						-	$36,960
28	Demolish and remove existing Coverall style Quonset Building			181	m^2			$40.00						-	$7,240
29	Break up and remove existing building concrete foundations			727	m^2			$25.00						-	$18,175
30	Break out and remove existing hard paving			1	l/s			$8,000.00						-	$8,000
31	Rough Grading			1635	m^2			$1.00						-	$1,635
32	Oversite excavation and filling			1635	m^2			$8.00						-	$13,080
33	Miscellaneous site demolition			1	l/s			$7,500.00						-	$7,500
34	Site Improvement Work													-	
35	Asphalt Paving			1318	m^2			$40						-	$52,720
36	Concrete base for relocated Quonset Building			163	m^2			$90						-	$14,670
37	Concrete Apron			59	m^2			$90						-	$5,310
38	Concrete Sidewalks			95	m^2			$85						-	$8,075
39	Concrete Curbs - allowance			1	l/s			$5,000						-	$5,000
	Miscellaneous concrete bases			1	l/s			$3,000						-	$3,000
	Miscellaneous patching existing paving			1	l/s			$7,500						-	$7,500
40	Line Painting			1	l/s			$3,000						-	$3,000
41	Security fence; tie into existing			88	m			$150						-	$13,200
42	Security Gate			1	No			$2,500						-	$2,500
43	Repairs to existing retaining wall			1	l/s			$25,000							
44	Miscellaneous site improvements allowance			1	l/s			$5,000						-	$5,000
45	Relocate existing Quonset Building			1	l/s			$7,500						-	$7,500
46	Racking and Storage Equipment - **By Owner**			1	l/s			Excluded						-	$0
47	CCTV - allowance			1	l/s			$5,000						-	$5,000
48	Racking and Storage Equipment - **By Owner**			1	l/s			Excluded						-	$0
49	Natural Gas Pumps - **Specifically Excluded**			1	l/s			Excluded						-	$0
50	Landscaping														
51	Landscaped areas			400	m^2			$60						-	$24,000
52	Site Servicing													-	
53	Domestic Water			1	l/s			$7,500						-	$7,500
54	Sanitary Sewer - Connect to Existing			1	l/s			$5,000						-	$5,000
55	Storm Sewer - Alterations to Existing			1	l/s			$15,000						-	$15,000
56	Gas			1	l/s			$0						-	$0
57	Hydro - allowance (Assumed Existing)			1	l/s			$5,000						-	$5,000
58	Cable/telus - allowance (Assumed Existing)			1	l/s			$2,500						-	$2,500
59	Site lighting			1	l/s			$6,000						-	$6,000
60	Off-site Costs														
61	Off-site Costs - **Specifically Excluded**			1	l/s			Excluded						-	$0
62															
63	**Sub-Total**														**$290,065**
64	General Contractors Overhead													12.00%	$34,808
65	General Contractors Fee													7.00%	$22,741
66	Phasing Allowance													0.00%	$0
67	Design Contingency Allowance													10.00%	$34,761
68	Escalation/Inflation Contingency Allowance													6.00%	$22,943

Item	Description	Addition or Renovation	Level of Renovation	Quantity	Unit	Gross Floor Area (ft^2)	Gross Floor Area (m^2)	Lump Sum Allowance	Demolition Unit Rate	Structural Unit Rate	Architectural Unit Rate	Mechanical Unit Rate	Electrical Unit Rate	Total Unit Rate	ESTIMATED CONSTRUCTION COST
69	Construction Contingency Allowance													5.00%	$20,266
70															
71	**ESTIMATED SITE DEVELOPMENT COSTS**														**$425,584**
72	Location Factor													0.00%	$0
73															
74	**ESTIMATED SITE DEVELOPMENT COSTS**														**$425,584**
75															
76	**ESTIMATED TOTAL CONSTRUCTION COST - BUILDING AND SITE**														**$2,020,708**

Appendix D

BUILDING SPACE PROGRAM

Appendix D-1

ALTERNATIVE 2 – REPAIR/RENOVATE GENERATION

Appendix D-1-1

SYSTEM CONTROL CENTRE

FILED CONFIDENTIALLY

Appendix D-1-2

BACK-UP CONTROL CENTRE

FILED CONFIDENTIALLY

Appendix D-2

ALTERNATIVE 3 – REPLACE

Appendix D-2-1

GENERATION

SUMMARY OF SPACE REQUIREMENTS

Generation Office and Warehouse Replacement

Department Name	Current		-		End of 2017	
	No.of People	Total Usable SF	No.of People	Total Usable SF	No.of People	Total Usable SF
Generation Office + Admin	29	2,856			29	2,856
Generation Field Office	37	1,602			37	1,602
Sub-total Dept. area	*66*	*4,458*			*66*	*4,458*
Common areas		8,509				8,509
Sub-total Office area		*12,967*				*12,967*
Material and Tool Storage		4,500				4,500
TOTAL INTERIOR FOOT PRINT (useable SF)	*66*	***17,467***			*66*	***17,467***
Gross up (10%)		1,747				1,747
TOTAL INTERIOR FOOT PRINT (useable+10%)		***19,213***				***19,213***

SUMMARY OF SPACE REQUIREMENTS

Generation Office and Warehouse Replacement		**Date:**	Nov. 2014
Division / Dept:	Common Areas	**Div / Dept Rep:**	

Common areas	No. of Each				Square Footage		
	Area	Current		End of 2017	Current		End of 2017
FIELD							
Clean Clothing Delivery	300	1		1	300		300
WC, Shower + lockers - men	790	1		1	790		790
WC, Shower +lockers -women	90	1		1	90		90
Coffee	40	1		1	40		40
Printer area	17	1		1	17		17
Meeting room (splits into 2)	785	1		1	785		785
GENERAL OFFICE							
Lobby/Entry Vestibule	150	1		1	150		150
Closet	50	1		1	50		50
Mobile Filing	500	1		1	500		500
Lunchroom	450	1		1	450		450
Emergency Operations Center	550	1		1	550		550
Small Meeting Room	120	3		3	360		360
Copy/mail	300	1		1	300		300
Storage Room	200	1		1	200		200
Plotter	12	3		3	36		36
BASE BUILDING							
Mech+ boiler Room	250	1		1	250		250
Electrical Room	150	1		1	150		150
First Aid Room	100	1		1	100		100
Janitor Room	50	1		1	50		50
LAN Room	300	1		1	300		300
WC - men+women	430	1		1	430		430
Toilet Room/shower	80	1		1	80		80
Water entry room	100	1		1	100		100
Sub-Total					6,078		6,078
Circulation	40%				2,431		2,431
Total Area					**8,509**		**8,509**

Notes:

SUMMARY OF SPACE REQUIREMENTS

Generation Office and Warehouse Replacen **Date:** Nov. 2014

Division / Dept: Generation Office + Admin **Div / Dept Rep:**

PERSONAL AREAS

Workstation Type	No. of Each				Square Footage		
	Sq Ft	Current		End of 2017	Current		End of 2017
WS1	48	16		16	768		768
OFFICE	120	9		9	1,080		1,080
HOTELING	48	4		4	192		192
Sub-Total					2,040		2,040
Circulation	40%				816		816
Sub-Total Personal Areas		29		29	2,856		2,856

SUPPORT AREAS

Description	No. of Each				Square Footage		
	Sq Ft	Current		End of 2017	Current		End of 2017
Sub-Total							
Circulation	40%						
Sub-Total Support Areas							
Total Area					**2,856**		**2,856**

Notes:

Prepared by: SSDG Interiors Inc.

SUMMARY OF SPACE REQUIREMENTS

Generation Office and Warehouse Replacen **Date:** Nov. 2014

Division / Dept: Generation Field Office **Div / Dept Rep:**

PERSONAL AREAS

Workstation Type	No. of Each				Square Footage		
	Sq Ft	Current		End of 2017	Current		End of 2017
TOUCHDOWN	20	35		35	700		700
FOREMAN	72	2		2	144		144
Sub-Total					844		844
Circulation	40%				338		338
Sub-Total Personal Areas		37		37	1,182		1,182

SUPPORT AREAS

Description	No. of Each				Square Footage		
	Sq Ft	Current		End of 2017	Current		End of 2017
Plan Files	100	1		1	100		100
Filing	10	10		10	100		100
Bookcases	10	10		10	100		100
Sub-Total					300		300
Circulation	40%				120		120
Sub-Total Support Areas					420		420
Total Area					**1,602**		**1,602**

Notes:

Appendix D-2-2

SYSTEM CONTROL CENTRE

FILED CONFIDENTIALLY

Appendix D-2-3

BACK-UP CONTROL CENTRE

FILED CONFIDENTIALLY

Appendix D-3

ALTERNATIVE 5 –
NEW COMBINED OPERATIONS CENTRE
TO REPLACE EXISTING FACILITIES

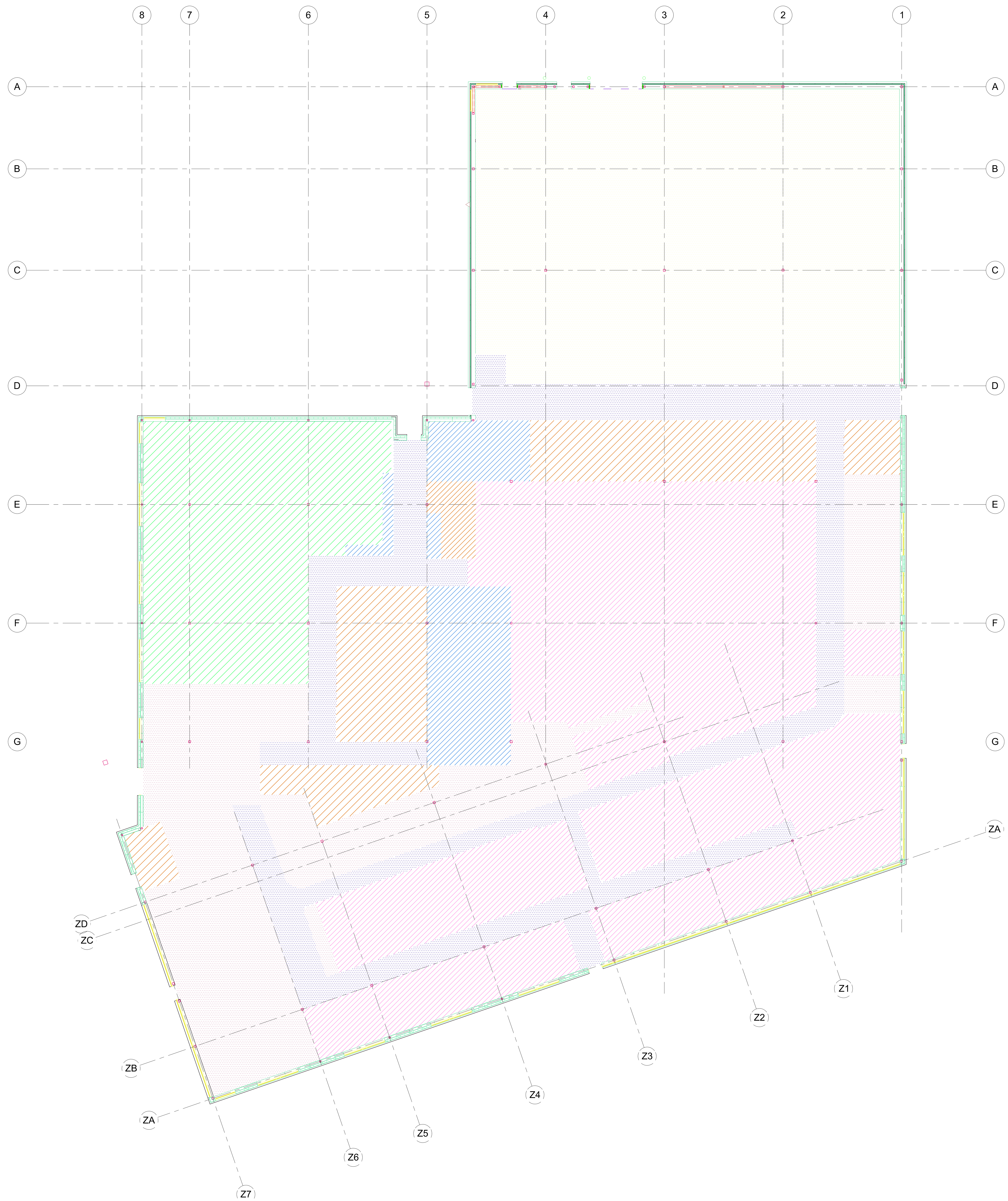
Appendix D-3-1

KOC SPACE PROGRAM

FILED CONFIDENTIALLY

Appendix D-3-2

KOC BUILDING SPACE LAYOUT



BUILDING USEABLE - 28,982 SF

BASE BLDG, WASHROOM, SERVICE RMS	2,408
OFFICE STAFF	8,402
FIELD OFFICE STAFF	2,740
FIELD OFFICE SUPPORT	1,190
SHARED	4,112
CORRIDOR	3,728
MATERIAL & TOOL STORAGE	6,402
	28,982 SF

SEAL

CONSULTANT

ssdg.

SSDG Interiors Inc.
300-1111 Melville Street Vancouver BC Canada V6E 3V6
T. 604-685-4301 **F.** 604-684-0336 **www.ssdg.com**

	ISSUE	DATE
1	ISSUE FOR REVIEW	MAR. 19/15
2	ISSUE FOR REVIEW	MAR. 26/15
3	REVISIONS	JUN. 29/15
4		

PROJECT TITLE

FORTIS BC INC.
KOOTENAY OPS CENTER

DRAWING TITLE

SPACE SUMMARY PLAN

PROJECT: 2014 178

SCALE: 1:100

DRAWN BY: JC

DRAWING:

ID1

Appendix D-3-3

KOC SITE PLAN

MQN ARCHITECTS

#100 – 3313 32nd Avenue, Vernon, BC V1T 2M7
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SEAL

CONSULTANT

NO.	REV.	ISSUE	YYYY.MM.DD

PROJECT TITLE

KOOTENAY OPERATIONS CENTRE

DRAWING TITLE

SITE PLAN - AREA BREAKDOWN

PROJECT:	09491
SCALE:	1 : 300
DRAWN BY:	JV
CHECKED BY:	Checker

DRAWING:

A104

Appendix D-3-4

KOC SITE PLAN AREA BREAKDOWN

Kootenay Operations Centre - Site Area Breakdown

Required Spaces	**Area (m2)**	**Area (ft2)**
Setbacks	4599	49498
Office Building Footprint	2795	30090
Wash Bay Building	176	1890
Septic Field	948	10209
Staff Parking	1810	19478
Staff Parking Circulation	2385	25674
Fleet Parking	1211	13037
Covered Parking	787	8467
Fleet Parking Circulation	3402	36618
Yard Storage	385	4143
Laydown Areas	2399	25825
Sidewalk / Builidng Concrete Apron / Patio	908	9776
Site Circulation	5334	57414
Landscape	1591	17121
District Stores Loading / Receiving	1220	13134
Yard Storage Circulation	10594	114034
Concrete Islands / Curbing	132	1426
Total (Site Area 10 Acres +/-)	**40676.1**	**437834**

Appendix E

CBRE CASTLEGAR AREA LEASE SEARCH LETTER

COMMERCIAL REAL ESTATE SERVICES

CBRE

William D.Coulter
Senior Vice President

CBRE Limited, Real Estate Brokerage
Office Properties

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Vancouver, BC V6E 4M3

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February 5, 2015

Ms. Becky Richardson
Facilities, Planning & Maintenance Manager
FortisBC
16705 Fraser Highway
Surrey, BC V4N 0E8

Dear Becky,

Re: Kootenay Operations Centre

Further to your request estimates we have completed a search for lease space in Castlegar and surrounding area based upon the criteria below:

- 10 acres of land
- 23,000 sq.ft. office
- 6,600 sq.ft. warehouse
- Fenced compound
- Grade parking for 200 cars

Our findings have confirmed that there are no properties or buildings available for lease that will meet the criteria required by FortisBC Inc. at this time. In smaller communities the market for specific building types is generally small with limited opportunities to lease. If a prospective tenant has a unique requirement then there is little chance to find a site or building to satisfy that requirement. There are also no options being marketed for lease or sale of suitable zoned land of the size required by FortisBC Inc. and we do not anticipate this will change in the near future.

Yours very truly,

CBRE LIMITED

William D Coulter

Bill Coulter
Personal Real Estate Corporation
Senior Vice President
Office Properties
Direct Line: (604) 662-5131

Appendix F

KOOTENAY STATION SERVICES AND GENERATION DRIVE TIME ASSESSMENT

	Warfield Complex		New Proposed Facility		Generation Office	
	Driving Distance (km)	Driving Time (minutes)	Driving Distance (km)	Driving Time (minutes)	Driving Distance (km)	Driving Time (minutes)
Arrow Lakes Hydro Generating Station	40.6	54	17	28	30.2	42
Beaver Park Substation	12.6	19	39.3	45	58.8	66
Blueberry Substation	21.9	25	9.4	14	28.9	35
Brilliant Dam	34.6	39	7.4	9	18.2	22
Brilliant Expansion Generating Station	34.7	40	7.6	10	18.3	22
Brilliant Switching Station	34.4	39	7.2	9	18	22
Brilliant Terminal Station	36.3	45	5.1	10	24.2	32
Cascade Substation	8.0	13	40.1	46	59.5	67
Castlegar Office	29.2	34	5.4	7	24.8	28
Castlegar Substation	28.8	33	5.1	7	24.5	28
Christina Lake Substation	83.0	82	77.1	85	96.6	105
Coffee Creek Substation	115.0	114	87.6	84	65.3	62
Corra Linn Dam	55.2	60	28	30	5.8	8
Cottonwood Substation	73.3	74	53.5	50	31.3	28
Emerald Switching Station	1.4	3	31.3	34	50.7	55
Fruitvale Substation	19.9	29	40.1	38	62.6	61
Generation Office	51.0	56	23.8	26	N/A	N/A
Glenmerry Substation	6.3	13	33	39	52.4	60
Hearns Substation	28.1	35	31	29	53.4	52
Kaslo Office	138.0	136	111	106	88.6	84
Kaslo Substation	139.0	138	112	108	89.4	86
Kraft (Celgar) Substation	35.8	42	119	16	27.2	34
Lower Bonnington Dam	52.3	57	25.2	28	20	4
Mawdsley Terminal	0.0	0	31.2	36	50.7	56
New Proposed Facility	30.9	36	N/A	N/A	24	28
Ootischenia Substation	30.9	36	0	0	22.2	28
Passmore Substation	63.8	66	36.6	36	17.6	18
Playmor Substation	49.3	53	22.1	23	1.7	3
Rosemont Substation	70.1	73	42.9	43	20.7	21
Salmo Substation	44.7	52	36.7	38	60.3	53
SCC	0.0	0	31.2	36	50.7	56
South Slocan Dam	51.2	56	24	27	0	0.5
South Slocan Switching Station	51.2	56	24	27	0	0.5
Stoney Creek Substation	4.0	10	28.2	30	47.7	51
Tarrys Substation	43.8	48	16.6	18	8.4	13
Trail Office	3.7	7	30.4	34	49.8	54
Upper Bonnington Dam	53.7	58	26.5	28	4.3	6
Upper Bonnington Switching Station	53.7	58	26.6	29	4.3	6
Valhalla Substation	94.5	94	67.3	64	48.4	47
Waneta Dam	21.4	31	48	57	67.5	78
Waneta Hydro Station	21.7	32	48.4	58	67.8	79
Warfield Complex	N/A	N/A	30.9	36	50.7	56
Warfield Terminal Station	1.4	3	29.8	33	49.3	53
Ymir Substation	57.3	62	49.3	48	47.2	40
Average	42	46.8	36	36.3	38	41
Maximum	139	138	119	108	96.6	105

Average Distance Difference (kilometers closer)

Warfield Complex to New Proposed Facility	6.04
Generation Office to New Proposed Facility	1.75

Average Drive Time Difference (minutes saved)

Warfield Complex to New Proposed Facility	10.5
Generation Office to New Proposed Facility	4.4

Appendix G

FINANCIAL INFORMATION

Appendix G-1

CAPITAL COST SUMMARY

FILED CONFIDENTIALLY

Appendix G-2

FINANCIAL SCHEDULES

FILED CONFIDENTIALLY

Appendix G-3

O&M SAVINGS

FILED CONFIDENTIALLY

Appendix G-4

BUILDING DEPRECIATION RATE FOR ALTERNATIVES 2, 3 AND 5

Appendix G-4: Building Depreciation Rate for Alternatives 2, 3 and 5

For General Plant Buildings, FBC currently has a depreciation rate of 6.1% approved by the BCUC for Masonry Structures (Account 390.1). This rate is primarily determined by the experience that FBC has had with the assets in the class and is not reflective of the lives it expects from a new building such as the new Kootenay Operations Centre. That is, it would result in a cost recovery that significantly prematurely recovers the cost (6.1% rate for 17 years) relative to the expected composite life of the building. Based on conversations with LTA Consultants Inc. Quantity Surveyor and Gannett Fleming Inc. concrete structures generally have an expected life of 75 to 80 years and that components of the building, such as mechanical and lighting, have a shorter expected life of approximately 25 years.

The rate of 1.9%, that FBC, is seeking Commission approval for is a composite rate for the new building that is based on the building components that are expected to last approximately either 25 years or 75 years. The separation of the costs is based on the cost estimates from the LTA Consultants Inc. Quantity Surveyor (LTA Consultants) for FBC. The composite depreciation rate for the preferred alternative is discussed in Sections 7.3.2.

The following table shows the derivation of the proposed composite rate for the KOC (Alternative 5):

Table 1: Composite Depreciation Rate for KOC Building, Alternative 5[1]

BCUC Account	Particular	2015$ $000's	Duration	Provision
390	Other Office	2,224	25 Years	$89
390	Warehouse	260	25 Years	10
390	Wash Bay	75	25 Years	3
	All Other Building	9,659	75 Years	129
390	Total KOC Structure	**$12,218**	**1.9%**	**$231**
	Composite Average Life		53 Years	

In both Alternatives 2 and 3, the composite depreciation rate used in the financial analysis for the Warfield and Trail facilities would be 2.3% with an average life of 43 years. The following tables provide the calculation of the composite rates used for the Generation facilities in Alternatives 2 and 3. For Generation facilities the variance in the composite depreciation rate and average life between Alternatives 2 and 3 is that for Alternative 2: Renovation would only extend the life of the building by 40 years whereas for Alternative 3: Replace on Existing Site would provide a building with a 75 year life.

[1] Please refer to the fully functional excel file included with Confidential Appendix G-2-3 for the detail capital expenditures in 2015 dollars

1 **Table 2: Composite Depreciation Rate for Generation Facility in Alternative 2**

BCUC Account	Particular	2015$ $000's	Duration	Provision
390	Other Office	$2,469	25 Years	$99
390	Warehouse	1,000	25 Years	40
	All Other Structure	4,205	40 Years	105
390	Total Generation Structure	**$7,674**	**3.2%**	**$244**
	Composite Average Life		31 Years	

2

3 **Table 3: Composite Depreciation Rate for Generation Facility in Alternative 3**

BCUC Account	Particular	2015$ $000's	Duration	Provision
390	Other Office	$2,296	25 Years	$92
390	Warehouse	638	25 Years	26
	All Other Structure	5,635	75 Years	75
390	Total Generation Structure	**$8,569**	**2.2%**	**$193**
	Composite Average Life		45 Years	

4

Appendix H

KOC TRAFFIC IMPACT STUDY

FORTIS BC

TRAFFIC IMPACT STUDY FOR PROPOSED OPERATIONS SITE

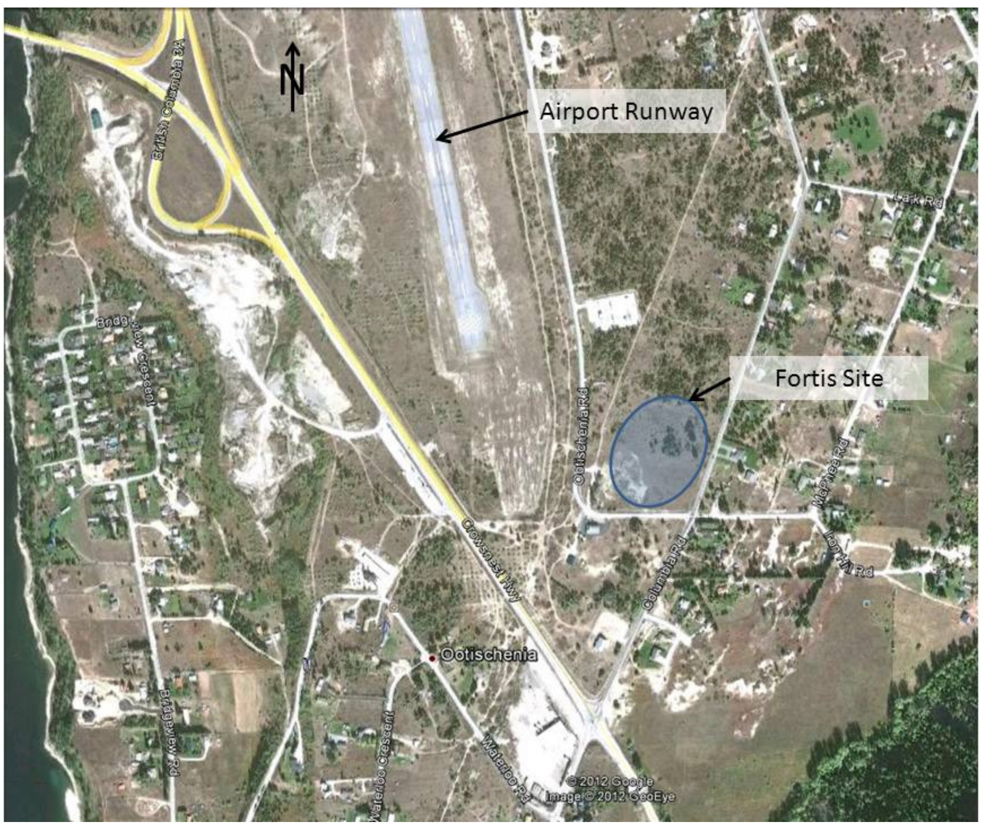
TABLE OF CONTENTS

SECTION 1
BACKGROUND

1.1 Study Purpose

FortisBC (Electrical) Inc. is looking to combine several of their existing Kootenay Operations into one new major center in the City of Castlegar, BC. Fortis has selected a site for this development, shown on the attached image. This is at the intersection of Highway 3 and Columbia Road. This site, shown in Figure 1.1 below, is located within the City of Castlegar.

Figure 1.1 – Site Location Map



This new site includes facilities for an Operations Office accommodating the following departments and all required ancillary spaces: Administration, Project Management crews, Major Maintenance crews, Safety, Operational Support groups, Metering, Kootenay C&M crews, and Kootenay Network Services Crews.

Adjoining the Operations office would be a District Stores facility, a fleet vehicle service bay with office and covered parking to accommodate large trucks and trailers.

To complete this traffic study, the following tasks were undertaken:

- Scope Definition meeting in Nelson, BC
- Define Background Traffic Conditions
- Trip Generation & Distribution
- Establish Opening Day & Future Horizon Volumes
- Operational Assessment - for the intersection of Highway 3 and Columbia Avenue, and the intersection of Columbia Road and Ootischenia Road
- Meetings & Reporting

1.3 Highway 3 / Columbia Road Intersection

The intersection of Highway 3 and Columbia Road lies approximately 1.0 km east of the Ootischenia Interchange, and approximately 3.0 km east of Columbia Avenue in downtown Castlegar. The highway, also known as the Crowsnest Highway, also leads towards the communities of Salmo, Creston and Trail. Traffic entering Columbia Road accesses both residential properties and the regional landfill site. Figure 1.2 and 1.3 show photographs of the intersection.

This intersection provides full movement for traffic entering and exiting Highway 3. The intersection is two-way stop controlled. This intersection was included in a recent traffic impact study for the Airport Lands, commissioned by the City of Castlegar and undertaken by McElhanney Consulting Ltd.

Figure 1.2 – Columbia Road Intersection looking East

Figure 1.3 – Columbia Road Intersection looking North

1.2 Land Use

The property is zoned Utility, land use will be a light industrial site, housing Fortis's Operations for the West Kootenay area. The site will generate traffic, ranging from employee vehicles to heavy trucks, over four virtually separate "waves" of traffic: employees arriving to work, then leaving in fleet vehicles, fleet vehicles returning, and employees leaving for home. The overall mix of light vehicles versus heavy vehicles is estimated to be similar to expectations for typical British Columbia highways.

Columbia Road and McPhee Road, which parallels Columbia, serve rural residential land use along their length. Ootischenia Road parallels the airport runway and also serves a smaller amount of rural residential development. Figure 1.4 shows this from an aerial perspective.

Figure 1.4 – Aerial View Columbia Road / Ootischenia Intersection

SECTION 2
PERFORMANCE CRITERIA

2.1 Capacity Criteria

The following performance criteria were targeted for this study:

1. Major Intersection level of service
    a. Two-way stop controlled = LOS D.
    b. Signalized = LOS C.
2. Low volume left turns and minor road traffic level of service = LOS E.
3. Volume / Capacity ratio (V/C):
    a. ≤ 0.90 per movement and overall intersections for two-way stop controlled intersections.
    b. ≤ 0.85 per movement and overall intersections for roundabouts.
    c. ≤ 0.80 per movement and overall intersections for signalized intersections.
4. Order of preference for intersection control: two-way stop control, roundabout, signals.
5. Adequate storage bays for all traffic queue lengths.

2.2 Design Horizon

The following traffic flow targets were selected for analysis in this study:

1. Year 2012 – current intersection spare capacity as a base case
2. Year 2027 – intersection capacity given 15 years of background growth

SECTION 3
TRAFFIC DATA

3.1 Highway Traffic Counts

Traffic volumes for each access location were evaluated through the use of MoTI's traffic count data. MoTI publishes traffic count data on their website for all major intersections in British Columbia. Intersections relevant to this study are listed in Table 3.1 below.

Table 3.1 - Highway Traffic Count Stations

32-016 East and West	Route 3, 1.7 Km East of Route 3A, East of Castlegar
32-017 East and West	Route 3 0.4 Km West Of Route 22 In Castlegar (Kinnaird I/C)
32-018 East and West	Route 3A Just East Route 3 At The Ootischenia I/C In Castlegar
32-021 East and West	1.0 Km East of Route 22 at West End of Kinnaird Bridge
32-025 East and West	At West End of Brilliant Bridge (Brilliant I/C)

Traffic count data from the MoTI website provided historic information on the annual average daily traffic volumes (AADT), and summer average daily traffic volumes (SADT). Data from these counts were used towards calculating the hourly peak period, background traffic flow, and forecasted traffic flow.

3.2 Peak Period for Analysis

Traffic count data from the MoTI website along with more recent traffic counts directed by MCSL, provided the information needed to calculate the hourly traffic peak period. McElhanney arranged a one-day traffic count in September 2011 at the Highway 3/ Columbia Avenue intersection for a separate traffic impact study related to the Airport Lands. The count data at the subject intersection is relevant to this study.

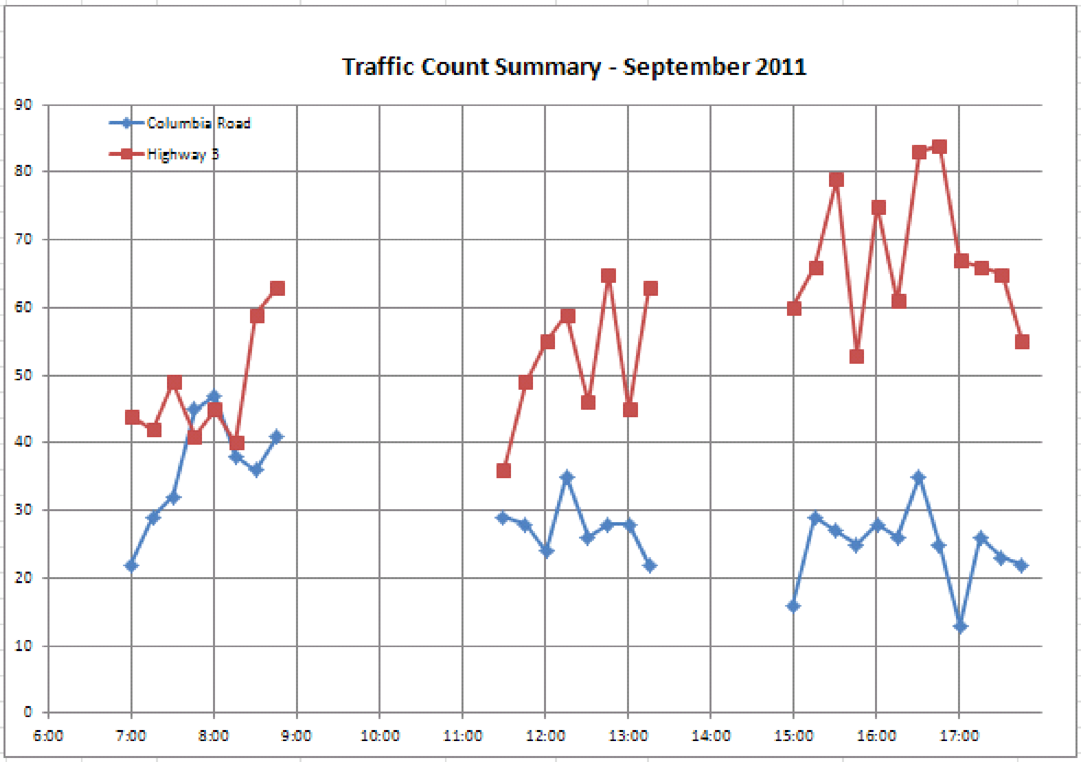
A report entitled *Traffic Impact Assessment, 'Chances' contained in the Castlegar Community Gaming Center*, 2008, by D.C. Dean Associates, Inc. established that a 1% per year growth rate applies to the highway background traffic. This rate was confirmed in the Airport Lands study. The 2008 study also concluded that September tends to generate the highest volumes of traffic during the year. Consequently, site traffic counts were taken on the weekdays of September 21st and 28th, 2011.

September traffic counts were recorded at the Highway 3 / Columbia Road Intersection. The following time periods were recorded:

- The AM peak (between 7:00 a.m. and 9:00 a.m.)
- The Noon peak (between 11:30 a.m. and 1:30 p.m.)
- The PM peak (between 3:00 p.m. and 6:00 p.m.)

From the three time periods recorded, the weekday PM peak generated the highest traffic volumes on Highway 3 between 4:00 p.m. and 5:00 p.m. However, the morning hour between 7:45 and 8:45 has the highest volumes on Columbia Road. This is illustrated in Figure 3.1 below. Both the weekday AM and PM peak hour were selected as the traffic design hour in this study.

Figure 3.1 – Traffic Count Summary at Columbia Street, Sept. 2011

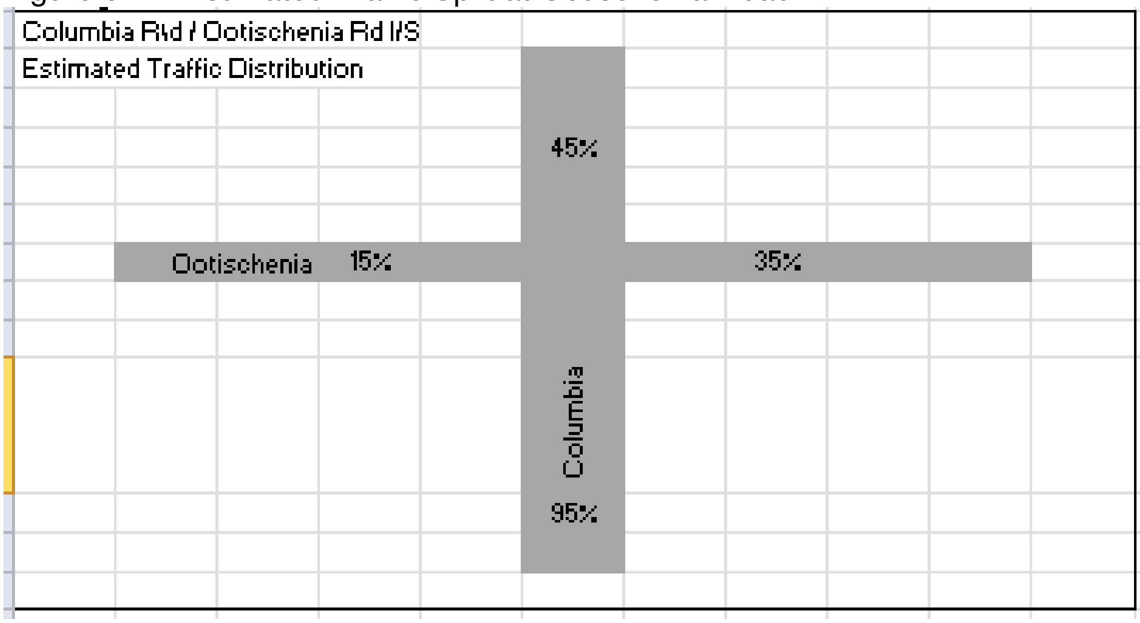


3.3 Background Traffic Flow – Highway 3

Traffic movements were modeled by spreadsheet to visualize and assess traffic at the two subject intersections and proposed access locations. Traffic counts were not done at Columbia/ Ootischenia Road, but traffic for the north leg of the Highway intersection provides the overall volume at the adjacent intersection.

Based on land uses, this traffic was distributed across the various movements on a percentage basis for the Columbia Road / Ootischenia Road Intersection, as shown in Figure 3.2 below. This indicates that the traffic volume at the south leg of the intersection would be 95% of the same road

Figure 3.2 – Estimated Traffic Split at Ootischenia Road



at the highway, to allow for trip generation along this 400m stretch of roadway. Traffic would be distributed 45% to the north, 15% to the west and 35% to the east. These proportions were used, as well as the directional split on the highway traffic, to estimate intersection movements. Minor values were added for local trips crossing Columbia Road or, for example accessing the Ootischenia Road from the north. These movements are estimated to be minor as virtually all commercial activity requires accessing the highway.

The foregoing logic allowed us to create a map of the intersection movements for both intersections. This is shown in Figures 3.3, 3.4 and 3.5 below, and indicates the peak traffic in the three time periods counted.

Figure 3.3 – 2011 AM Peak Traffic Movements

Columbia R\d / Ootischenia Rd I/S					76					
AM Peak Traffic Count				53		23				
Sept, 2011										
			SB			↖	5			
		2	50	1		←	5	WB		
	13	↙	↓	↘		↙	39		49	
31							Oots			64
	19		1	↗		↖	↑	↗	15	
		EB	1	→		6	17	13		
			17	↘			NB			
				105		36				
					141	Volume Entering =			156	

Highway 3 / Columbia Road I/S					148					
AM Peak Traffic Count				110		38				
Sept, 2011										
			SB			↖	31			
		2	4	104		←	42	WB		
	46	↙	↓	↘		↙	29		102	
129			HWY 3			HWY 3				333
	83		3	↗		↖	↑	↗	231	
		EB	77	→		2	4	50		
			3	↘			NB			
				36		56				
					92	Volume Entering =			351	

Figure 3.4 – 2011 Noon Peak Traffic Movements

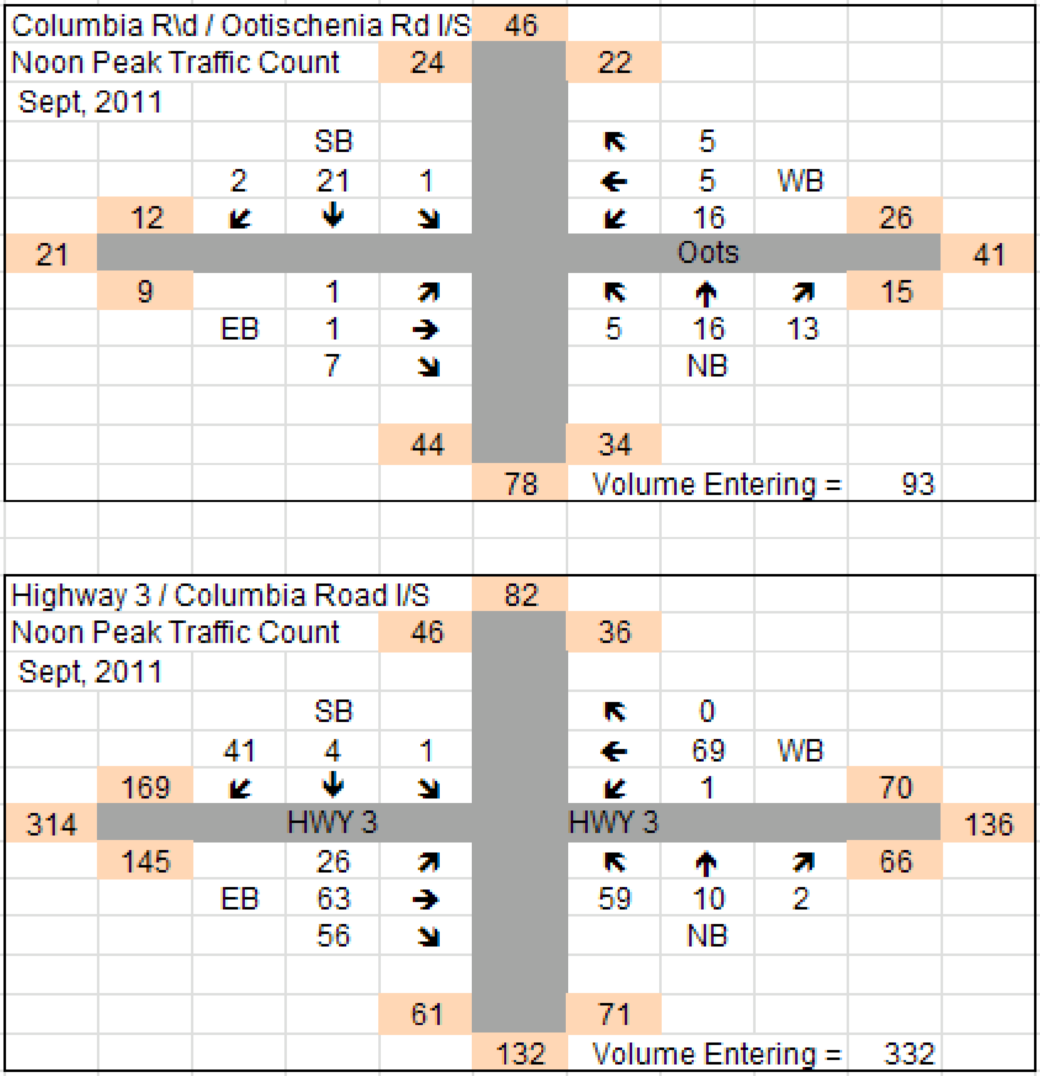
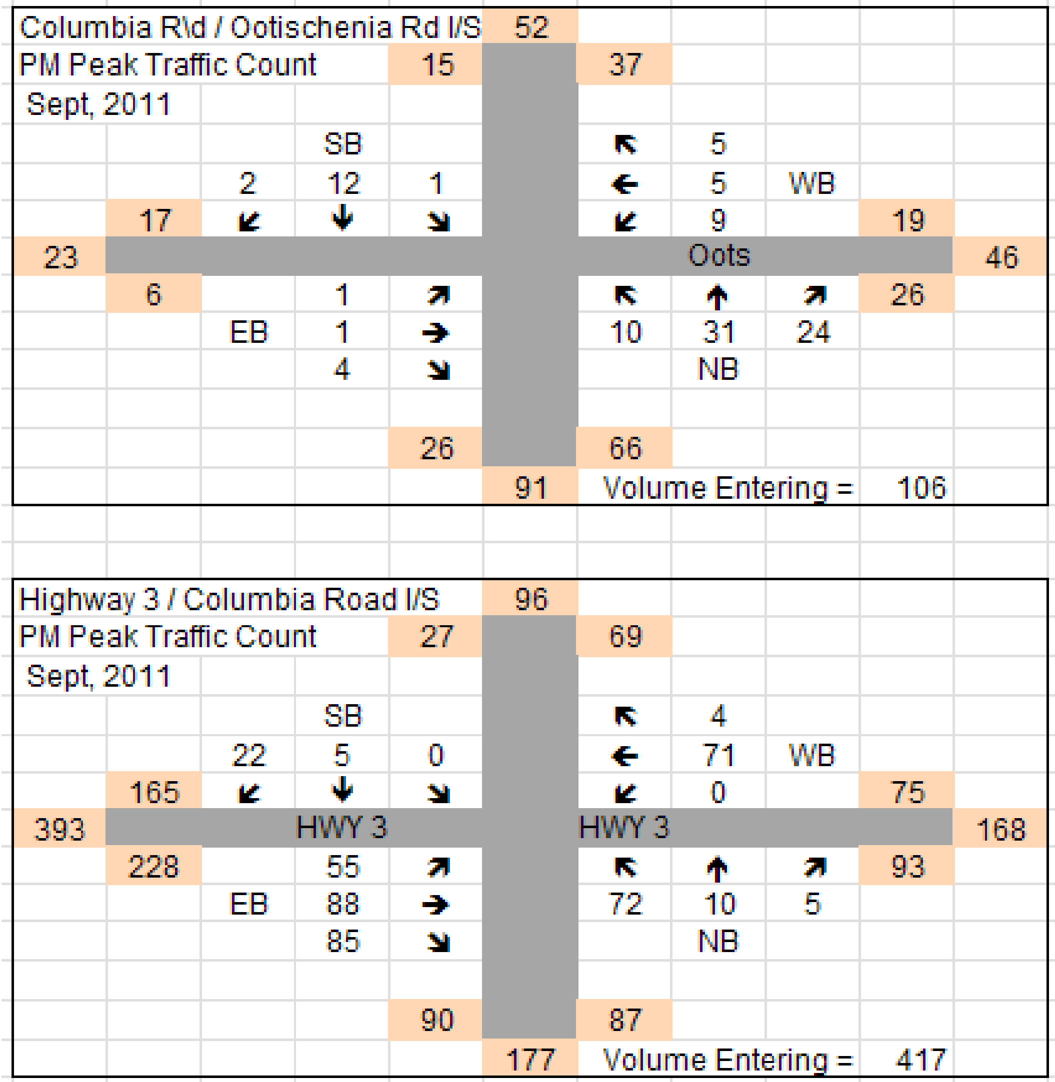


Figure 3.5 – 2011 PM Peak Traffic Movements



3.4 Forecasted Traffic Flow

Traffic forecasts were developed through the use of MoTI's historic traffic count data. Statistics from two traffic count stations provided the basis for the projections: Station 32-016 (East of Columbia Road), and Station 32-018 (at the Ootischenia I/C, which connects Highway 3 ans Highway 3A west of the Columbia Road / Highway 3 Intersection). Historic traffic count data is summarized in Table 3.2.

Table 3.2 - Historic Traffic Statistics.

Year	AADT (vehicles/day)	
	Highway 3A (@ Ootischenia I/C)	Highway 3 (East of Columbia Road)
1995	5,997	913
1996	6,870	1,218
1997	6,188	1,363
1998	5,805	1,465
1999	5,859	1,707
2000	5,920	1,927
2001	5,414	1,791
2002	5,964	-
Annual Growth Rate	1%	4%
Suggested Growth Rate	1%	

Annual Growth Rates along Highway 3 and Highway 3A between 1995 and 2002 vary between1% and 4%. Further regression analysis suggests that an annual growth rate of 1% is more reasonable for the next 15-years, since some numbers appear anomalous.

Table 3.3 presents the AADT traffic values for 2012 and a 15-year horizon using the annual growth rate of 1%.

Table 3.3 - Projected Traffic Volumes.

Time Horizon	AADT (vehicles/day)	
	Highway 3A	Highway 3
Year 2013	6,654	2,077
Year 2028	7,724	2,484

3.5 Traffic Generation

Trip generation and distribution information was supplied by Fortis, as follows:

1. Generally the morning private transportation would start From 6:30 till 7:00 for IBEW employees. Some exempt and COPE workers would be arriving at the site between 7:30 and 8:00.

2. The operations personnel would be egressing the complex between 7:15 and 8:00 for C+M and T+D. and ingressing between 14:30 and 15:30, for a standard 7 to 3 shift, and ingressing between 16:30 and 18:00 for the modified (Compressed) shift.

3. During the normal work shift we would experience approx 20 vehicles egressing and ingressing for all departments. The design folks would be coming and going throughout the day as would the management folks.

4. The T+D and C+M personnel would travel south toward HWY 3, 90 percent of the time. We would coach the crews to go that direction rather than driving towards the golf course, and to avoid driving in the residential area.

The following table was also supplied by Fortis:

Table 3.4 - Operations Center Trip Generation

Type of vehicle	Weight /Length	Number	Travel Pattern - Monday - Friday
Tandem Axel Line Truck	40,000 max loaded	6 total	Leave 7:30 Return 2:30-3pm
½ ton Truck		26 total	Leave 7 - Return 3pm
1 ton Truck		17 total	Leave 7 - Return 3pm
¾ ton Truck		19 total	Leave 7 - Return 3pm
Various vans, SUVs , trailers and pool vehicles	10,000 max loaded pole trailer (5 in total), truck/pole trailer combined max length 65 ft	35 Total	Leave 7 - Return 3pm
Employee vehicles		170 employees	Office staff hour 7:30-4:00pm

Along with this information, the following assumptions were made:

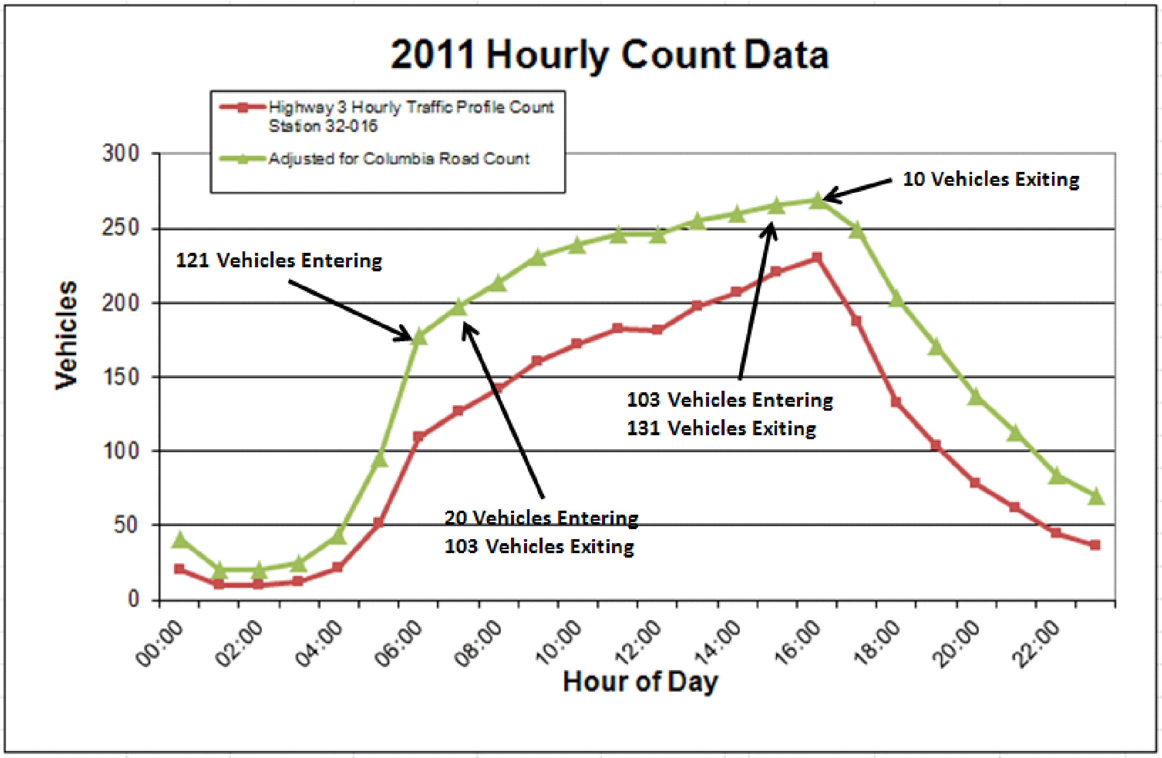
- Employee vehicles will have an average occupancy of 1.2 persons per vehicle
- Fortis fleet vehicles will have an average occupancy of 1.5 persons
- Fortis tandem trucks will have an average occupancy of 2.0 persons
- Based on this information and assumptions, the following trip generation was calculated

Table 3.5 – Operations Center Trip Generation

Summary - vehicles	Vehicles In	Vehicles Out
Before 7:00	121	
At 7:00	20	97
Before /at 7:30		6
At 3:0	103	
After 3:00		131
After 4:00		10

It is important to note that this traffic does not coincide precisely with the peak hour of the highway or Columbia Road. It can be shown applied to the highway hourly traffic profile as shown in Figure 3.6 below.

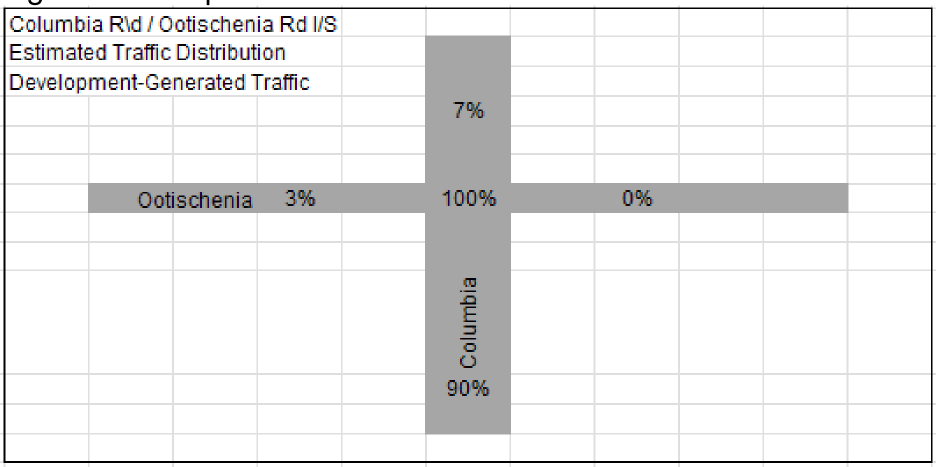
Figure 3.6 – Highway 3 hourly Traffic and Development Traffic

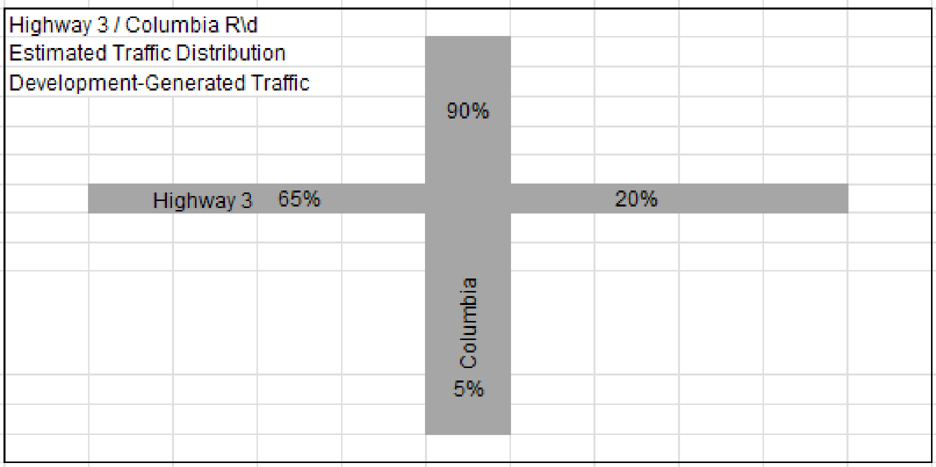


3.6 Generated Traffic Distribution

This traffic is estimated to be distributed through the intersections as shown in Figure 3.7 below. The splits will apply to both entering and exiting traffic. This represents a reasonable distribution of employee home addresses.

Figure 3.7 – Operations Center – Generated Traffic Distribution





SECTION 4
CAPACITY ANALYSIS

The nature of the travel patterns for this traffic generator requires a somewhat unique approach to the analysis. As shown previously on Figure 3.6, the traffic applies technically over a couple of hourly time periods. However, there are two factors to consider:

1. the incoming and outgoing traffic 'waves' will be separate (i.e. not conflicting), as both are created by the same employees (arrive before 7:00, leave after 7:00).
2. the vast majority of the traffic turnover will occur in within a shorter period – say 20 minutes for each of the incoming and outgoing 'waves'.

To address this the following steps were taken for the analysis:

- A single morning time period and a single afternoon time period were selected to establish background traffic. These hours correspond with the peak timeframes from the traffic counts, as shown in Figures 3.3 and 3.5 above.
- The noon time period was not analyzed, as site-generated traffic will be insignificant, compared to the other times of day.
- Background traffic values were factored forward from 2011 to 2013 at 1% per annum to emulate the development start-up, and to 2028 for the 25-year horizon.
- A site plan 'Option C' was considered for a right-out (southbound) exit only to Columbia Road and a full access at Ootischenia Road. These were included in the overall traffic network model to produce the traffic movements at the intersections.
- The four development traffic inbound and outbound 'waves' were defined as follows:
    - Scenario 1: AM peak plus employee arrivals at site
    - Scenario 2: AM peak plus fleet vehicle departure from site
    - Scenario 3: PM peak plus fleet return to site
    - Scenario 4: PM peak plus employee departure from site

- Development traffic was multiplied by 3, to emulate an 'hourly' arrival rate for a 20-minute 'wave', and added to the background traffic for the appropriate hour.
- Separate capacity analysis runs were required for each 'wave' to assess the impacts of each. These were carried out for the two main intersections: Highway 3 / Columbia Road and Columbia Road / Ootischenia Road, given the current roadway configurations and traffic control (two way stop control).

Intersection capacity analysis methodology followed the Highway Capacity Manual (HCM), developed by the Transportation Research Board. The analysis was undertaken using the software program Highway Capacity Software (HCS), developed by McTrans, which supports the HCM methodology.

4.1 Capacity Analysis Results

The following Table 5.1 summarizes the traffic analysis undertaken. The background traffic is based on values estimated for 2012, and projected to the 2027 horizon. Note that the future two-way stop control and signal results are based on a separate left turn lane on the intersection side roads, which does not presently exist.

The analysis shows what percentage of the full development outlined in Section 2 could be built by the time the Level of Service or volume-to-capacity ratio (v/c) reaches the performance criteria limits.

Highway 3 / Columbia Road: Scenario 1

Movement	1	4	7	8	9	10	11	12
Lane Config	L	L	LT		R	LT		R
v (vph)	274	30	19		51	110		2
C(m) (vph)	1386	1484	190		951	281		1010
v/c	0.20	0.02	0.10		0.05	0.39		0.00
95% queue length	0.74	0.06	0.33		0.17	1.89		0.01
Control Delay	8.2	7.5	26.0		9.0	26.0		8.6
LOS	A	A	D		A	D		A
Approach Delay				13.6			25.7	
Approach LOS				B			D	

Highway 3 / Columbia Road: Scenario 2

Movement	1	4	7	8	9	10	11	12
Lane Config	L	L	LT		R	LT		R
v (vph)	3	30	6		51	193		228
C(m) (vph)	1493	1484	585		951	725		1010
v/c	0.00	0.02	0.01		0.05	0.27		0.23
95% queue length	0.01	0.06	0.03		0.17	1.08		0.87
Control Delay	7.4	7.5	11.2		9.0	11.8		9.6
LOS	A	A	B		A	B		A
Approach Delay				9.2			10.6	
Approach LOS				A			B	

Highway 3 / Columbia Road: Scenario 3

Movement	1	4	7	8	9	10	11	12
Lane Config	L	L	LT		R	LT		R
v (vph)	235	0	92		5	5		22
C(m) (vph)	1419	1369	261		937	337		976
v/c	0.17	0.00	0.35		0.01	0.01		0.02
95% queue length	0.59	0.00	1.60		0.02	0.05		0.07
Control Delay	8.0	7.6	26.3		8.9	15.8		8.8
LOS	A	A	D		A	C		A
Approach Delay				25.4			10.1	
Approach LOS				D			B	

Highway 3 / Columbia Road: Scenario 4

Movement	1	4	7	8	9	10	11	12
Lane Config	L	L	LT		R	LT		R
v (vph)	56	0	83		5	96		266
C(m) (vph)	1492	1369	436		937	620		976
v/c	0.04	0.00	0.19		0.01	0.15		0.27
95% queue length	0.12	0.00	0.70		0.02	0.55		1.12
Control Delay	7.5	7.6	15.2		8.9	11.9		10.1
LOS	A	A	C		A	B		B
Approach Delay				14.8			10.5	
Approach LOS				B			B	

Columbia Road / Ootischenia Road: Scenario 1

Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	378	1		58			19	
C(m) (vph)	1507	1550		229			706	
v/c	0.25	0.00		0.25			0.03	
95% queue length	1.00	0.00		1.01			0.08	
Control Delay	8.2	7.3		26.0			10.2	
LOS	A	A		D			B	
Approach Delay				26.0			10.2	
Approach LOS				D			B	

Columbia Road / Ootischenia Road: Scenario 2

Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	6	1		49			19	
C(m) (vph)	1157	1550		552			650	
v/c	0.01	0.00		0.09			0.03	
95% queue length	0.02	0.00		0.29			0.09	
Control Delay	8.1	7.3		12.2			10.7	
LOS	A	A		B			B	
Approach Delay				12.2			10.7	
Approach LOS				B			B	

Columbia Road / Ootischenia Road: Scenario 3

Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	256	1		26			6	
C(m) (vph)	1556	1530		402			622	
v/c	0.16	0.00		0.06			0.01	
95% queue length	0.59	0.00		0.21			0.03	
Control Delay	7.8	7.4		14.6			10.8	
LOS	A	A		B			B	
Approach Delay				14.6			10.8	
Approach LOS				B			B	

Columbia Road / Ootischenia Road: Scenario 4

Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	11	1		20			388	
C(m) (vph)	1556	1530		593			1012	
v/c	0.01	0.00		0.03			0.38	
95% queue length	0.02	0.00		0.10			1.85	
Control Delay	7.3	7.4		11.3			10.8	
LOS	A	A		B			B	
Approach Delay				11.3			10.8	
Approach LOS				B			B	

SECTION 5
SUMMARY

The land use, traffic, geometric and capacity analyses result in the following observations:

- Existing traffic conditions are light, with no capacity concerns at these intersections
- Traffic generated by the site can be separated into four relatively independent "waves" of traffic volume
- Each of these 'waves' was assessed for opening day (2013), overlain onto the appropriate hours' background traffic.
- Each wave of development traffic was effectively concentrated into a 20-minute timeframe, by tripling the actual development traffic generation numbers.
- The worst movements show a level of service D, with less than 30 seconds delay. This is not considered unreasonable.

Further considerations:

- Traffic will self-regulate to some extent - staggering arrival time over greater than 20 minutes would improve results.
- There could be some overlap of the "Waves" depending on punctuality but this was ignored in the analysis.
- It is expected that the afternoon "waves" will be less defined than the morning. It is the morning conditions that govern, so this is not considered significant.
- No improvements to geometry were considered in this analysis (i.e. the Columbia / Ootischenia intersection uses two lanes only for all legs).
- The access points were not analyzed as they will be better than the intersections.
- The site plan for "Option C" is preliminary, and shows some auxiliary laning, and magazine storage, but this was not assessed in this Traffic Impact Study.

Pavement considerations:

- Pavement strength based on ESALS.

- Only 6 large vehicles are included (40,000 lb payload). ESALs will not be significantly high, but it is critical that the road be useable year-round.

APPENDIX A

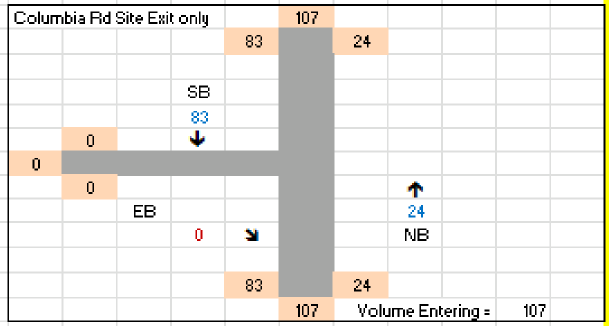
Combined Traffic

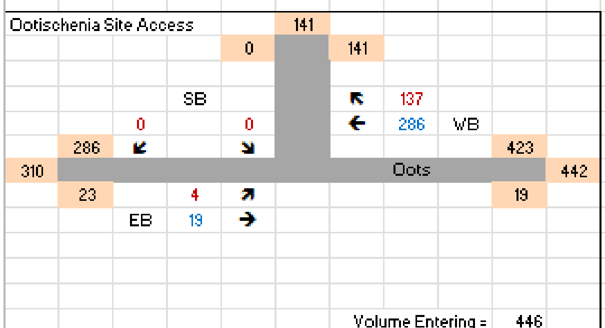
Scenario 1 Duration (min): 20

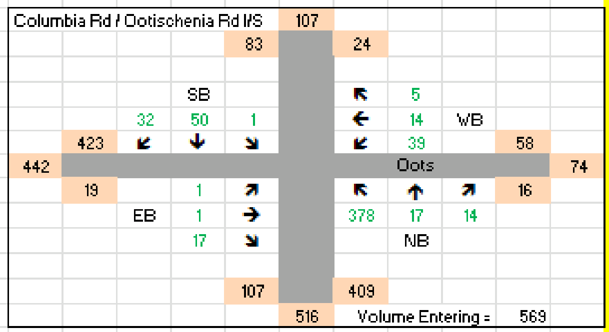
AM Employees Arrive

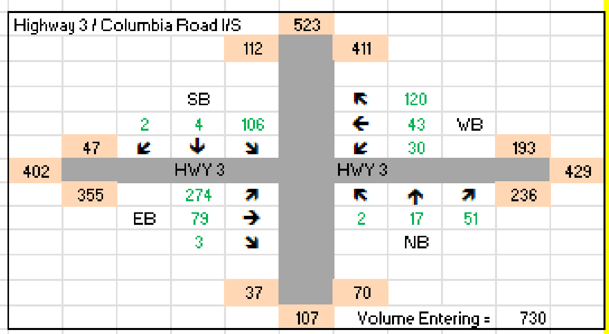
Background factored to 2013

PlusDevelopment Traffic (multiplied by): 3

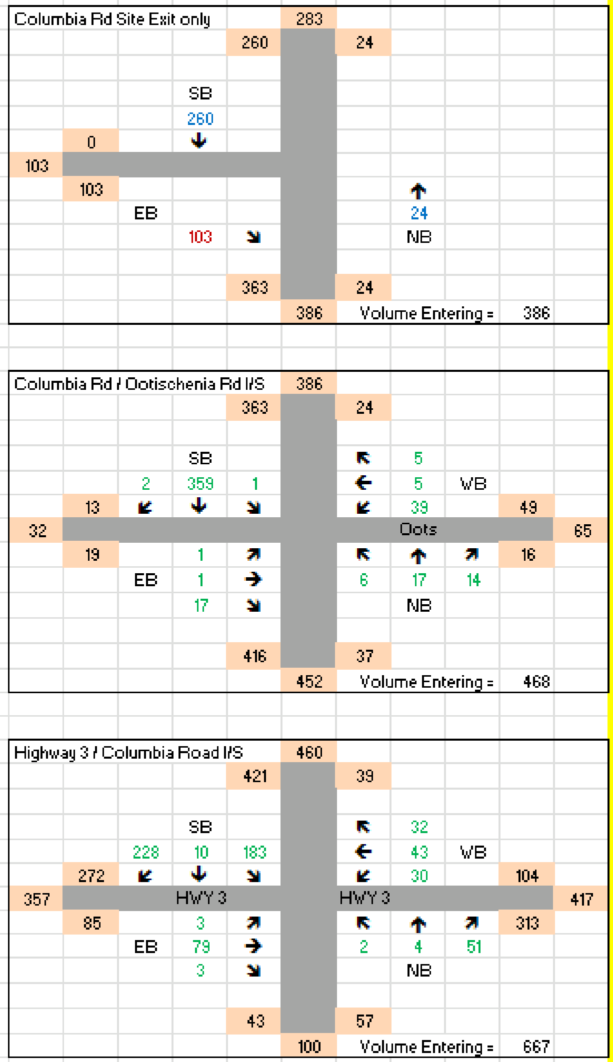








Combined Traffic
Scenario 2: Duration (min): 20
AM Fleet Departs
Background factored to 2013
PlusDevelopment Traffic (multiplied by): 3



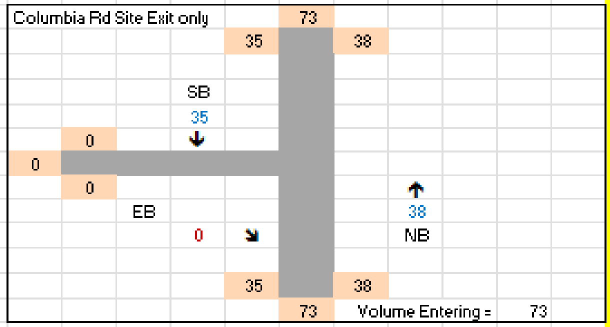
Combined Traffic

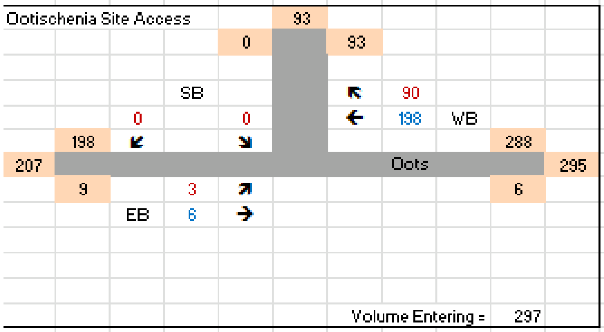
Scenario 3: Duration (min): 20

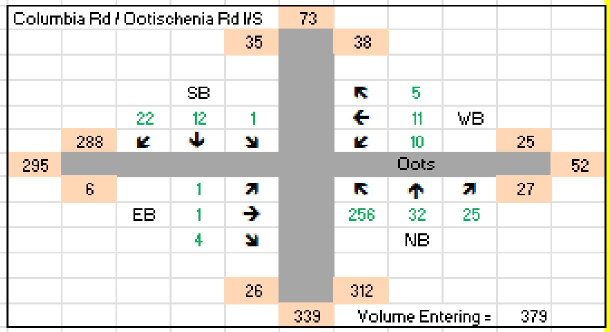
PM Fleet Returns

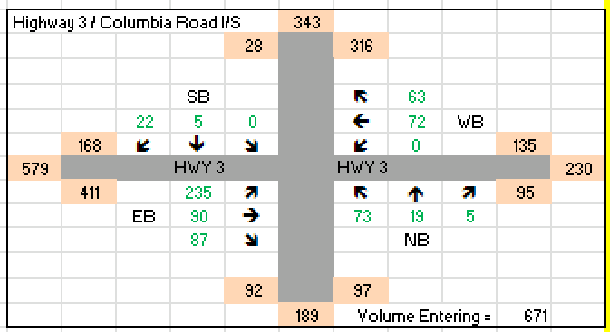
Background factored to 2013

PlusDevelopment Traffic (multiplied by): 3

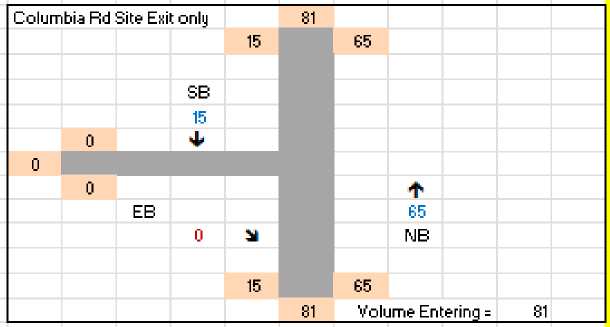


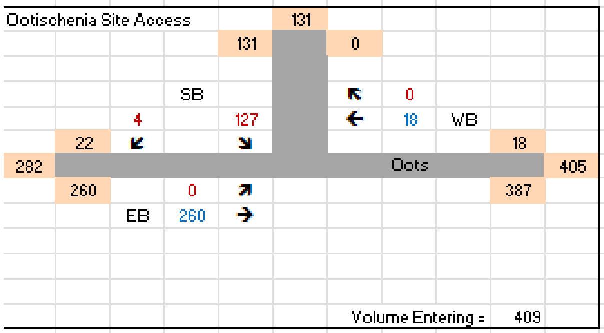


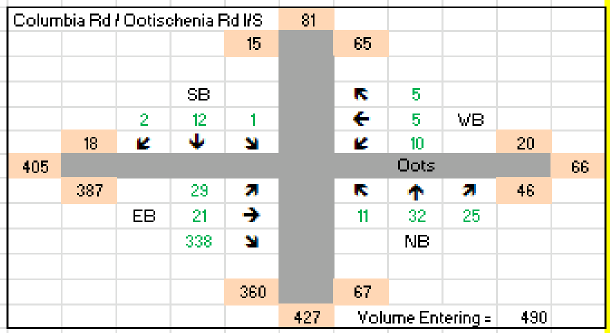


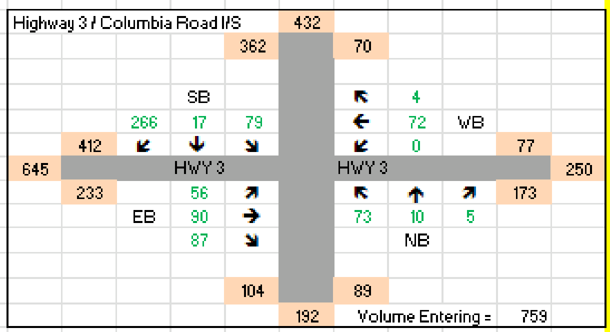


Combined Traffic
Scenario 4: Duration (min): 20
PM Employees Leave
Background factored to 2013
PlusDevelopment Traffic (multiplied by): 3



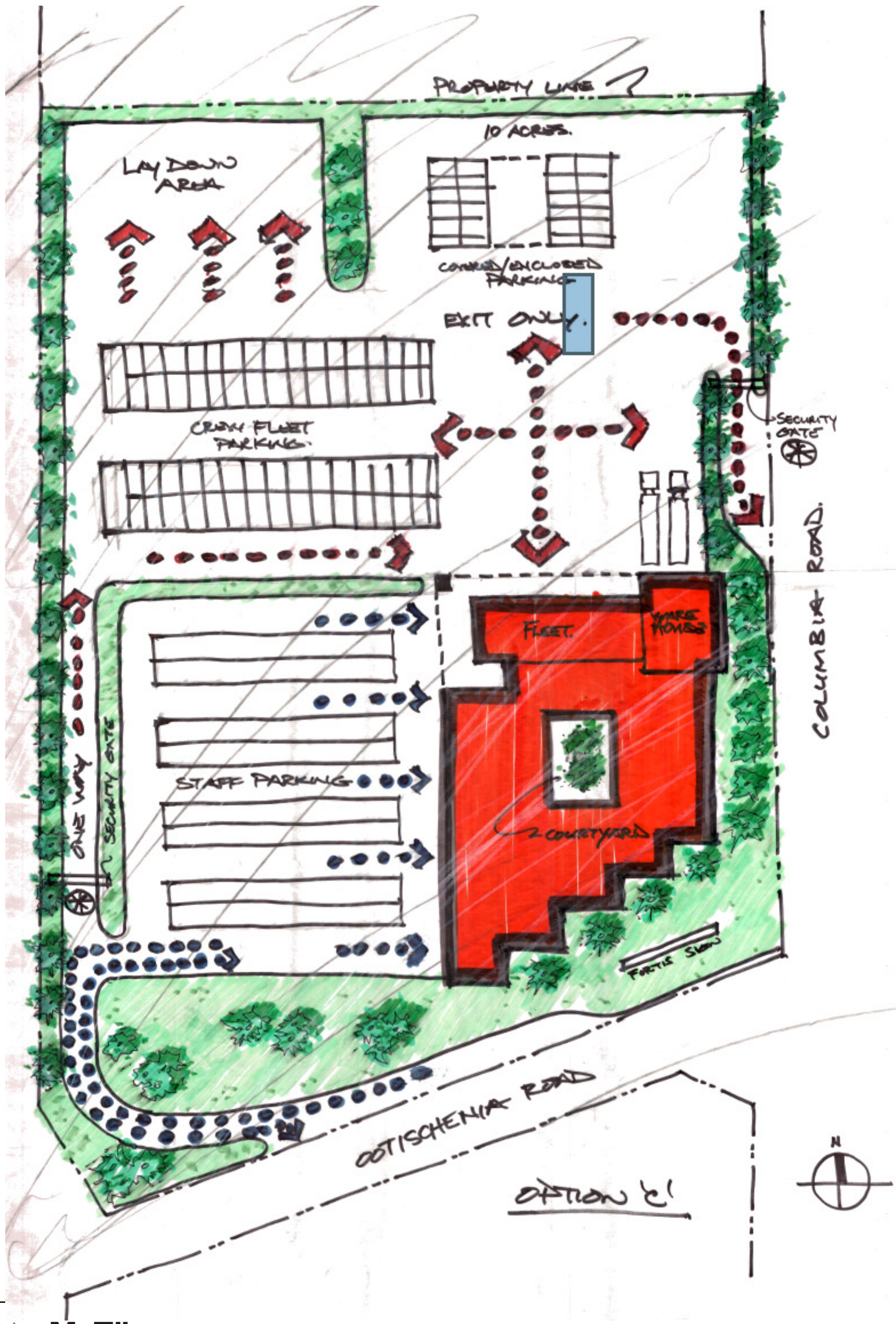






APPENDIX B

Site Layout Option 'C' – Preferred



Appendix I

KOC GEOTECHNICAL CONSULTATION STUDY

DEVERNEY
ENGINEERING SERVICES LTD.

FortisBC Inc.
1290 Esplanade
Trail, BC
V1R 4L4

August 16, 2012
File: DE11-1007

Attn: Ms. Jan Isherwood

Re: Geotechnical Assessment, Kootenay Operations Centre,
120 Ootischenia Road, Castlegar

Dear Ms. Isherwood,

This letter-report presents a summary of a geotechnical assessment at the site of a proposed commercial building at 120, Ootischenia Road in Castlegar.

Scope of Work

Deverney Engineering Services Ltd. scope of work was to carry out an investigation of the soil conditions at the subject property to provide an evaluation of soil bearing capacity in relation to building foundations at the site, and to provide related recommendations for excavation and management of site preparations and for placement and testing of structural fill.

Authorization to proceed with the work was received from Ms. Isherwood on July 23, 2012.

LIMITATIONS OF REPORT

Deverney Engineering Services Ltd. (DESL) has prepared this report for and at the expense of the property owner. The material in it reflects the judgement of DESL in light of the information available to DESL at the time of report preparation.

Any use that a third party makes of this report, or any reliance on decisions to be based on it is the responsibility of such third parties. DESL accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

As a mutual protection to our client, the public, and ourselves, all reports and drawings are submitted for the confidential information of our client. Authorization for any use and/or publication of this report or any data, statements, conclusions or abstracts from or regarding our reports and drawings, through any form of print or electronic media is reserved pending written approval from DESL.

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SITE INVESTIGATION

The site field investigation was conducted by the writer on August 2, 2012. The investigation included a reconnaissance assessment of the building site on the subject property and nearby areas. A shallow sub-surface investigation of the subject property was conducted by excavation to identify sub-surface soil characteristics within the general area of the proposed building.

Reference was also made to soils reports, aerial images, and topographic maps. A list of references follows the signature page.

Geotechnical Excavations

Six test excavations were made at the subject property. Locations of the excavations are indicated on the site plan (Figure 1). Excavations were conducted using a John Deere 120 tracked excavator under the supervision of the writer. Soils were logged, hand textured, and visually classified using the Modified Soil Classification System. Several samples were retained and two samples were submitted for laboratory analysis.

SITE DESCRIPTION

The subject property is situated on a flat lot within the community of Ootischenia. The subject property is bounded on the east by Columbia Road and on the south and west side by Ootischenia Road. The north side has a similar flat vacant lot.

The southwest corner of the subject property had been previously been occupied by a building, since demolished. Most of the operations centre building site appears to be previously un-disturbed.

Soils Mapping

Soils Resources Maps (Jungen 1980) identify soils at this part of Ootischenia as being of the Glade Association, being derived from moderately coarse and very coarse textured glacio-fluvial terrace deposits.

Stratigraphy

The shallow sub-surface soils exposed at the test excavation sites are described below. Test excavations were advanced to depths of 3.4 to 4.2 metres. Detailed soil logs are provided in Appendix I. Test pit locations indicated on Figure 1. All test excavations were backfilled immediately after completion.

Soils at TP #1 to TP #4 had a surface layer of sandy organic topsoil to depths of 0.15 to 0.2 metres.

Test Pit #5 had a 0.5m deep layer of sand fill. Test Pit #6 had no topsoil or fill. The locations of these two test excavations appear to have been disturbed by site grading following removal of the previous building.

Native soils underlying the topsoil or fill materials consisted of a deep deposit of sand. This sand material was of uniform composition, with trace fines and trace gravel sizes. The sand was slightly moist throughout and compact in consistency.

Grab samples were taken from two locations; at a depth of 1.2m from TP#2, and at a depth of 1.0m from TP #5. These samples were judged to represent the modest variation of sand composition, with the sample from TP#5 being somewhat finer than that observed through most of the test excavations.

These samples were submitted for laboratory analysis of grain size distribution. Grain size distributions are in Appendix 2. Both samples showed grain size distributions for poorly graded sands, classified as **SP**. Fines content ranged from 1.1% in the sample from TP#5 to 1.3% in the sample from TP #2.

Excavation walls tended to collapse when disturbed, so the excavations were continued as deeply as could be achieved without generating excessively large disturbance areas.

Groundwater

No groundwater was observed at depth in any of the test excavations, and no indications of period high groundwater conditions such as rust staining or gleying were observed.

Considering the geomorphic history of this site, being a glacio-fluvial terrace, and the rapidly draining soil characteristics, it is inferred that groundwater levels are depressed here, possibly co-incident with the water levels in the Columbia River, approximately 80m lower in elevation.

SOIL PROPERTIES

Internal Friction

The native soils present beneath the topsoil are generally suitable as foundation materials for the proposed structure.

A representative angle of internal friction was inferred from the soil material types, consistency, and estimated dry unit weights as per NAVFAC 2005. The estimated internal friction angles have been applied to the determination of soil bearing capacity in accordance with procedures described in the Canadian Foundation Engineering Manual.

An internal friction angle (ϕ) of 32° was estimated for the **SP** soils at the subject property. The estimated dry unit weight is 17.6 kN/m^3.

Bearing Capacity - Strip Footings

Bearing capacity was calculated on the basis of a nominal strip footing width of 0.6m (24"). The proposed building, foundations will be embedded to a depth of 0.75m (30") for frost protection. Granular fill or native soils to that depth will remain in place beneath the interior floor slab.

Settlement

For shallow footings supported on native sand soils, the estimated Serviceability Limit States (SLS) bearing pressures that would result in footing settlements of 25 mm are provided below on Table 1.

Modulus of subgrade reaction values are based on published correlations for plate load test results and geotechnical properties of soil types. For compact native sands as observed at the test excavations, the modulus of subgrade reaction will range from 75 to 100 MN/m^3.

Table 1 Bearing Resistances for Footings on Existing Sand Soils

Footing Width (m)	Net Ultimate Bearing Resistance	Estimated Serviceability Limit State Bearing Pressure to Attain Specified Settlement of 25 mm
0.6	261 kPa	180 kPa

Based on the observed soil characteristics and assumed foundation conditions, Ultimate Limit States (ULS) soil bearing capacity was calculated to exceed **260 kPa** (5,456 psf).

Serviceability Limit States (SLS) soil bearing capacity is **180 kPa** (3,759 psf).

Frost Depth

The sand soils present at this site are judged as not frost susceptible. The recommended minimum footing depth for frost protection is 0.75m (30").

RECOMMENDATIONS

General

The native sand soils at this site are generally suitable for conventional construction. The sand soils are easily disturbed, and measures are warranted to minimize disturbance during excavation and during footing form preparation.

Building Foundations

It is recommended that building foundation construction be undertaken with consideration of the following measures:

- Strip and remove fill and topsoil from all areas within the building footprint. It is recommended that the footing areas be inspected by the Engineer prior to placement of concrete to confirm the removal of topsoil, to confirm the native soils, and to examine the preparation of soils beneath the footings.
- Foundation excavations are to be undertaken using a smooth blade excavator bucket (clean up bucket) to minimize disturbance.
- Footing excavations are to be over-excavated to a minimum of 0.1m (4″) below the design subgrade. Design subgrade for sand or gravel soils is minimum 0.75m below finished exterior grade.
- Proof compact the excavated footing area. If soft areas are encountered, the surface soils should be removed and replaced with a compacted layer of free draining pit run gravel or crushed gravel fill.
- Without delay, place and spread a 0.1m deep layer of clean (less than 5% fines) ¾″ or 1″ minus crushed gravel across the footing area, and compact with a heavy vibrating plate compactor. The addition of water may be needed, depending on the moisture content of the gravel.
- In the event of over-excavation, or if fill materials are encountered below the subgrade depth, then structural fills will be required. Structural fills are to comprise free draining (less than 5% fines) pit run (3″ minus) gravel or ¾″ or 1″ crushed gravel. Structural fills are to be placed and compacted in maximum 0.15m (loose thickness) lifts.
- Any structural fills exceeding 0.2m total thickness are to be subjected to field density testing to confirm that materials have been compacted to 100% of the Standard Proctor Maximum Dry Density (SPMDD).

Floor Slabs

- Interior concrete floor slabs are to be founded on un-disturbed native materials. Where the removal of topsoil or fill materials results in a requirement to place material to restore the ground to subgrade elevation, structural fill will be needed.
- Structural fills are to comprise free draining (less than 5% fines) pit run (3″ minus) gravel or ¾″ or 1″ crushed gravel. Structural fills are to be placed and spread in lifts not exceeding 0.15m (loose thickness), and compacted to a minimum of 100% of the Standard Proctor Maximum Dry Density (SPMDD).
- Any structural fills exceeding 0.2m total thickness are to be subjected to field density testing to confirm that materials have been compacted to 100% of the SPMDD.
- The final subgrade fill beneath the floor slab is to comprise a minimum 0.1m layer of ¾″ or 1″ minus clean crushed gravel, compacted to a minimum of 100% of the SPMDD.
- Concrete floor slabs are to be underlain by 6-mil polyethylene sheeting to minimize upward migration of moisture.

Foundation Drainage

- Foundation drains are to be installed in accordance with conventional practices, including placement of perforated pipe, drain rock, and a geotextile filter wrap (see Figure 2). The recommended geotextile is Nilex Type 4535, Armtec 300, Canada Culvert CC6B (or approved equivalent).
- The perforated drain pipe (CSA Approved) can be set with a 0% gradient. Because of the free draining nature of the native subgrade soils, there is no requirement for outlet to daylight.

Storm and Roof Drainage

- To minimize ingress of surface runoff from natural and landscaped areas of the property, it is recommended that finished ground surfaces, including landscaped areas and sidewalks be graded to slope away from the building foundations at a minimum gradient of 2% for a distance of at least 2 metres.
- Roof leaders are to be installed to direct runoff away from the building foundation, with appropriate surface grading to ensure that roof runoff is carried away from the building. Roof leaders are not to be connected to foundation drains. Considering the flat ground surface, roof leaders may be connected to cobble / gravel filled soakaways.

Road and Parking Drainage

- Care is warranted for management of surface runoff from paved areas. The roads and parking areas are to be graded, ditched, curbed, or otherwise sloped to ensure that surface runoff does not move toward the building foundations.

SUPERVISION

The implementation of foundation recommendations, including verification of site native soils, and the excavation, preparation, and construction of building foundation sites, and the placement of structural fills are to be conducted under the direction or supervision of a suitably qualified Professional Engineer to meet the intent and requirement of Schedule B under the BC Building Code.

CLOSURE

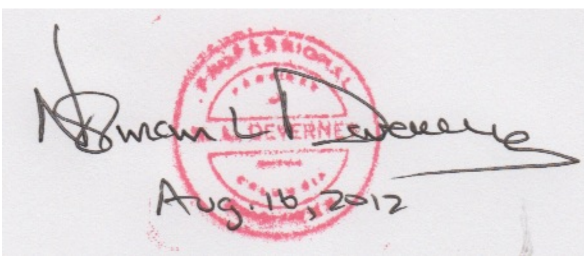
This report is prepared in accordance with generally accepted engineering practices in this area. No other warranty, express or implied is made.

Variability is inherent in geological features, and actual ground conditions in some parts of the site may differ from those inferred. Subsurface soil conditions have been inferred from the observed exposures. Changes to design details, work procedures and other project considerations may be warranted on the basis of site conditions encountered.

The evaluations and recommendations of this report are for the sole use of our client for the proposed construction activities at the time of the evaluation. If conditions are observed that differ from those presented in this report, Deverney Engineering Services Ltd. reserves the right to review the information, and adjust the conclusions and recommendations accordingly.

Respectfully submitted

DEVERNEY ENGINEERING SERVICES LTD.



Norman L. Deverney, P.Eng.

Attachments:	References	
	Appendix 1	Test Excavation Logs
	Appendix 2	Laboratory Sieve Analyses, GMT
	Figure 1	Plan View of Subject Property
	Figure 2	Foundation Detail

References

Air Photos   Google Earth Images, 2004 and 2007

Canadian Geotechnical Society, **Canadian Foundation Engineering Manual, 4th Edition, 2006.**

Jungen, J. R., "**Soil Resources of the Nelson Map Area**", RAB Bulletin No. 20, BC Ministry of Environment, 1980.

Naval Facilities Engineering Command, **Soil Mechanics Design Manual**, 7.01, 2005

Appendix 1

Test Excavation Logs

CLIENT: FortisBC Inc. EQUIP.: John Deere 120	PROJECT NAME: Geotechnical Services LOCATION: 120 Ootischenia Road, Castlegar, BC	**TEST PIT: #1** LOC.: 5 m W. of E. fence, 14 m N. of Oot Rd.

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | SPT TEST | GRAB SAMPLE | SPLIT PEN | CORE SAMPLE

Depth (m)	PLASTIC — M.C. — LIQUID (20% 40% 60% 80%)	USC	Soil symbol	Soil/rock Description	Sample type	Sample/ SPT(N)	Other Test Comments	Depth (m)
0.0				Topsoil, sandy, organic.				0.0
		SP		Sand, trace silt, uniform compact, trace gravel, moist, light gray.				
0.50								.5
1.0								1.0
1.5								1.5
2.0								2.0
2.5								2.5
3.0								3.0
3.5								3.5
4.0								4.0
				End of hole @ 4.2 m. Dry, backfilled.				
4.5								4.5
5.0								5.0
5.5								5.5

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END OF EXCAVATION: 4.2 m	LOGGED BY: NLD	DATE: Aug. 2/12	DWG NO.: 1	PAGE: 1

CLIENT: FortisBC Inc. EQUIP.: John Deere 120	PROJECT NAME: Geotechnical Services LOCATION: 120 Ootischenia Road, Castlegar, BC	**TEST PIT: #2** LOC.: 45 m N. of Oot. Rd, 5 m W. of fence

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | SPT TEST | GRAB SAMPLE | SPLIT PEN | CORE SAMPLE

Depth (m)	PLASTIC — M.C. — LIQUID (20% 40% 60% 80%)	USC	Soil symbol	Soil/rock Description	Sample type	Sample/ SPT(N)	Other Test Comments	Depth (m)
0.0				Topsoil, sandy, organic.				0.0
		SP		Sand, trace silt, scattered gravel, cobbles uniform, compact, light gray, moist.				
0.50								.5
1.0				Grab sample at 1.2 m.				1.0
1.5								1.5
2.0								2.0
2.5								2.5
3.0								3.0
				End of hole @ 3.4 m. Dry, backfilled.				
3.5								3.5
4.0								4.0
4.5								4.5
5.0								5.0
5.5								5.5

DEVERNEY ENGINEERING SERVICES LTD.

END OF EXCAVATION: 3.4 m	LOGGED BY: NLD	DATE: Aug. 2/12	DWG NO.: 1	PAGE: 1

CLIENT: FortisBC Inc. EQUIP.: John Deere 120	PROJECT NAME: Geotechnical Services LOCATION: 120 Ootischenia Road, Castlegar, BC	**TEST PIT: #3** LOC.: 74 m N. of fence @ Oot. Rd., 30 m W. of Columbia Rd. fence

SAMPLE TYPE: SHELBY TUBE / NO RECOVERY / SPT TEST / GRAB SAMPLE / SPLIT PEN / CORE SAMPLE

Depth (m)	PLASTIC – M.C. – LIQUID (20% 40% 60% 80%)	USC	Soil symbol	Soil/rock Description	Sample type	Sample/ SPT(N)	Other Test Comments	Depth (m)
0.0				Topsoil, sandy, organic.				0.0
		SP		Sand, trace silt, scattered gravel sizes, compact.				
0.50				0.2 m thick gravelly seam @ 0.6 m.				.5
1.0								1.0
1.5								1.5
2.0								2.0
2.5								2.5
3.0								3.0
3.5								3.5
4.0								4.0
				End of hole @ 4.2 m. Dry, backfilled.				
4.5								4.5
5.0								5.0
5.5								5.5

Deverney ENGINEERING SERVICES LTD.	END OF EXCAVATION: 4.2 m	LOGGED BY: NLD	DATE: Aug. 2/12	DWG NO.: 1	PAGE: 1

CLIENT: FortisBC Inc. EQUIP.: John Deere 120	PROJECT NAME: Geotechnical Services LOCATION: 120 Ootischenia Road, Castlegar, BC	**TEST PIT: #4** LOC.: 8 m N. of fence (Oot.), 24 m W. of fence @ Columbia

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | SPT TEST | GRAB SAMPLE | SPLIT PEN | CORE SAMPLE

Depth (m)	PLASTIC M.C. LIQUID 20% 40% 60% 80%	USC	Soil symbol	Soil/rock Description	Sample type	Sample/ SPT(N)	Other Test Comments	Depth (m)
0.0				Topsoil, sandy, organic.				0.0
		SP		Sand, some gravel @ 0.5 m, trace silt, complact, moist.				
0.50								.5
1.0								1.0
1.5								1.5
2.0								2.0
2.5								2.5
3.0								3.0
3.5								3.5
4.0				End of hole @ 4.0 m. Dry, backfilled.				4.0
4.5								4.5
5.0								5.0
5.5								5.5

DEVERNEY ENGINEERING SERVICES LTD.	END OF EXCAVATION: 4.0 m	LOGGED BY: NLD	DATE: Aug. 2/12	DWG NO.: 1	PAGE: 1

CLIENT: FortisBC Inc. EQUIP.: John Deere 120	PROJECT NAME: Geotechnical Services LOCATION: 120 Ootischenia Road, Castlegar, BC	**TEST PIT**: **#5** LOC.: 8 m N. of fence, 50 m W. of Columbia Rd. fence

SAMPLE TYPE: SHELBY TUBE | NO RECOVERY | SPT TEST | GRAB SAMPLE | SPLIT PEN | CORE SAMPLE

Depth (m)	PLASTIC — M.C. — LIQUID (20% 40% 60% 80%)	USC	Soil symbol	Soil/rock Description	Sample type	Sample/ SPT(N)	Other Test Comments	Depth (m)
0.0				Fill, sand.				0.0
0.50		SP		Sand, trace silt, scattered gravel and cobble sizes, moist, compact.				.5
1.0				Grab sample at 1.0 m.				1.0
1.5								1.5
2.0								2.0
2.5								2.5
3.0								3.0
3.5								3.5
4.0								4.0
				End of hole @ 4.2 m. Dry, backfilled.				
4.5								4.5
5.0								5.0
5.5								5.5

CLIENT: FortisBC Inc. EQUIP.: John Deere 120	PROJECT NAME: Geotechnical Services LOCATION: 120 Ootischenia Road, Castlegar, BC	**TEST PIT**: **#6** LOC.: 35 m from Oot. Rd. fence, 95 m from Columbia Rd.

SAMPLE TYPE: SHELBY TUBE · NO RECOVERY · SPT TEST · GRAB SAMPLE · SPLIT PEN · CORE SAMPLE

Depth (m)	PLASTIC M.C. LIQUID (20% 40% 60% 80%)	USC	Soil symbol	Soil/rock Description	Sample type	Sample/ SPT(N)	Other Test Comments	Depth (m)
0.0		SP		Sand, trace silt, scattered gravel, moist, compact.				0.0
0.50								.5
1.0								1.0
1.5								1.5
2.0								2.0
2.5								2.5
3.0								3.0
3.5								3.5
4.0				End of hole @ 4.0 m. Dry, backfilled.				4.0
4.5								4.5
5.0								5.0
5.5								5.5

DEVERNEY ENGINEERING SERVICES LTD. | END OF EXCAVATION: 4.0 m | LOGGED BY: NLD | DATE: Aug. 2/12 | DWG NO.: 1 | PAGE: 1

Appendix 2

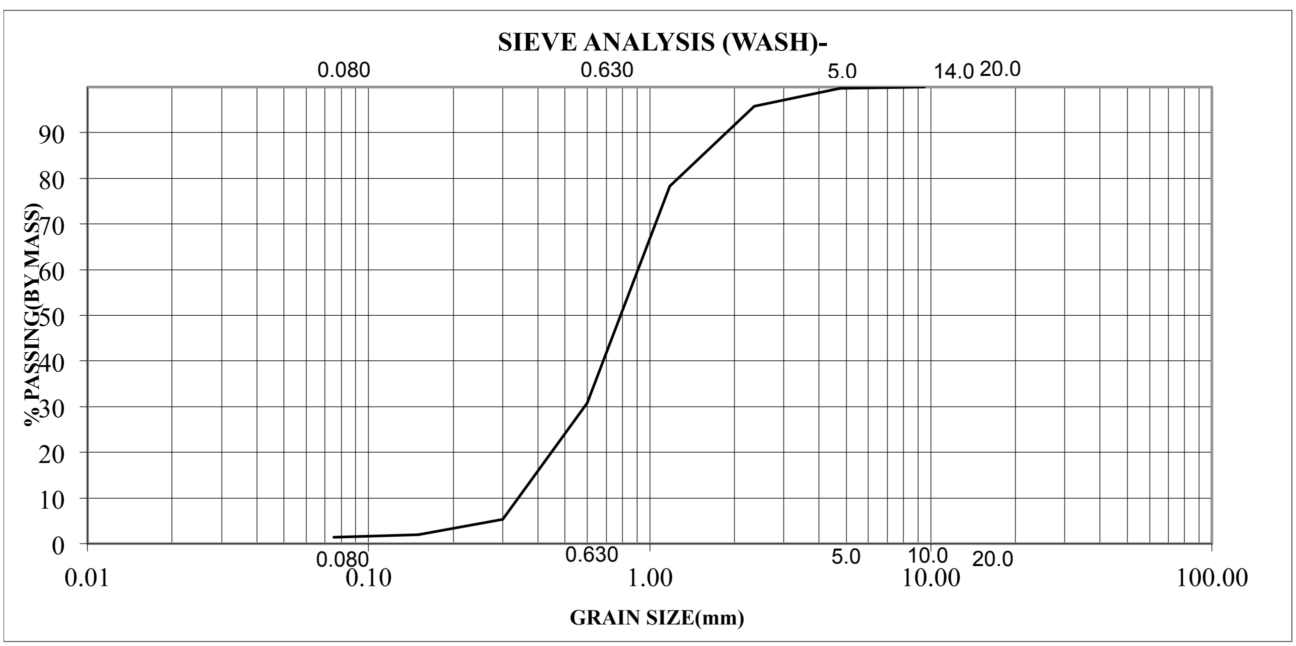
Laboratory Sieve Analyses, GMT

SIEVE ANALYSIS

Project FortisBC Kootenay Operations Centre
Contract No.
Pit Name
Material Fine Aggregate Sample TP #2 1.2 M
Date Sampled Aug 2/12 Location Ootischenia
Date Tested Aug 3/12 By AAO

MOISTURE DETERMINATION			WASH TEST	
Mass of Moist Sample	g		Mass of dry sample	446.5 g
Mass of Dry Sample	g		Mass of Washed Sample	442.2 g
Loss of Moisture	g		Mass Lost(Passing 0.075mm)	4.3 g
% Moisture			Passing 0.075mm on Dry Siev	1.7 g
Fineness Modulus			Total Passing 0.075mm	6 g

Sieve Size	Mass Retained	%Retained	%Passing	**Fine Agg.**		Mass Retained	%Retained	%Passing
19.0								
12.5								
9.5								100.0
4.75						1.1	0.2	99.8
2.36						17.9	4.0	95.7
1.18						77.6	17.4	78.4
0.600						212.1	47.5	30.8
0.300						113.8	25.5	5.3
0.150						15	3.4	1.9
0.075						2.7	0.6	1.3
PAN						6	1.3	
TOTAL						446.2		

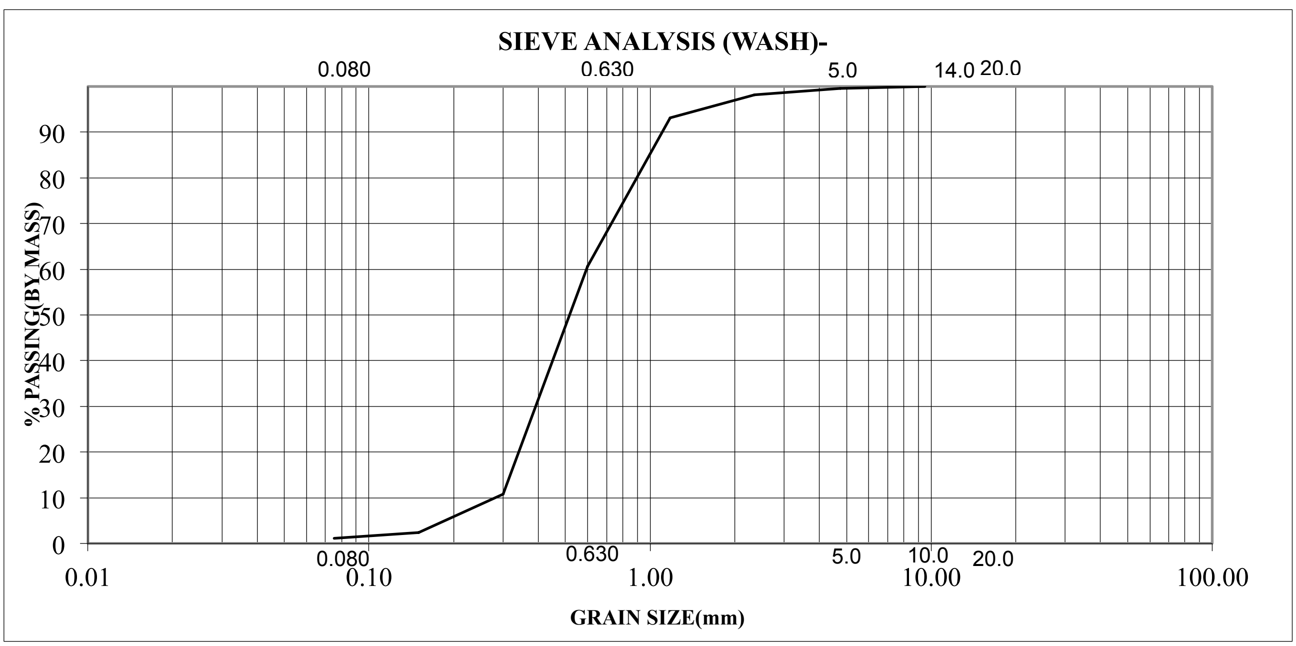


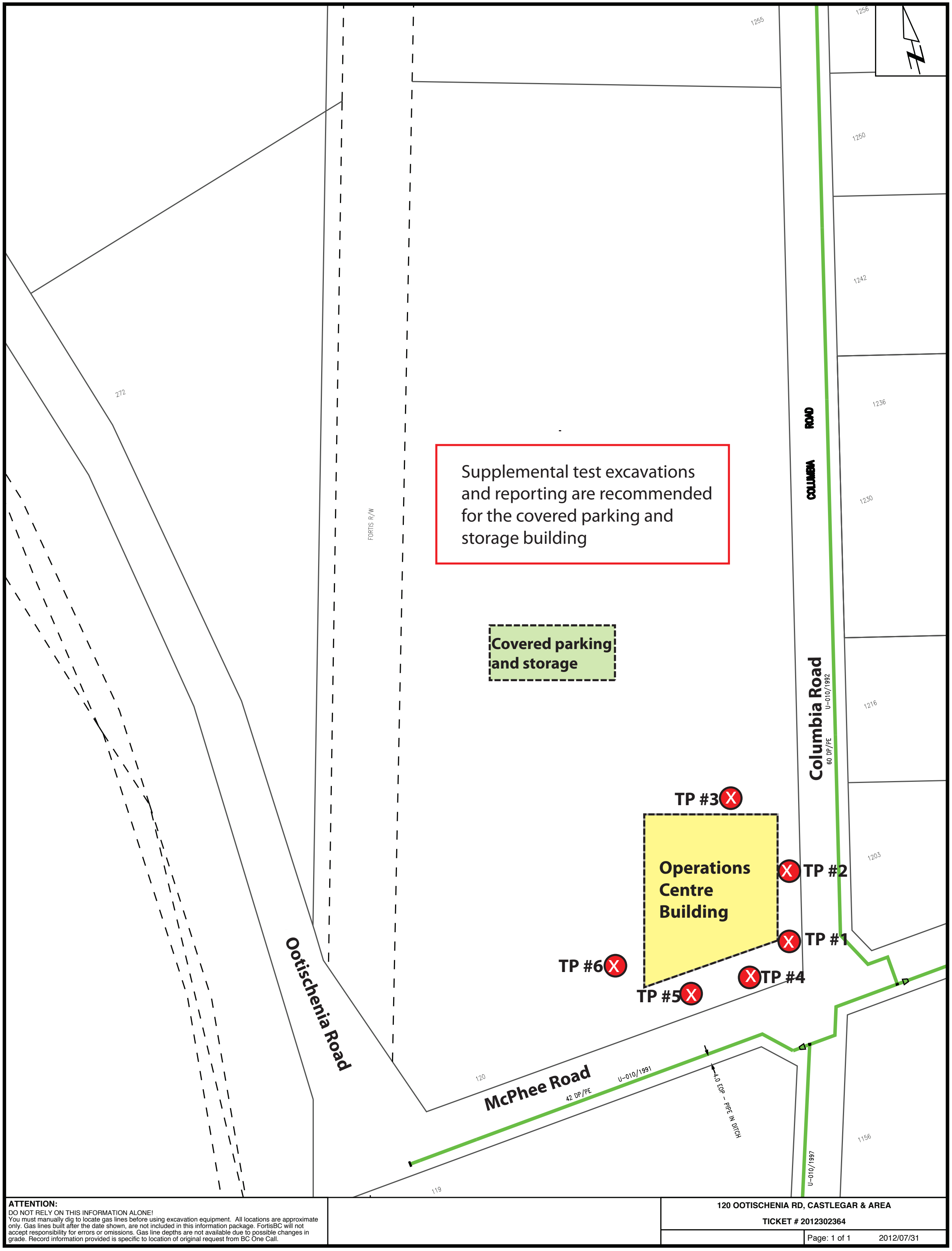
SIEVE ANALYSIS

Project	FortisBC Kootenay Operations Centre		
Contract No.			
Pit Name			
Material	Fine Aggregate	Sample	TP #5 1.0 M
Date Sampled	Aug 2/12	Location	Ootischenia
Date Tested	Aug 3/12	By	AAO

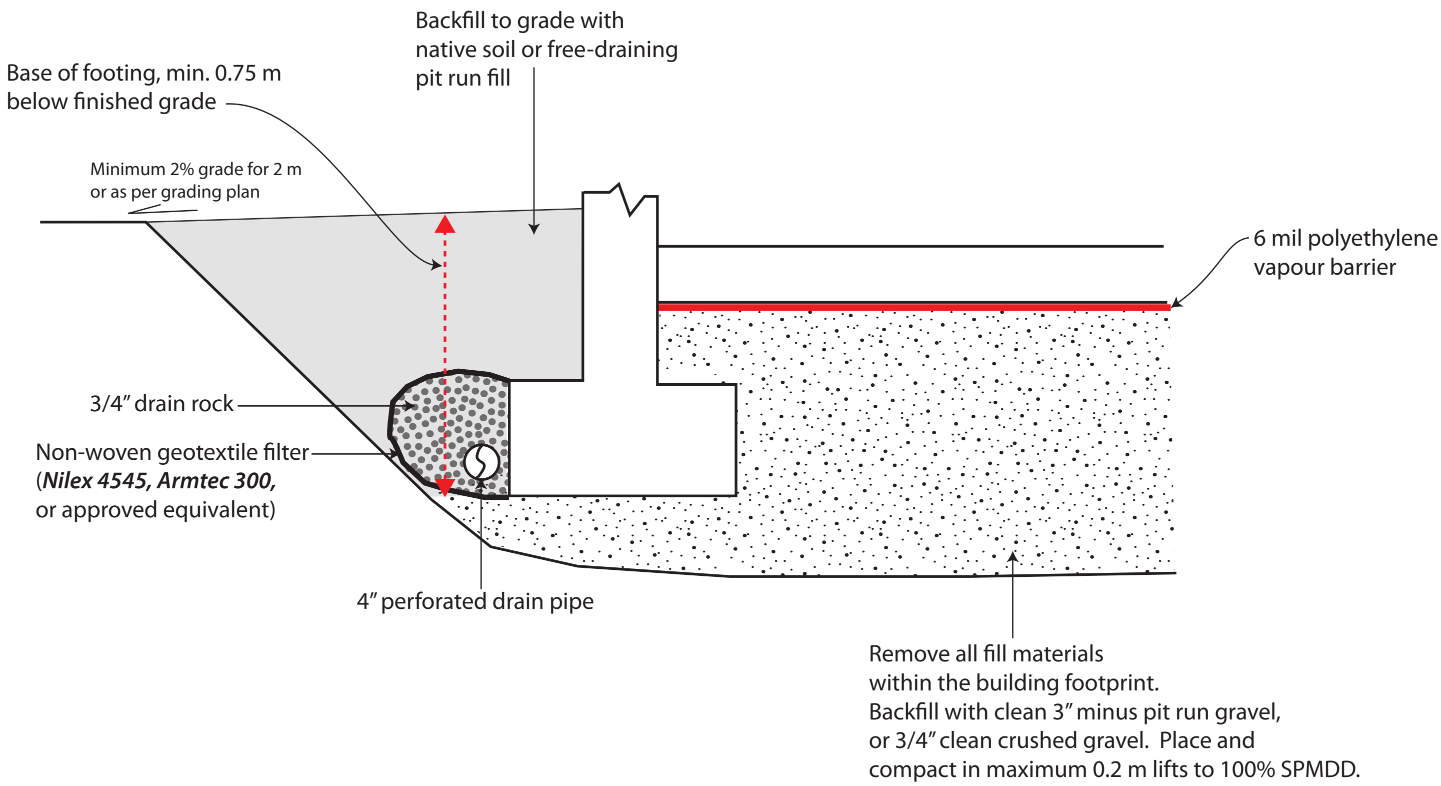
MOISTURE DETERMINATION			WASH TEST		
Mass of Moist Sample	g		Mass of dry sample	682.6	g
Mass of Dry Sample	g		Mass of Washed Sample	677.4	g
Loss of Moisture	g		Mass Lost(Passing 0.075mm)	5.2	g
% Moisture			Passing 0.075mm on Dry Siev	2.5	g
Fineness Modulus			Total Passing 0.075mm	7.7	g

Sieve Size	Mass Retained	%Retained	%Passing	**Fine Agg.**		Mass Retained	%Retained	%Passing
19.0								
12.5								
9.5								100.0
4.75						3	0.4	99.6
2.36						9.6	1.4	98.2
1.18						34.2	5.0	93.1
0.600						221.5	32.5	60.7
0.300						340.7	49.9	10.8
0.150						57.6	8.4	2.3
0.075						8.2	1.2	1.1
PAN						7.7	1.1	
TOTAL						682.5		





DEVERNEY ENGINEERING SERVICES LTD.		Figure 1 Plan View of Subject Property Geotechnical Investigation Building Foundation, Kootenay Operations Centre 120 Ootischenia Road, Castlegar, BC FortisBC Inc.			
Reference:	Date: Aug., 2012	Designed by: NLD	Drawn by: DLRD	Scale: 1:2,500	Job number: DE11-1007



DEVERNEY ENGINEERING SERVICES LTD.		Figure 2 Foundation Detail Geotechnical Investigation Building Foundation, Kootenay Operations Centre 120 Ootischenia Road, Castlegar, BC FortisBC Inc.			
Reference:	Date: Aug., 2012	Designed by: NLD	Drawn by: DLRD	Scale: 1:NTS	Job number: DE11-1007

Appendix J

KOC BUILDING PLANS

MQN ARCHITECTS
#100 – 3313 32nd Avenue, Vernon, BC V1T 2M7
T: 250-542-1199 www.mqnarchitects.com

SEAL

CONSULTANT

NO.	REV.	ISSUE	YYYY/MM/DD

PROJECT TITLE

KOOTENAY OPERATIONS CENTRE

DRAWING TITLE

AERIAL VIEW

PROJECT:	09491
SCALE:	
DRAWN BY:	JV
CHECKED BY:	Checker

DRAWING:

A102C

GENERAL NOTES

1. THE ENTIRE ARCHITECTURAL DRAWING PACKAGE IS THE SOLE PROPERTY OF THE ARCHITECT. ALL RIGHTS ARE RESERVED AND ANY USE OR REPRODUCTION OF THE ARCHITECTURAL DOCUMENTS WITHOUT PRIOR WRITTEN CONSENT OR PERMISSION IS STRICTLY PROHIBITED.
2. THE CONTRACTOR/CONSTRUCTOR (AND ANY OTHER SUBCONTRACTORS REQUIRED) SHALL REVIEW AND EXAMINE THE SITE AND PORTIONS THEREOF WHICH WILL AFFECT HIS WORK. CONTRACTORS/CONSTRUCTORS SHALL COMPARE THE EXISTING CONDITIONS WITH THE CONSTRUCTION DRAWINGS AND SPECIFICATIONS AND SATISFY THEMSELVES AS TO THE CONDITIONS UNDER WHICH WORK IS TO BE PERFORMED. THE CONTRACTOR/CONSTRUCTOR SHALL VERIFY THAT NO CONFILICT EXISTS IN LOCATIONS OF ANY AND ALL MECHANICAL, TELEPHONE, ELECTRICAL, PLUMBING AND FIRE PROTECTION SYSTEMS AND EQUIPMENT, INCLUDING ALL PIPING, DUCT WORK AND CONDUIT, AND THAT ALL REQUIRED CLEARANCES FOR INSTALLATION AND MAINTENANCE OF ABOVE EQUIPMENT ARE PROVIDED. EXPOSED OR CONCEALED ELEMENTS SHALL BE IDENTIFIED AND REVIEWED WITH THE ARCHITECT PRIOR TO COMMENCEMENT OF WORK. NO ALLOWANCES SHALL BE MADE FOR ANY EXTRA EXPENSES INCURRED DUE TO FAILURE OR NEGLECT ON THE CONTRACTOR/CONSTRUCTOR'S PART TO MAKE SUCH IDENTIFICATION.
3. ALL DETAIL DRAWINGS ARE FOR DESIGN PURPOSE. THE CONTRACTOR AND/OR CONSTRUCTOR MUST PROVIDE SHOP DRAIWNGS FOR REVIEW AND APPROVAL BY THE ARCHITECT PRIOR TO ORDERING AND/OR FABRICATION OF MATERIALS.
4. THE CONTRACTOR AND/OR CONSTRUCTOR SHALL SUBMIT SHOP DRAWINGS FOR ALL FABRICATED ITEMS, CUT SHEETS, PRODUCT DATA AND MAINTENANCE MANUALS FOR ALL FIXTURES AND EQUIPMENT AND SAMPLES OF FINISHED PROPOSED BY THE ARCHITECT AND/OR OWNER PRIOR TO COMMENCEMENT OF WORK.
5. THE CONTRACTOR/CONSTRUCTOR SHALL REVIEW SHOP DRAWINGS, PRODUCT DATA, PRODUCT DAMPLES ETC. AND SIGN SHOP DRAWINGS PRIOR TO SUBMITTAL TO THE ARCHITECT. ONCE THE CONTRACTOR AND/OR CONSTRUCTOR HAVE COMPLETED REVIEW AND APPROVAL, SUBMITTALS SHOULD BE ISSUED TO THE OWNER AND ARCHITECT FOR FINAL APPROVAL. THE CONTRACTOR AND/OR CONSTRUCTOR MUST NOT PROCEED WITH MATERIAL PROCUREMENT OR CONSTRUCTION UNTIL APPROVALS ARE OBTAINED.
6. THE CONTRACTOR AND/OR CONSTRUCTOR SHALL REVIEW THE ARCHITECTURAL DOCUMENTS FOR CONFORMANCE WITH ALL APPLICABLE CODES AND BY-LAWS AND SHALL ADVISE THE ARCHITECT OF ANY DISCREPANCIES PRIOR TO COMMENCEMENT OF WORK.
7. THE CONTRACTOR AND/OR CONSTRUCTOR SHALL REVIEW AND VERIFY ALL DIMENSIONS INDICATED ON THE ARCHITECTURAL DRAWINGS AND SHALL REPORT ANY ERRORS AND/OR OMISSIONS TO THE ARCHITECT PRIOR TO COMMENCEMENT OF WORK.
8. IN THE EVENT OF A CONFLICT BETWEEN DATA AND INFORMATION INDICATED ON DRAIWNGS AND/OR SPECIFICATIONS, THE SPECIFICATIONS SHALL GOVERN. DETAIL DRAWINGS SHALL TAKE PRECEDENCE OVER DRAWINGS OF SMALLER SCALE.
9. ALL WRITTEN DIMENSIONS SHALL HAVE PRECEDENCE. THE ARCHITECTURAL DRAWINGS ARE NOT TO BE SCALED.
10. THE CONTACTOR/CONSTRUCTOR SHALL REVIEW, CONFIRM AND COORDINATE THE INFORMATION INDICATED WITHIN THE ARCHITECTURAL DRAWING AND SPECIFICATION PACKAGE WITH ALL OTHER ASSOCIATED INFORMATION PROVIDED BY THE CIVIL, STRUCTURAL, MECHANICAL, FIRE PROTECTION, ELECTRICAL, ACOUSTICAL, LANDSCAPE, INTERIOR DESIGN ETC. DISCIPLINES AND SHALL REPORT ANY ERRORS AND/OR OMISSIONS TO THE ARCHITECT AND ALL OTHER PERTINENT CONSULTANT PRIOR TO COMMENCEMENT OF WORK.
11. THE CONTRACTOR/CONSTRUCTOR SHALL RESTORE ANY DAMAGE TO ADJACENT CITY OF CASTLEGAR PROPERTY DURING CONSTRUCTION TO MATCH EXISTING CITY OF CASTLEGAR STANDARDS.
12. N.I.C. INDICATES ITEMS NOT INCLUDED WITHIN THIS CONTRACT.
13. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
14. ALL CONSTRUCTION SHALL COMPLY WITH THE BRITISH COLUMBIA BUILDING CODE (2012 EDITION) IN ADDITION TO ALL OTHER APPLICABLE CODES, ORDINANCES AND STATUTES.
15. THE CONTRACTOR/CONSTRUCTOR SHALL PROVIDE ALL REQUIRED INTERIOR AND EXTERIOR FIRE-STOPPING IN ACCORDANCE WITH BRITISH COLUMBIA BUILDING CODE (2012 EDITION) REQUIREMENTS. REFER TO FIRE-STOPPING NOTES FOR ADDITIONAL INFORMATION.

FIRE STOPPING NOTES

1. PROVIDE ALL REQUIRED FIRE-STOPPING WHERE APPLICABLE AS REQUIRED IN COMPLIANCE WITH ALL BRITISH COLUMBIA BUILDING CODE (2012 EDITION) FIRE-STOPPING REQUIREMENTS.
2. ALL JOINTS AND/OR PENETRATIONS THRU A MEMBRANE FORMING PART OF AN ASSEMBLY REQUIRED TO HAVE A FIRE RESISTANCE RATING AND/OR A FIRE SEPARATION SHALL BE TIGHTLY FITTED OR SEALED WITH AN APPROVED FIRE-STOPPING SYSTEM THAT HAS AN ‘F’ RATING NOT LESS THAN THE FIRE PROTECTION RATING FOR CLOSURES WITHIN THE FIRE SEPARATION WHEN SUBJECTED TO THE TEST METHODS DESCRIBED IN ULC – S115 ‘FIRE TESTS OF FIRE-STOP SYSTEMS’.
3. FOR THE PURPOSES INTENDED BY THE REQUIREMENTS DESCRIBED ABOVE, ‘TIGHT-FITTING’ SHALL MEAN CAST IN PLACE FOR CONCRETE APPLICATIONS AND EQUIVALENT TO AN AIR BARRIER IN OTHER TYPES OF CONSTRUCTION.
4. THE CONTRACTOR/CONSTRUCTOR SHALL PROVIDE THE ARCHITECT AND AUTHORITIES HAVING JURISDICTION EITHER ULC OR CUL APPROVEDFIRE-STOP ASSEMBLY DOCUMENTATION OR PROVIDE FIRE-STOPPING ENGINEERED WRITTEN JUDGEMENT SIGNED BY A P. ENG. FOR SUBMISSION AND APPROVAL BY AUTHORITY HAVING JURISDICTION PRIOR TO COMMENCEMENT OF WORK.
5. THE CONTRACTOR/CONSTRUCTOR SHALL CONFIRM THAT ALL REQUIRED FIRE-STOPPING WORK MUST BE PERFORMED BY PERSONAL TRAINED BY AN APPROVED/CERTIFIED TECHNICAL FIRE-STOPPING INSTRUCTOR PRIOR TO COMMENCEMENT OF WORK.
6. REFER TO SPECIFICATIONS FOR ADDITIONAL FIRE-STOPPING INFORMATION.

FIRE SEPARATION NOTES

1. REFER TO ARCHITECTURAL DRAWINGS FIRE RATING PLAN FOR INTERIOR AND EXTERIOR REQUIRED FIRE RATED WALL AND/OR PARTITION INFORMATION.
2. ALL GYPSUM BOARD LOCATED WITH A DESIGNATED FIRE RATED WALL AND/OR PARTITION TO BE TYPE ‘X’ UNLESS OTHERWISE NOTED OR INDICATED.
3. ALL FIRE RATED PARTITIONS ARE TO EXTEND FROM THE FLOOR TO THE UNDERSIDE OF FLOOR STRUCTURE OR ROOF DECK STRUCTURE ABOVE UNLESS OTHERWISE NOTED OR INDICATED.
4. PROVIDE CONTINUOUS FIRE-STOPPING TO UNDERSIDE OF METAL DECKING WHERE FIRE RATED PARTITION ABUTS OR TERMINATES AT DECKING.
5. ALL JOINTS AND PENETRATIONS THRU REQUIRED FIRE RATED PARTITIONS ARE TO BE FILLED AND SEALED (BOTH SIDES) WITH APPROVED FIRE-STOPPING SYSTEMS AND MATERIALS TO ACHIEVE A CONTINUOUS SMOKE-TIGHT BARRIER.
6. PROVIDE MINERAL FIBRE ABSORPTIVE MATERIAL WITHIN ALL RATED INTERIOR PARTITIONS UNLESS OTHERWISE NOTED OR INDICATED.

CONCRETE AND CONCRETE BLOCK WALLS AND PARTITION NOTES

1. ALL CONCRETE BLOCK WALLS TO EXTEND TO UNDERSIDE OF STRUCTURE ABOVE, UNLESS OTHERWISE NOTED OR INDICATED.
2. PROVIDE CONTINUOUS COMPRESSIBLE JOINT FILLER AT TOP OF ALL BLOCK WALLS AND PARTITIONS.
3. PROVIDE CONTINUOUS CALKING AT TOP JOINT WHERE EXPOSED.
4. PROVIDE CONTINUOUS FIRE STOPPING AND SMOKE SEALS AT ALL PERIMETER JOINTS AND PENETRATIONS LOCATED WITHIN DESIGNATED FIRE RATED BLOCK PARTITIONS. REFER TO FIRE STOPPING NOTES.
5. PROVIDE LATERAL BRACING AS REQUIRED AT TOP OF ALL CONCRETE BLOCK PARTITIONS. REFER TO STRUCTURAL FOR LATERAL BRACING DETAILS.
6. REFER TO DETAILS FOR REVEALS AND CHAMFERS LOCATED WITHIN ARCHITECTURAL CONCRETE. REFER TO STRUCTURAL AND COORDINATE CONCRETE DETAILS AS REQUIRED.
7. REFER TO ELEVATIONS, DETAILS, SPECIFICATIONS AND MATERIALS SCHEDULES FOR EXPOSED CONCRETE FINISH INCLUDING POLISHED CONCRETE AND/OR LIGHT SANDBLASTED CONCRETE.
8. PROVIDE CONTINUOUS CONCRETE INFILL WITHIN CONCRETE BLOCK CORES IN ACCORDANCE WITH STRUCTURAL REQUIREMENTS. REFER TO STRUCTURAL FOR ADDITIONAL INFORMATION.

EXTERIOR WALL NOTES

1. SUPPLY AND INSTALL ALL EXTERIOR BUILDING ENVELOPE MATERIALS IN STRICT ACCORDANCE WITH MANUFACTURES’ RECOMMENDATIONS. REFER ALSO TO SPECIFICATIONS.
2. PROVIDE CONTINUOUS PEEL AND STICK MEMBRANE (MINIMUM 150mm BOTH SIDES) AT ALL ABUTMENTS OF DISSIMILAR MATERIALS PRIOR TO INSTALLATION OF POLYURETHANE SPRAY FOAM INSULATION (TYPICAL).
3. REFER TO EXTERIOR WALL SECTIONS AND WALL TYPES FOR EXTENT OF EXTERIOR GYPSUM BOARD LOCATIONS.
4. REFER TO ARCHITECTURAL DRAWINGS, WALL TYPES AND BUILDING CODE COMPLIANCE INFORMATION FOR LOCATION AND EXTENT OF ALL EXTERIOR WALL FIRE SEPARATIONS AND/OR EXTERIOR WALL FIRE RESISTANCE RATINGS.
5. ALL EXTERIOR METAL STUD FRAMING TO BE DESIGNED C/W SIGNED AND SEALED SHOP DRAWINGS BY A CERTIFIED PROFESSIONAL ENGINEER REGISTERED WITHIN THE PROVINCE OF BRITISH COLUMBIA.
6. PROVIDE A CONTINUOUS FOAM GASKET C/W WIDTH TO MATCH WIDTH OF BOTTOM TRACK AT ALL EXTERIOR WALL STEEL STUD FRAMING BOTTOM SILL TRACK CONDITIONS.
7. ENSURE CONTINUITY OF AIR/VAPOUR BARRIER AT ALL EXTERIOR BUILDING ENVELOPE MATERIAL TRANSITIONS (TYPICAL).
8. ENSURE ALL SURFACES SCHEDULED TO RECEIVE POLYURETHANE SPRAY FOAM INSULATION ARE CLEAN, DRY AND FREE FROM EXCESS DEBRIS PRIOR TO APPLICATION.
9. PROVIDE A 6mm EXPANSION JOINT GAP C/W CONTINUOUS FOAM ROD AND CAULKING SEAL (BOTH SIDES) AT ABUTMENT OF ALL CONCRETE BLOCK WALLS AND STRUCTURAL STEEL COLUMNS.
10. PROVIDE CONTINUOUS PERIMETER FOAM ROD AND CAULKING AT ALL PENETRATIONS THRU THE EXTERIOR BUILDING ENVELOPE AS REQUIRED TO ENSURE A ‘TIGHT- FITTING’ SEAL.

INTERIOR GYPSUM BOARD NOTES

1. ALL GYPSUM BOARD TO BE 5/8” THICKNESS UNLESS OTHERWISE NOTED OR INDICATED.
2. PROVIDE CONTINUOUS CAULKING AT ALL PERIMETER JOINTS AND PENETRATIONS THRU GYPSUM BOARD AS REQUIRED.
3. PROVIDE CONTINUOUS PERIMETER FIRE-STOPPING AT ALL PENETRATIONS THRU FIRE RATED PARTITIONS. REFER TO FIRE-STOPPING NOTES.
4. PROVIDE ALL NECESSARY BLOCKING, BACKING, FRAMING, HANGERS OR OTHER REQUIRED SUPPORT ASSEMBLIES BETWEEN STUD FRAMING AS REQUIRED TO ADEQUATELY SUPPORT/SECURE ALL MECHANICAL AND ELECTRICAL FIXTURES, CABINETRY, FURNISHINGS, ETC. PRIOR TO BOARDING OF WALL PARTITIONS.
5. PROVIDE FIBERGLASS REINFORCED, MOISTURE RESISTANT GYPSUM BOARD AT ALL LOCATIONS DESIGNATED TO RECEIVE CERAMIC WALL TILE FINISH.
6. PROVIDE FIBRE REINFORCED CEMENT BOARD AT ALL LOCATIONS DESIGNATED AS SHOWERS TO RECEIVE CERAMIC WALL TILE FINISH.
7. REFER TO INTERIOR ELEVATIONS AND INTERIOR DETAILS FOR ADDITIONAL GYPSUM BOARD INFORMATION.
8. REFER TO SPECIFICATIONS FOR ADDITIONAL GYPSUM BOARD INFORMATION.

STEEL STUD FRAMING NOTES

1. ALL METAL STUDS LOCATED WITHIN DESIGNATED ‘NON-LOAD BEARING’ SINGLE STUD ACOUSTIC WALLS TO BE MINIMUM 25 GAUGE. REFER TO SPECIFICATIONS.
2. ALL FULL HEIGHT METAL STUD PARTITION WALLS TO BE CONTINUOUSLY ACOUSTICALLY SEALED AT HEAD AND SILL PLATES WITH TWO EACH BEADS OF ACOUSTICAL CAULKING BOTH SIDES OF METAL BOTTOM AND TOP TRACKS.
3. REFER TO SPECIFICATIONS FOR ADDITIONAL STEEL STUD FRAMING INFORMATION.

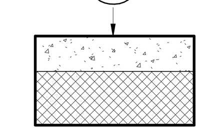
FLOOR NOTES

1. ALL CONCRETE FLOOR SLABS TO BE LEVEL, CLEAN AND FREE OF DEBRIS PRIOR TO INSTALLATION OF FINISH FLOOR MATERIAL.
2. INSTALL ALL FINISH FLOOR MATERIALS IN STRICT ACCORDANCE WITH MANUFACTURERS’ RECOMMENDATIONS AND REQUIREMENTS.
3. PROVIDE FINAL CLEANING OF ALL FINISH FLOOR MATERIALS IN STRICT ACCORDANCE WITH MANUFACTURERS’ RECOMMENDATIONS AND REQUIREMENTS.
4. REFER TO ROOM FINISH SCHEDULE FOR FLOOR FINISHES.

ROOF NOTES

1. INSTALL ROOFING MATERIALS IN STRICT ACCORDANCE WITH MANUFACTURES’ RECOMMENDATIONS AND REQUIREMENTS.
2. REFER TO MECHANICAL DRAWINGS FOR EXTENT AND LOCATION OF ALL MECHANICAL ROOFTOP UNITS, ROOF PENETRATIONS AND ADDITIONAL ROOF MOUNTED MECHANICAL EQUIPMENT.
3. PROVIDE BUILT-UP ROOF BACK SLOPE AS REQUIRED AT ALL ROOFTOP MECHANICAL EQUIPMENT LOCATIONS AS REQUIRED TO ACHIEVE CONTINUOUS POSITIVE DRAINAGE FROM EQUIPMENT LOCATIONS TOWARDS ROOF DRAIN LOCATIONS. REFER TO ARCHITECTURAL ROOF PLAN. REFER TO MECHANICAL.
4. PROVIDE 4” THICKNESS CONCRETE SUPPORT AND VIBRATION MITIGATION PADS AT ALL MECHANICAL ROOFTOP LOCATIONS. REFER TO DETAILS. REFER TO MECHANICAL.
5. REFER TO SPECIFICATIONS FOR ADDITIONAL ROOFING INFORMATION.

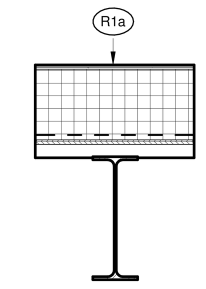
FLOOR ASSEMBLIES

F1a


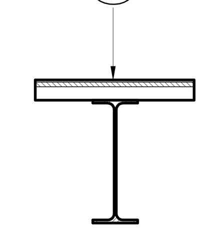
CONCRETE SLAB ON GRADE

REINFORCED CONCRETE SLAB (REFER TO STRUCTURAL)
10 MIL POLY VAPOUR BARRIER
COMPACTED GRANULAR FILL (REFER TO STRUCTURAL AND GEOTECH)

ROOF ASSEMBLIES

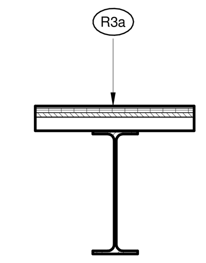
R1a


2 PLY SBS ROOFING MEMBRANE
6mm DENSDECK PRIME
R40 RIGID INSULATION
CONTINUOUS AIR BARRIER / ROOF RETARDER COMPATIBLE WITH ROOFING MEMBRANE SYSTEM
13mm DENS DECK SHEATHING
METAL ROOF DECK (REFER TO STRUCTURAL)
SLOPED ROOF STRUCTURE (REFER TO STRUCTURAL)

R2a


COVERED PARKING ROOF

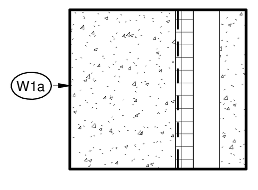
2 PLY SBS ROOFING MEMBRANE
13mm DENS DECK SHEATHING
METAL ROOF DECK (REFER TO STRUCTURAL)
SLOPED ROOF STRUCTURE (REFER TO STRUCTURAL)

R3a


CANOPY ROOF

2 PLY SBS ROOFING MEMBRANE
TAPERED INSULATION AS REQUIRED TO CREATE MINIMUM 2% BACK SLOPE
13mm DENS DECK SHEATHING
METAL ROOF DECK (REFER TO STRUCTURAL)
ROOF STRUCTURE (REFER TO STRUCTURAL)

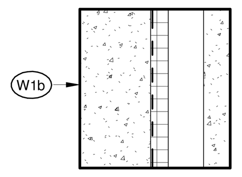
EXTERIOR WALL ASSEMBLIES

W1a


PRECAST CONCRETE UPSTAND - WAREHOUSE / WASHBAY

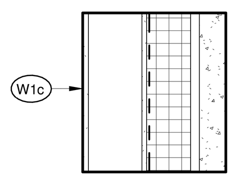
CONCRETE WALL (REFER TO STRUCTURAL)
CONTINUOUS AIR / VAPOUR BARRIER MEMBRANE OR DAMPROOFING
50mm RIGID INSULATION (R10)
100mm AIR SPACE
75mm PRECAST CONCRETE (PAINTED) C/W ANCHORS BY PRECAST SUPPLIER / CONTRACTOR.

NOTE: PROVIDE CONTINUOUS AIR / VAPOUR BARRIER MEMBRANE WHEN ABOVE GRADE AND DAMPROOFING BELOW GRADE

W1b


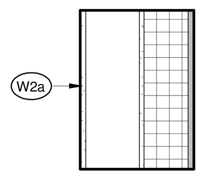
FOUNDATION WALL - OFFICE

CONCRETE WALL (REFER TO STRUCTURAL)
DAMPROOFING
50mm RIGID INSULATION (R10)
100mm AIR SPACE
75mm PRECAST CONCRETE (PAINTED) C/W ANCHORS BY PRECAST SUPPLIER / CONTRACTOR.

W1c


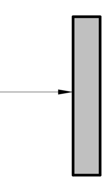
PRECAST CONCRETE UPSTAND - OFFICE

16mm TYPE `X' GYPSUM BOARD
152mm STEEL STUDS @ 400mm O.C.
13mm DENS GLASS EXTERIOR SHEATHING
CONTINUOUS AIR / VAPOUR BARRIER MEMBRANE
125mm SEMI-RIGID INSULATION (R21)
25mm AIR SPACE
75mm PRECAST CONCRETE (PAINTED) C/W ANCHORS BY PRECAST SUPPLIER / CONTRACTOR.

W2a


FIBRE CEMENT WALL PANELS - OFFICE

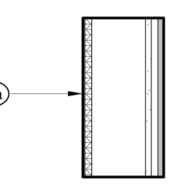
16mm TYPE `X' GYPSUM BOARD
152mm STEEL STUDS @ 400mm O.C.
13mm DENS GLASS EXTERIOR SHEATHING
CONTINUOUS AIR / VAPOUR BARRIER MEMBRANE
63.5mm HORIZONTAL Z-GIRTS @ 400mm O.C.
63.5mm 18 GA VERTICAL Z-GIRTS @ 400mm O.C.
125mm SEMI-RIGID INSULATION (R21) WITHIN GIRT SPACE
FIBRE CEMENT WALL PANELS

W3a


VERTICAL INSULATED METAL PANEL - FLEET / WAREHOUSE

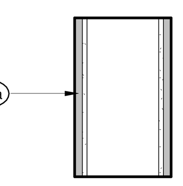
76mm THICK (R20) VERTICAL INSULATED METAL PANEL BY KINGSPAN
PROFILE: MICRORIB
COLOUR: SANDSTONE
WIDTH: 3'-0"

REFER TO STRUCTURAL FOR SUPPORT

W4a


CANOPY PARAPET - OFFICE

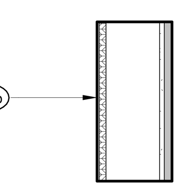
2 PLY SBS ROOF MEMBRANE
19mm PLYWOOD
152mm STEEL STUDS @ 400mm O.C.
16mm DENS GLASS EXTERIOR SHEATHING
AIR BARRIER
19mm X 76mm TREATED PLYWOOD FURRING @ 400mm O.C.
WOOD CLADDING

W5a


HORIZONTAL INSULATED METAL PANEL - COVERED PARKING WALLS

22mm THICK HORIZONTAL CORRUGATED METAL PANEL BY VICWEST
AIR BARRIER
13mm DENS GLASS EXTERIOR SHEATHING
203mm STEEL STUDS @ 400MM O.C. (REFER TO STRUCTURAL)
13mm DENS GLASS EXTERIOR SHEATHING
AIR BARRIER
25mm THICK HORIZONTAL CORRUGATED METAL PANEL BY VICWEST

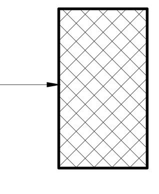
COLOUR TO BE DETERMINED

W5b


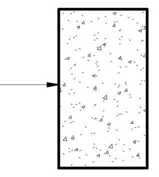
HORIZONTAL INSULATED METAL PANEL - COVERED PARKING PARAPET

22mm THICK HORIZONTAL CORRUGATED METAL PANEL BY VICWEST
AIR BARRIER
13mm DENS GLASS EXTERIOR SHEATHING
152mm STEEL STUDS@ 400MM O.C. (REFER TO STRUCTURAL)
19mm PLYWOOD
2 PLY SBS MEMBRANE

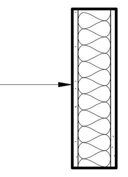
INTERIOR WALL PARTITIONS

P1a


190mm H x 240mm W x 390mm LG LIGHTWEIGHT CONCRETE BLOCK (REFER TO STRUCTURAL). PAINT BOTH SIDES, COLOUR TO BE DETERMINED BY INTERIOR DESIGNER.

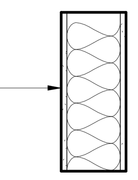
P2a


CONCRETE WALL (REFER TO STRUCTURAL)

P4a


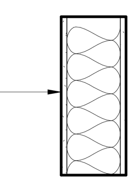
FIRE SEPARATION C/W 1 HR FIRE RESISTANCE RATING

16mm TYPE `X' GYPSUM BOARD
92mm STEEL STUDS @ 400mm O.C.
ROXUL MINERAL WOOL ACOUSTIC INSULATION
16mm TYPE `X' GYPSUM BOARD

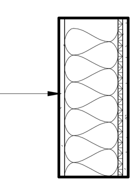
P6a


FIRE SEPARATION C/W 1 HR FIRE RESISTANCE RATING

16mm TYPE `X' GYPSUM BOARD
152mm STEEL STUDS @ 400mm O.C.
ROXUL MINERAL WOOL ACOUSTIC INSULATION
16mm TYPE `X' GYPSUM BOARD

P6b


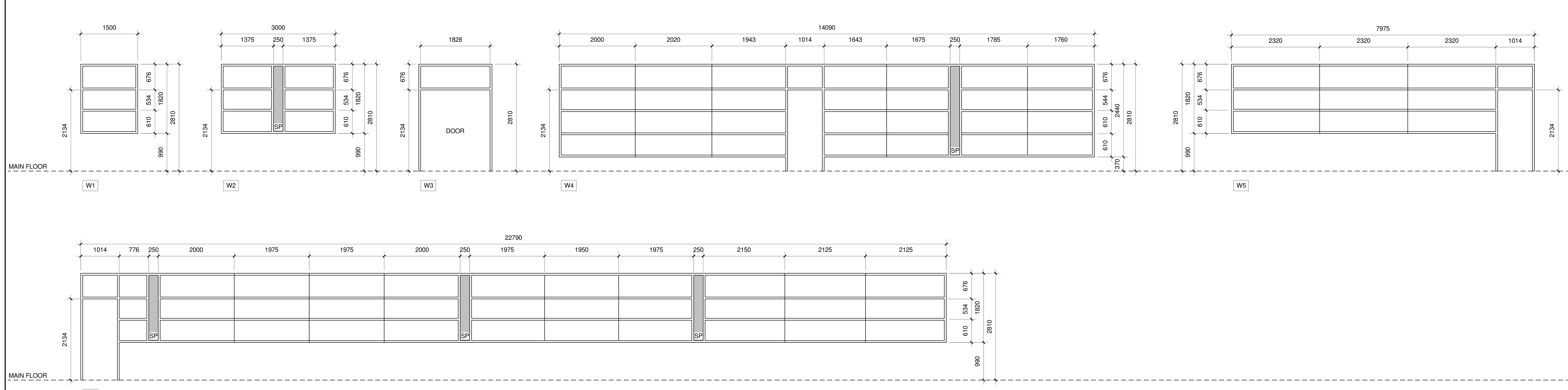
16mm TYPE `X' GYPSUM BOARD
152mm STEEL STUDS @ 400mm O.C.
ROXUL MINERAL WOOL ACOUSTIC INSULATION
16mm TYPE `X' GYPSUM BOARD

P6c


16mm TYPE `X' GYPSUM BOARD (OFFICE SIDE)
152mm STEEL STUDS @ 400mm O.C.
ROXUL MINERAL WOOL ACOUSTIC INSULATION
13mm PLYWOOD
16mm TYPE `X' ABUSE RESISTANT GYPSUM BOARD

NOTE: ABOVE 2400mm USE 16mm TYPE `X' GYPSUM BOARD AND 13mm x 38mm PLYWOOD STRIPS @400mm O.C. IN LIEU OF 16mm TYPE `X' ABUSE RESISTANT GYPSUM BOARD AND 13mm PLYWOOD (ONE SIDE).

WINDOW SCHEDULE



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1		ISSUED FOR 50% REVIEW	2015 / 02 / 05
2		ISSUED FOR COSTING	2015 / 02 / 13

PROJECT TITLE

KOOTENAY OPERATIONS CENTRE

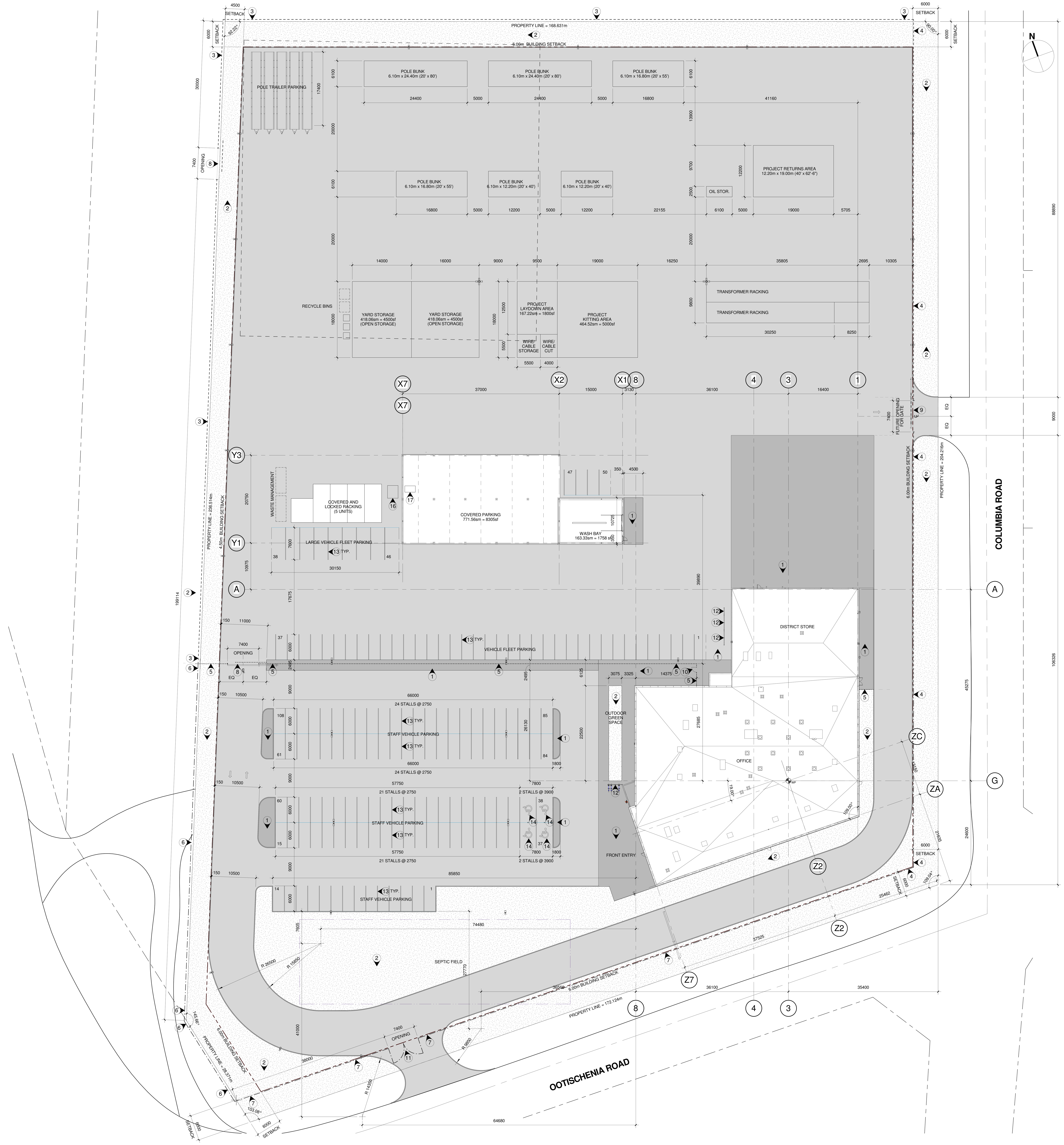
DRAWING TITLE

GENERAL NOTES, ASSEMBLIES AND WINDOW SCHEDULE

PROJECT:	09491
SCALE:	As indicated
DRAWN BY:	JV
CHECKED BY:	Checker

DRAWING:

A002



SITE LEGEND

DENOTES CONCRETE SIDEWALK AND CURB
REFER TO CIVIL / LANDSCAPE

DENOTES ASPHALT
REFER TO CIVIL

DENOTES LANDSCAPE AREA
REFER TO LANDSCAPE

DENOTES GRAVEL
REFER TO LANDSCAPE

WP WORKPOINT

DENOTES TYPE 1 GATE
FOR OCCUPANCY AND CONSTRUCTION

DENOTES TYPE 2 GATE
FOR OCCUPANCY

DENOTES TYPE 3 GATE
FOR CONSTRUCTION

CONSTRUCTION NOTES

1. CONCRETE SIDEWALK, REFER TO CIVIL AND LANDSCAPE
2. LANDSCAPE AREA, REFER TO LANSCAPE.
3. TYPE 1 GATE FOR OCCUPANCY AND CONSTRUCTION, TO BE LOCATED ALONG PROPERTY LINE
4. TYPE 1 GATE FOR OCCUPANCY AND CONSTRUCTION, TO BE LOCATED ALONG BUILDING SETBACK LINE (6.00m FROM PROPERTY LINE).
5. TYPE 2 GATE FOR OCCUPANCY, CONFIRM LOCATION ON SITE.
6. TYPE 3 GATE FOR CONSTRUCTION, TO BE LOCATED ALONG PROPERTY LINE.
7. TYPE 3 GATE FOR CONSTRUCTION, TO BE LOCATED ALONG BUILDING SETBACK LINE (6.00m FROM PROPERTY LINE).
8. ROLLING GATE, 7.40m (24'-0") OPENING REQUIRED.
9. LOCATION OF FUTURE ROLLING GATE, 7.40m (24'-0") OPENING REQUIRED. ENSURE POST ALIGNMENT IS SUITABLE FOR FUTURE GATE.
10. SINGLE PANEL SWING GATE
11. DOUBLE PANEL SWING GATE
12. BICYCLE RACK, REFER TO LANDSCAPE.
13. 4" WIDE PAINTED PARKING STALL LINES, TYPICAL. TRAFFIC WHITE PAINT.
14. PAINTED DESIGNATED ACCESSIBLE PARKING SYMBOL. TRAFFIC WHITE PAINT.
15. ACCESSIBLE SIDEWALK LETDOWN WITHIN CONCRETE SIDEWALK C/W MAXIMUM 1:12 SLOPE, REFER TO CIVIL.
16. TRANSFORMER. REFER TO ELECTRICAL.
17. TRANSFORMER RETURN. REFER TO ELECTRICAL.

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PROJECT TITLE

KOOTENAY OPERATIONS CENTRE

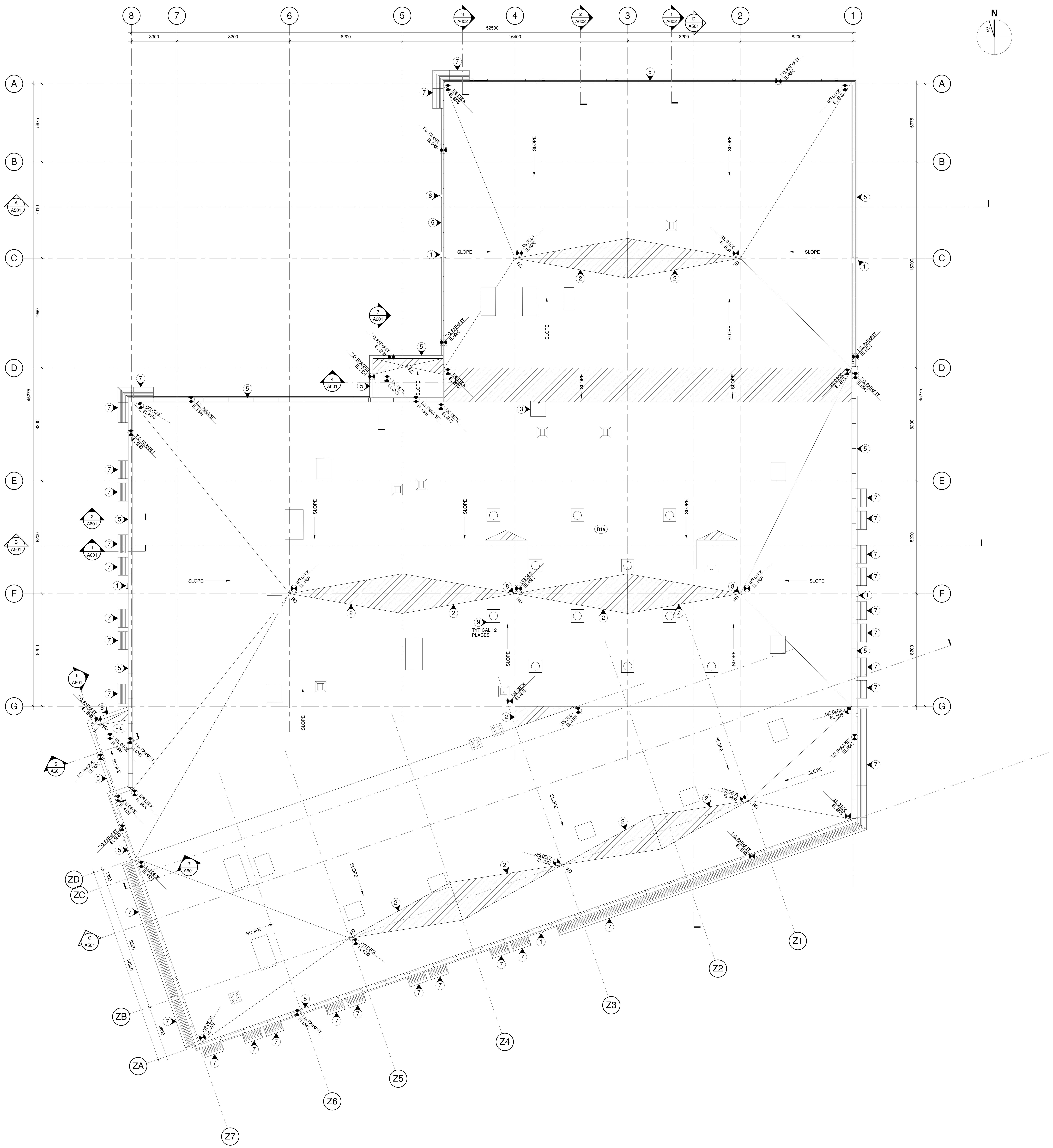
DRAWING TITLE

SITE PLAN

PROJECT:	09491
SCALE:	1 : 300
DRAWN BY:	AC/JV
CHECKED BY:	Checker

DRAWING:

A102



GENERAL NOTES

1. REFER TO STRUCTURAL, MECHANICAL AND ELECTRICAL FOR ADDITIONAL INFORMATION AND PROVIDE COORDINATION OF DISCIPLINES AS REQUIRED.
2. ALL ROOF TOP MECHANICAL UNITS TO BE PAINTED. COLOUR TO BE DETERMINED BY ARCHITECT PRIOR TO FABRICTION OF UNIT.
3. REFER TO MECHANICAL DRAWINGS FOR LOCATION AND SIZE OF ALL MECHANICAL ROOF PENETRATIONS.
4. REFER TO STRUCTURAL FOR ALL STRUCTURAL SUPPORT MEMBER LOCATIONS AND SIZES PERTAINING TO MECHANICAL UNIT ROOF SUPPORT AND/OR MECHANICAL DUCT PENETRATIONS.
5. PROVIDE CONTINUOUS PERIMETER BUILT-UP BACKSLOPE C/W POSITIVE SLOPE TO ROOF DRAINS AT ALL MECHANICAL ROOF TOP UNITS LOCATIONS.
6. ALL ROOF PARAPET CAP FLASHING TO BE PREFINISHED. COLOUR TO BE DETERMINED BY ARCHITECT.
7. PROVIDE TAPERED ROOF INSULATION AS REQUIRED TO ACHIEVE MINIMUM 2% ROOF BACKSLOPE (TYPICAL) WHERE NOTED OR INDICATED.

CONSTRUCTION NOTES

1 PREFINISHED ALUMINUM OVERFLOW ROOF DRAINAGE SCUPPER BOX C/W COLOUR TO MATCH IMMEDIATELY ADJACENT EXTERIOR WALL CLADDING COLOUR. CONFIRM COLOUR WITH ARCHITECT PRIOR TO FABRICATION. REFER TO ARCHITECTURAL DETAIL.

2 HATCHED AREA INDICATES EXTENT OF ROOF BACKSLOPE TO MECHANICAL ROOF DRAINS AS REQUIRED. REFER TO GENERAL NOTES.

3 ROOF MOUNTED METAL LOCKABLE ACCESS HATCH C/W FINISH PAINT. COLOUR TO BE CONFIRMED BY ARCHITECT. REFER TO SPECIFICATIONS. REFER TO ARCHITECTURAL DETAIL.

4 ROOF TOP MECHANICAL EQUIPMENT C/W FINISH PAINT.

5 PREFINISHED METAL ROOF PARAPET CAP FLASHING.

6 COMMUNICATIONS ANTENNA, 13m ABOVE PARAPET. REFER TO STRUCTURAL AND ANTENNA MANUFACTURER FOR SUPPORT.

7 PRE-FINISHED MANUFACTURED SUN SHADE CONNECTED TO WINDOW FRAMING. REFER TO SPECIFICATIONS.

8 BACK SLOPE ROOF INSUALTION TO DRAINS AT GRIDLINES F/2 AND F/4 TO ACCOMMODATE 1" DEFLECTION IN ROOF STRUCTURE.

9 SOLATUBE, REFER TO SPECIFICATIONS.

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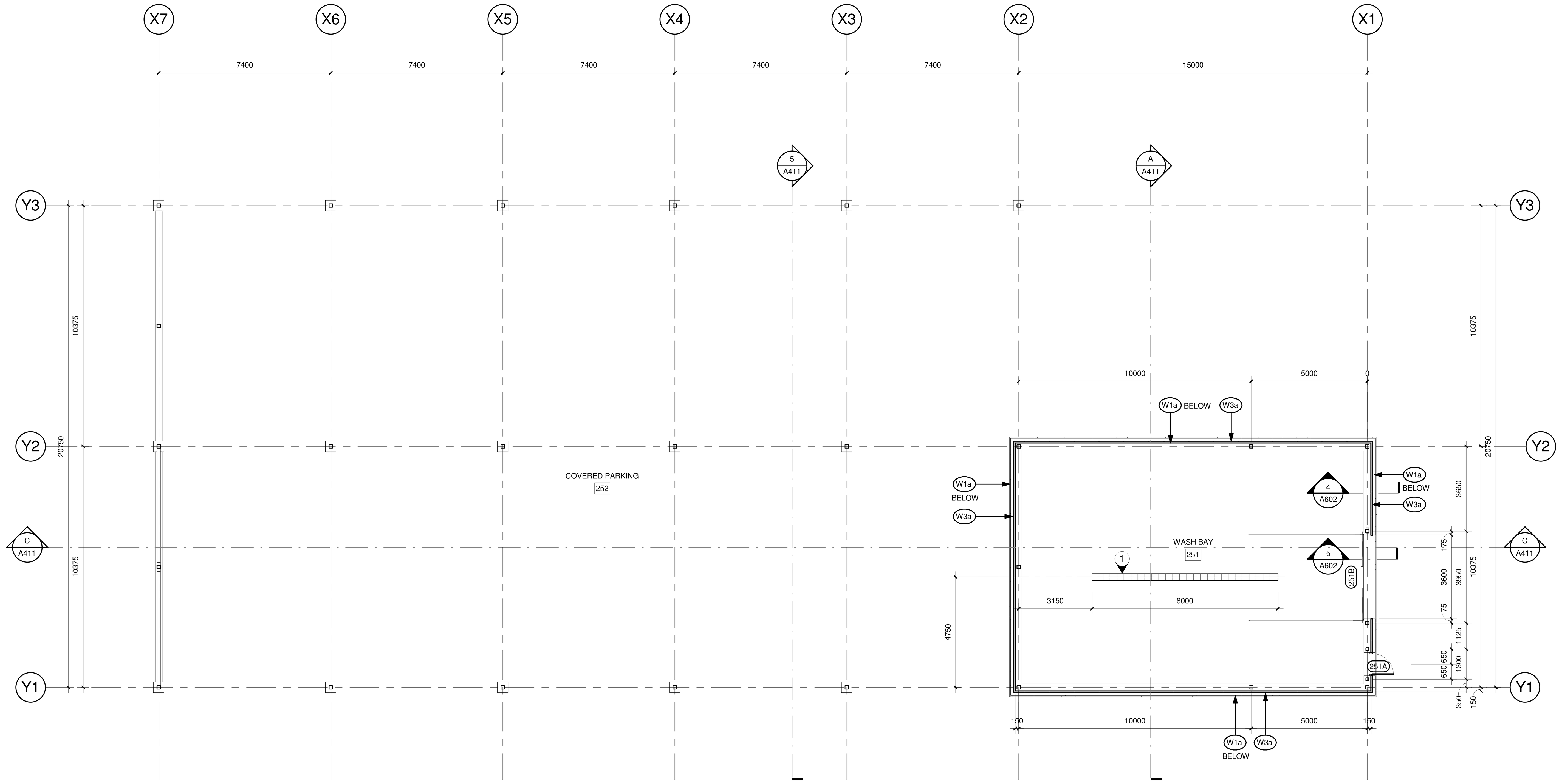
PROJECT TITLE

KOOTENAY OPERATIONS CENTRE

DRAWING TITLE

ROOF PLAN

PROJECT:	09491
SCALE:	1 : 100
DRAWN BY:	JV
CHECKED BY:	Checker
DRAWING:	A202



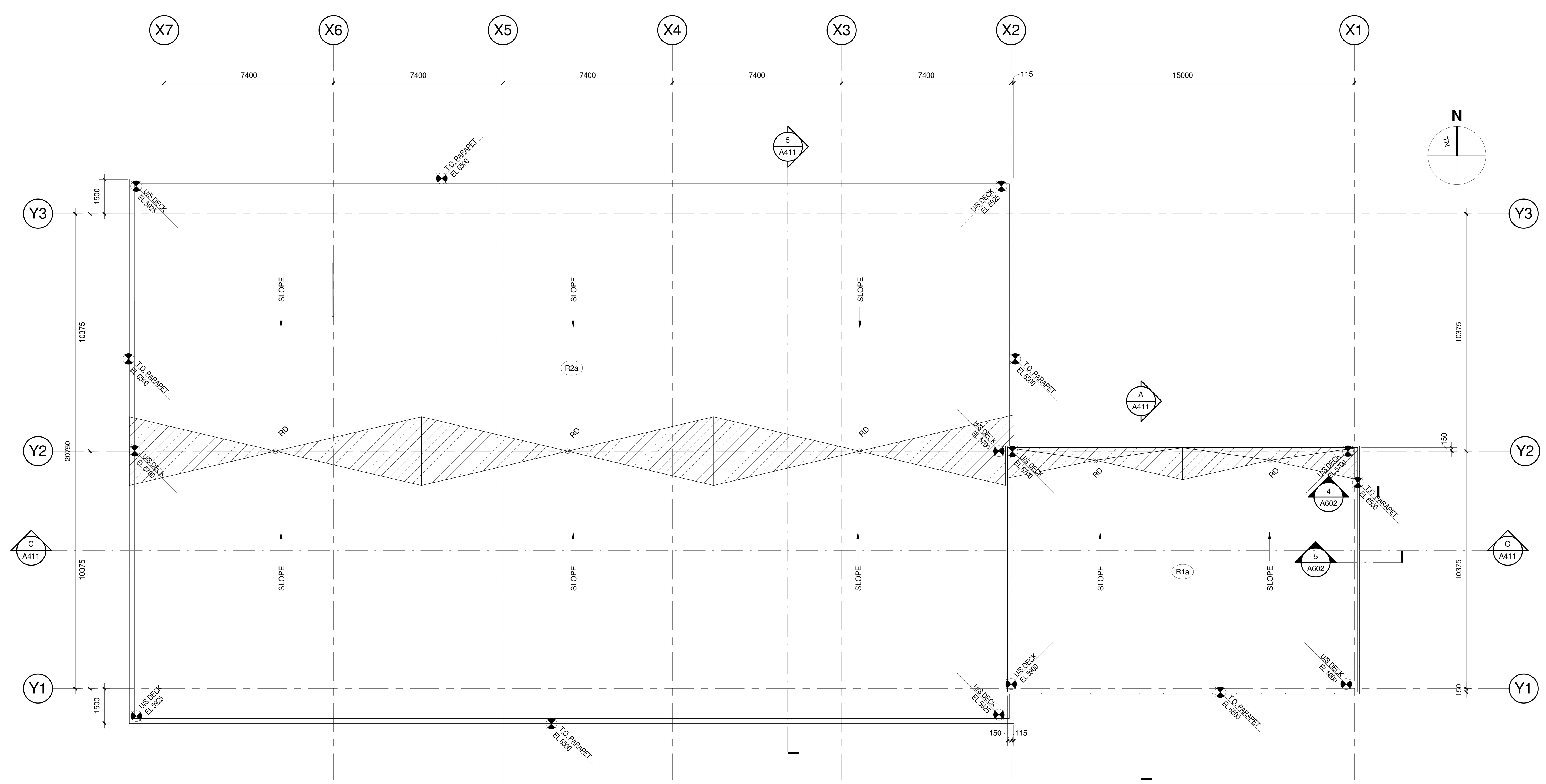
1 MAIN FLOOR - COVERED PARKING

GENERAL NOTES

1. REFER TO STRUCTURAL, MECHANICAL, ELECTRICAL AND INTERIOR DESIGN FOR ADDITIONAL INFORMATION AND PROVIDE COORDINATION OF DISCIPLINES AS REQUIRED.
2. N.I.C. INDICATES ITEMS NOT IN CONTRACT.

CONSTRUCTION NOTES

1. RECESSED TRENCH DRAIN, REFER TO MECHANICAL AND STRUCTURAL.



2 ROOF - COVERED PARKING

GENERAL NOTES

1. REFER TO STRUCTURAL, MECHANICAL AND ELECTRICAL FOR ADDITIONAL INFORMATION AND PROVIDE COORDINATION OF DISCIPLINES AS REQUIRED.
2. ALL ROOF TOP MECHANICAL UNITS TO BE PAINTED. COLOUR TO BE DETERMINED BY ARCHITECT PRIOR TO FABRICTION OF UNIT.
3. REFER TO MECHANICAL DRAWINGS FOR LOCATION AND SIZE OF ALL MECHANICAL ROOF PENETRATIONS.
4. REFER TO STRUCTURAL FOR ALL STRUCTURAL SUPPORT MEMBER LOCATIONS AND SIZES PERTAINING TO MECHANICAL UNIT ROOF SUPPORT AND/OR MECHANICAL DUCT PENETRATIONS.
5. PROVIDE CONTINUOUS PERIMETER BUILT-UP BACKSLOPE C/W POSITIVE SLOPE TO ROOF DRAINS AT ALL MECHANICAL ROOF TOP UNITS LOCATIONS.
6. ALL ROOF PARAPET CAP FLASHING TO BE PREFINISHED. COLOUR TO BE DETERMINED BY ARCHITECT.
7. PROVIDE TAPERED ROOF INSULATION AS REQUIRED TO ACHIEVE MINIMUM 2% ROOF BACKSLOPE (TYPICAL) WHERE NOTED OR INDICATED.

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PROJECT TITLE

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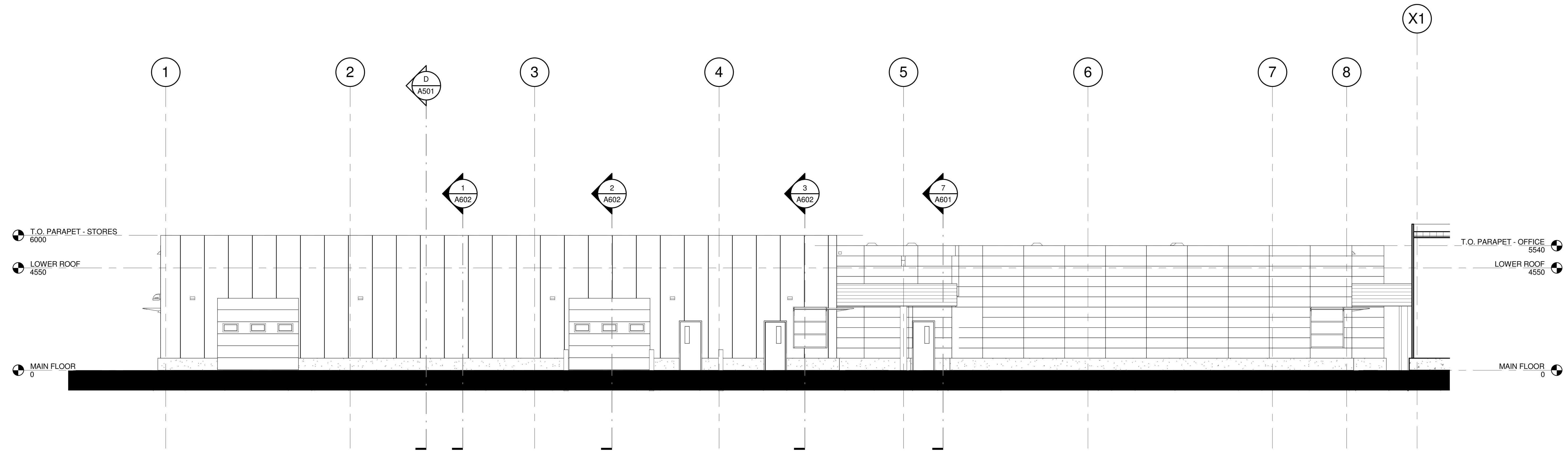
DRAWING TITLE

WASHBAY AND COVERED PARKING FLOOR AND ROOF PLAN

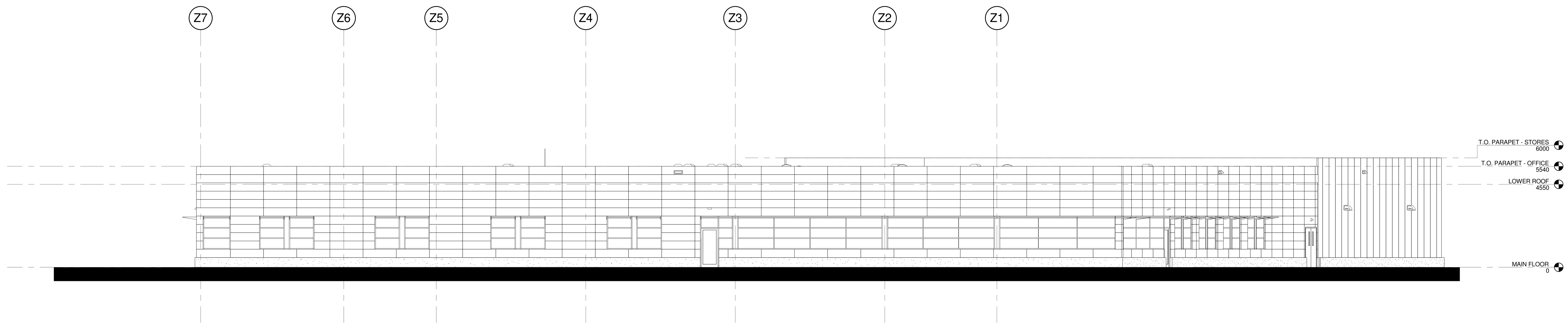
PROJECT:	09491
SCALE:	1 : 100
DRAWN BY:	JV
CHECKED BY:	Checker

DRAWING:

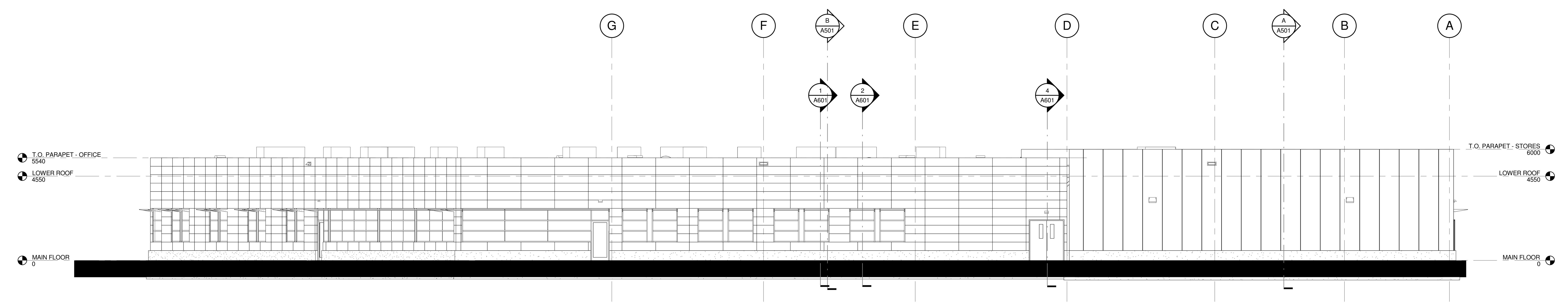
A211



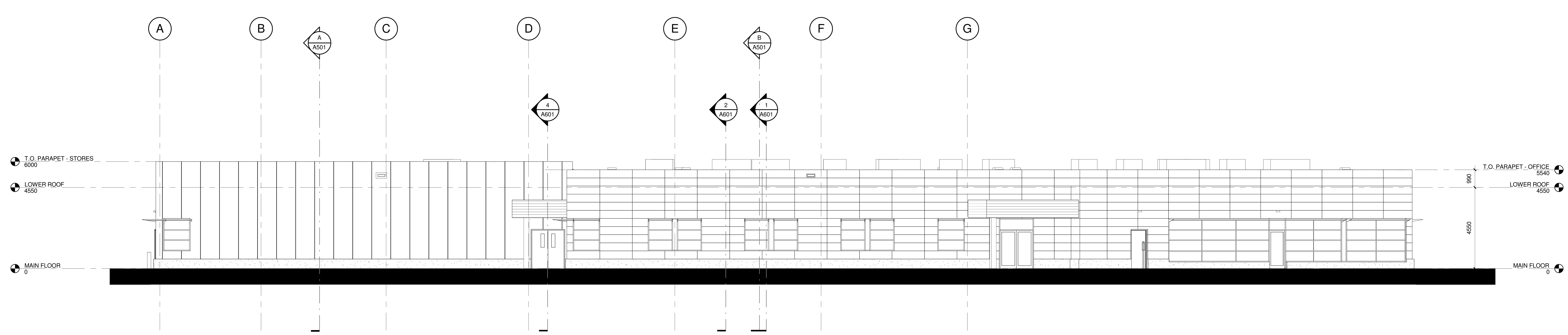
1 NORTH ELEVATION



2 SOUTH ELEVATION



3 EAST ELEVATION



4 WEST ELEVATION

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PROJECT TITLE

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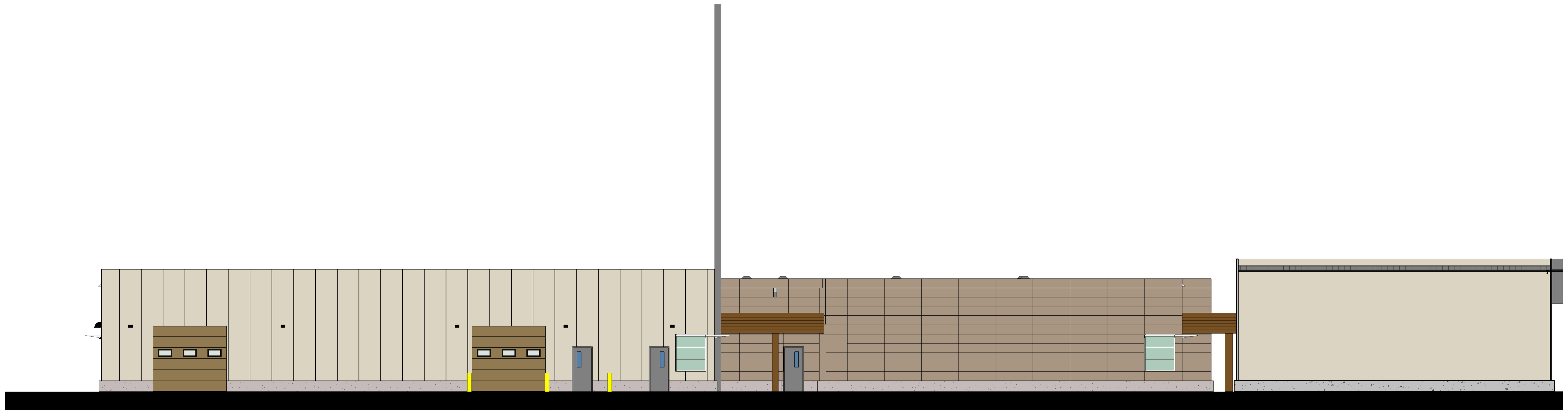
DRAWING TITLE

EXTERIOR ELEVATIONS

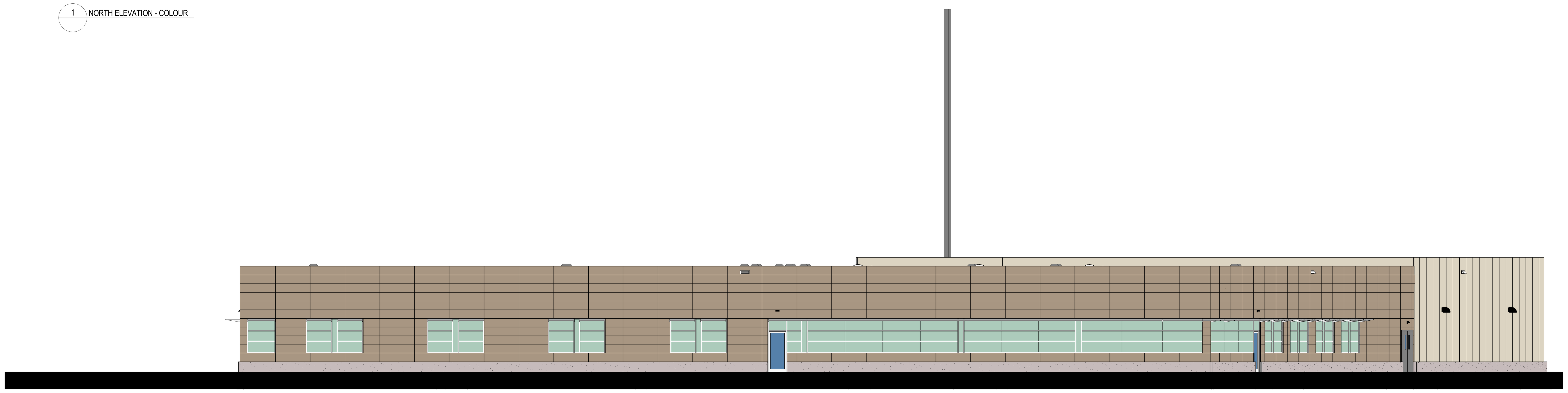
PROJECT:	09491
SCALE:	1 : 100
DRAWN BY:	JV
CHECKED BY:	Checker

DRAWING:

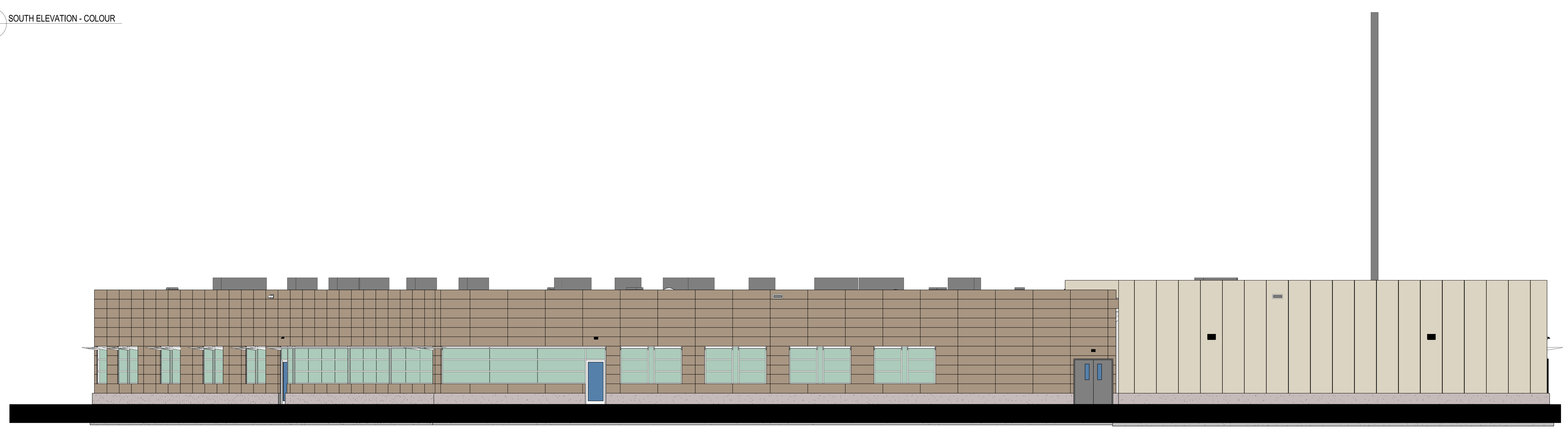
A401



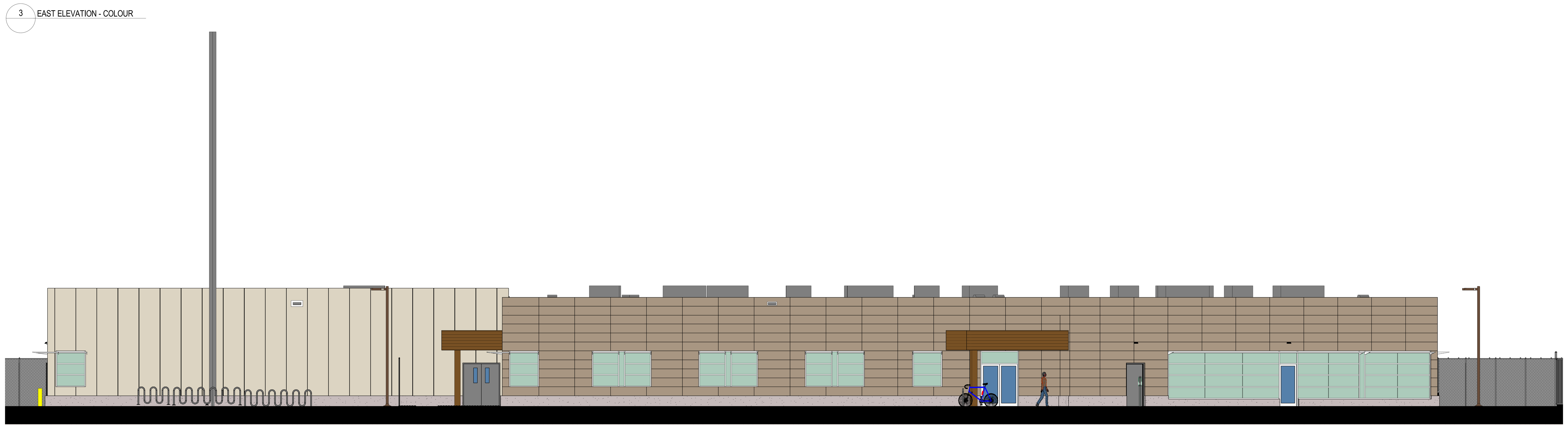
1 NORTH ELEVATION - COLOUR



2 SOUTH ELEVATION - COLOUR



3 EAST ELEVATION - COLOUR



4 WEST ELEVATION - COLOUR

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PROJECT TITLE

KOOTENAY OPERATIONS CENTRE

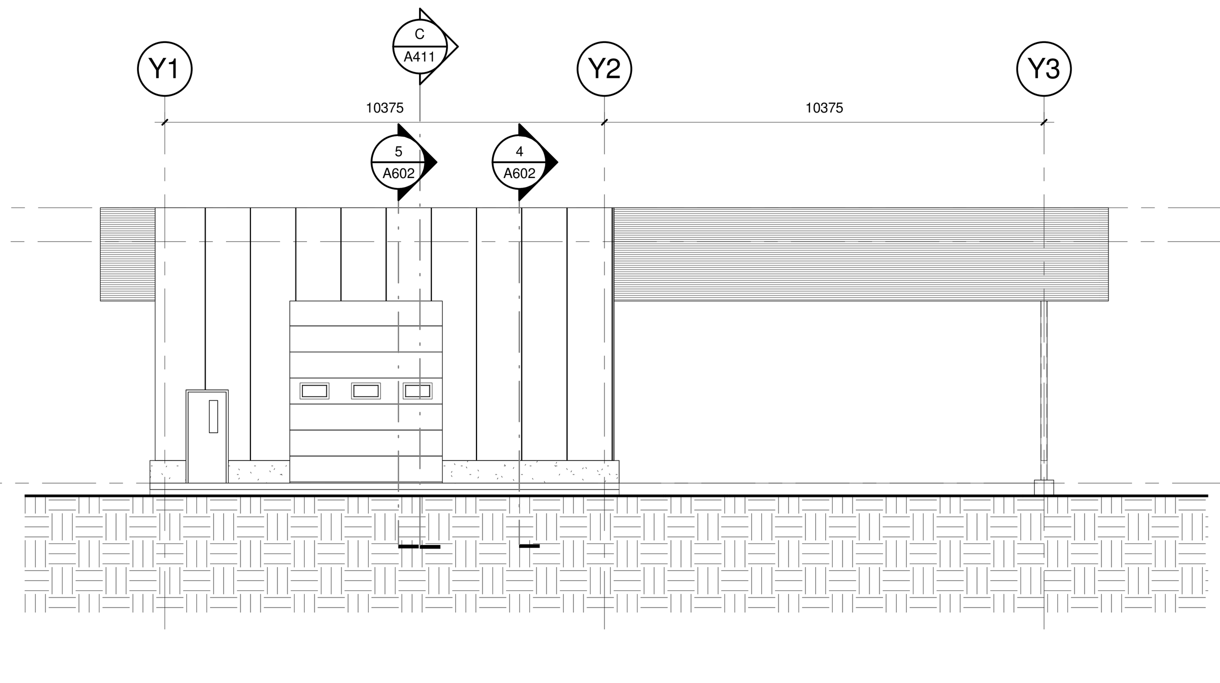
DRAWING TITLE

EXTERIOR ELEVATIONS - COLOUR

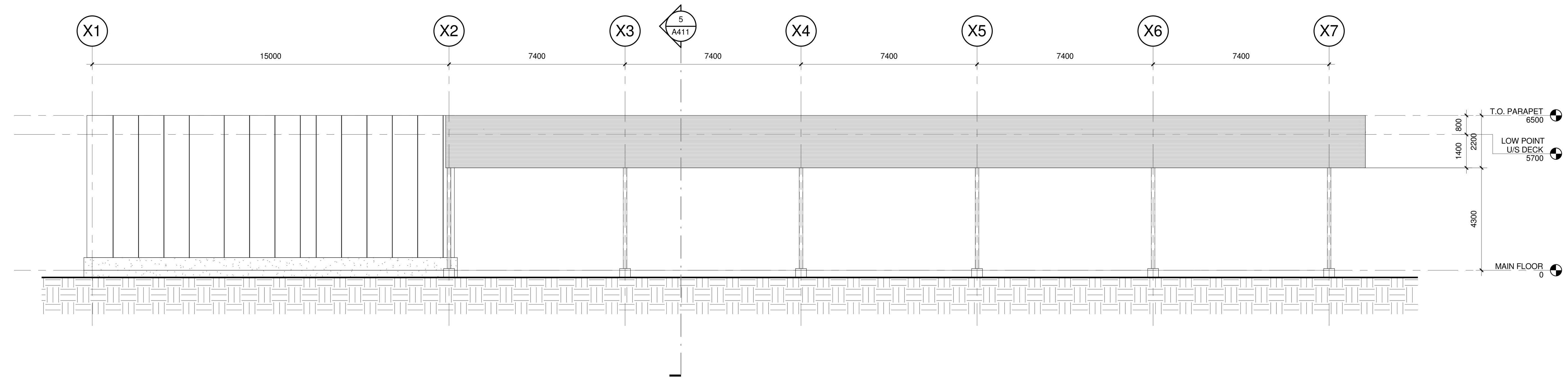
PROJECT:	09491
SCALE:	1 : 100
DRAWN BY:	JV
CHECKED BY:	Checker

DRAWING:

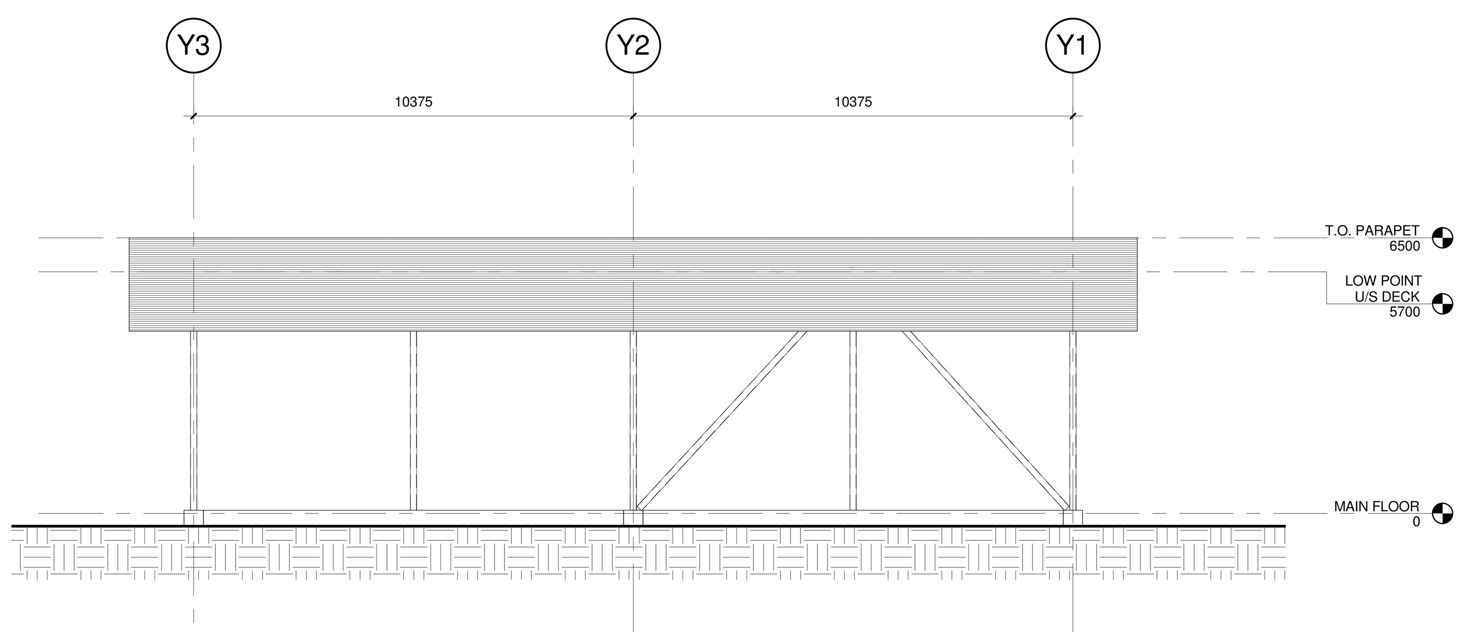
A402



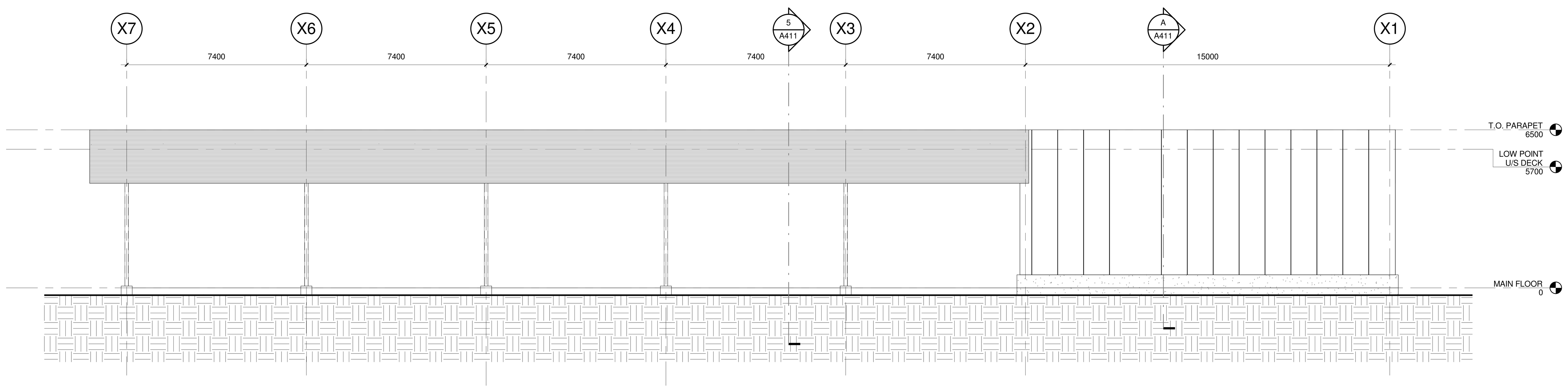
1 COVERED PARKING EAST



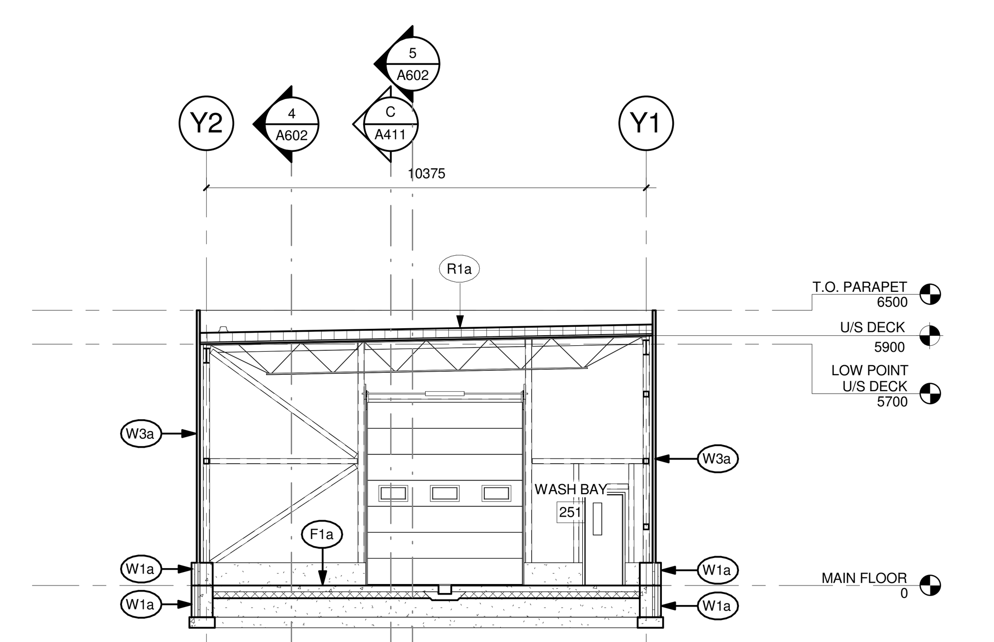
2 COVERED PARKING NORTH



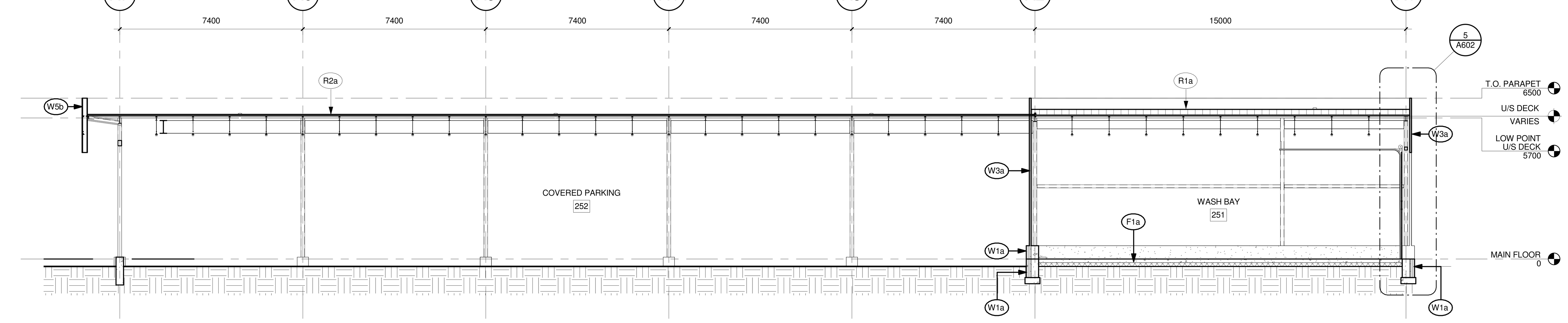
3 COVERED PARKING WEST



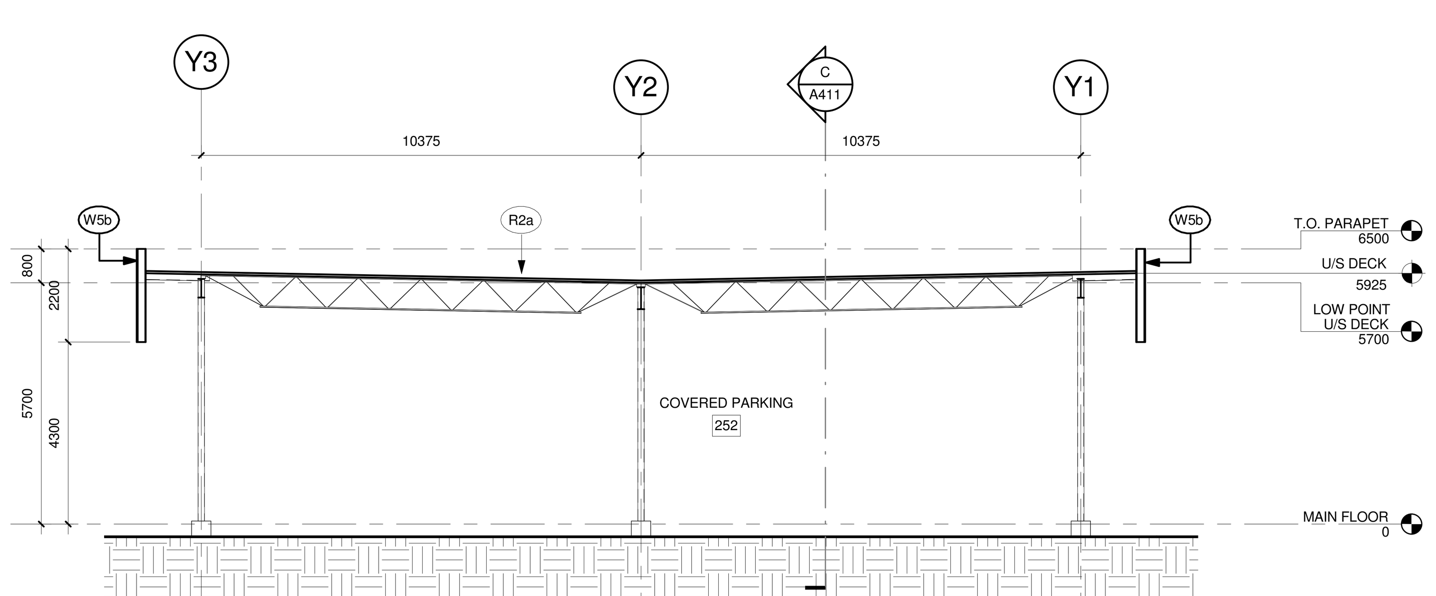
4 COVERED PARKING SOUTH



A COVERED PARKING SECTION A
A211



C COVERED PARKING SECTION C
A211



5 COVERED PARKING SECTION B
A211

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PROJECT TITLE

KOOTENAY OPERATIONS CENTRE

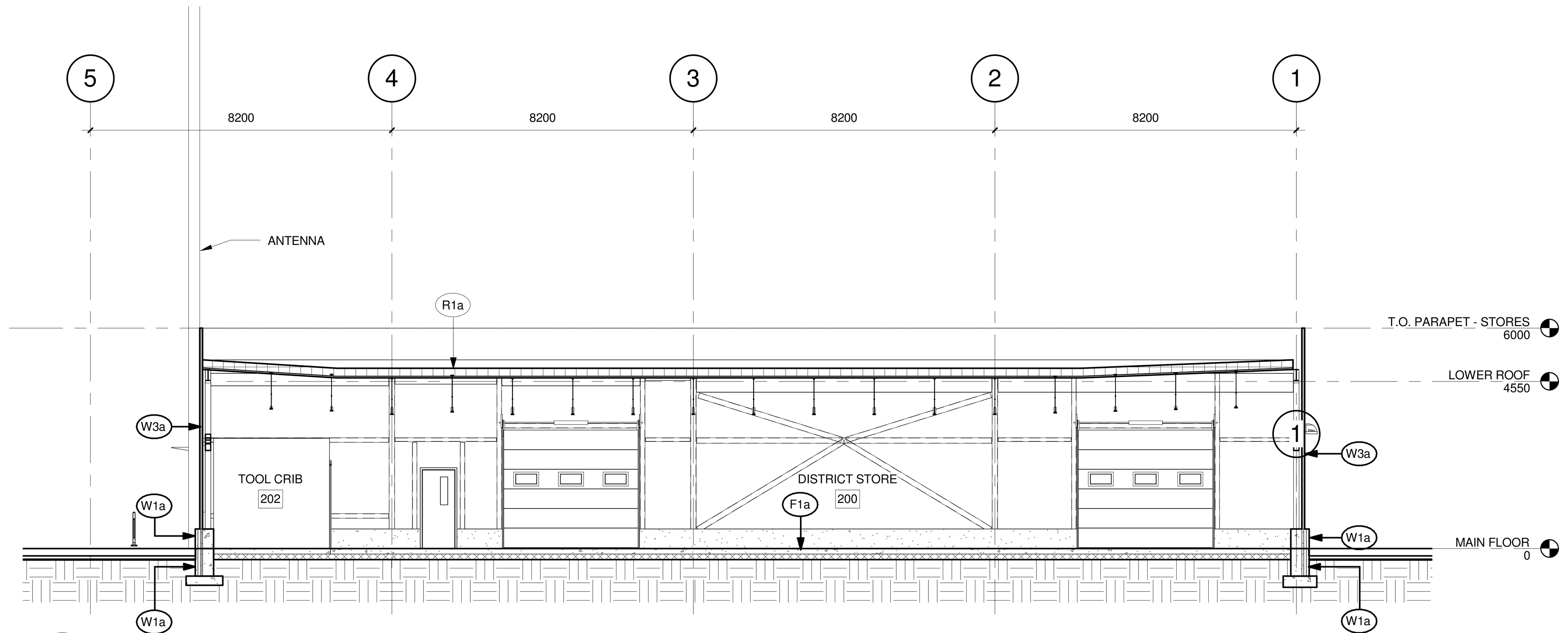
DRAWING TITLE

COVERED PARKING ELEVATIONS AND SECTIONS

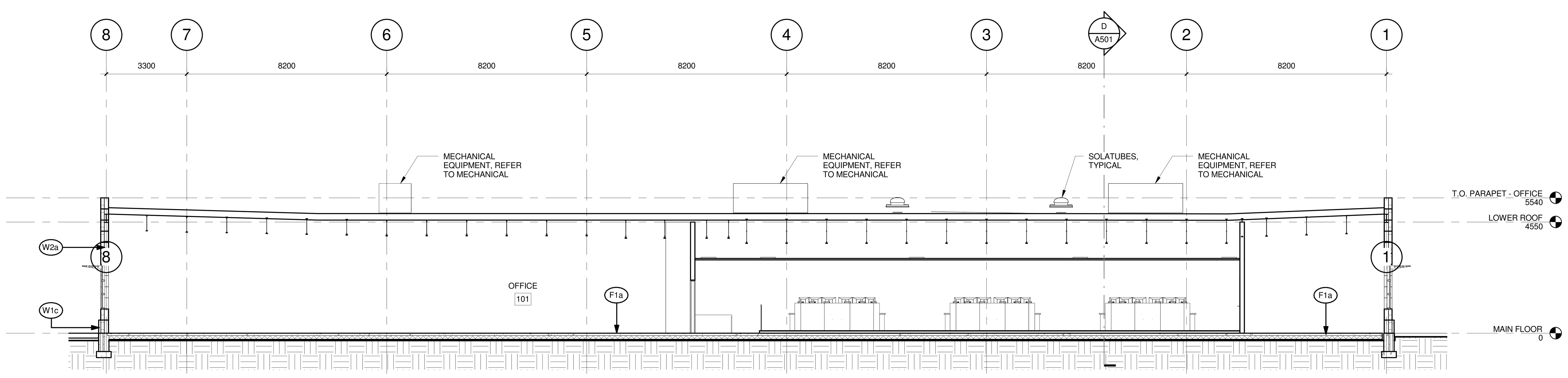
PROJECT:	09491
SCALE:	1 : 100
DRAWN BY:	JV
CHECKED BY:	Checker

DRAWING:

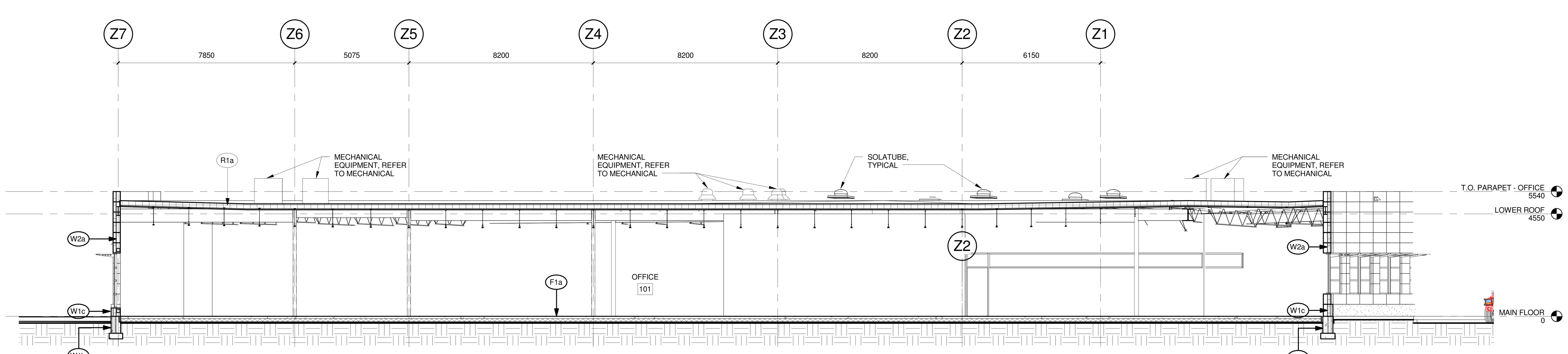
A411



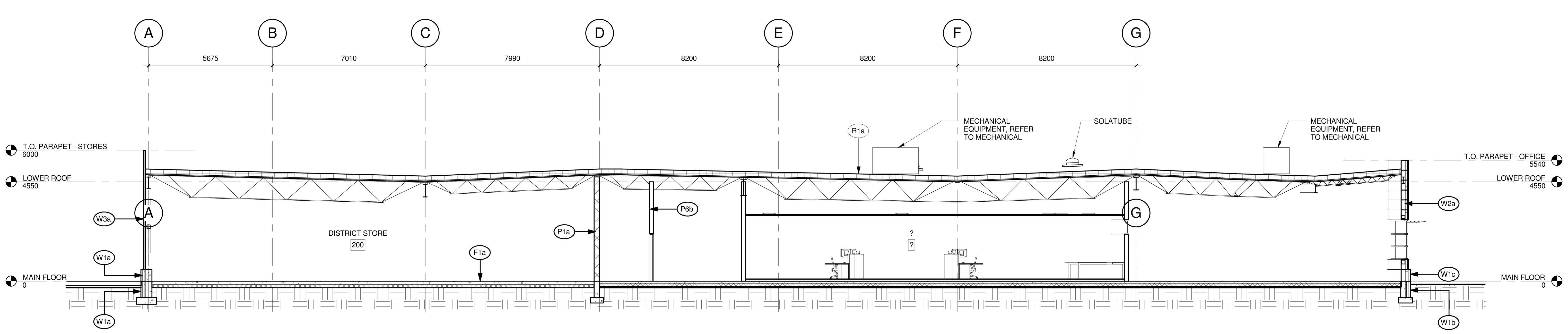
A
A201
BUILDING SECTION A



B
A201
BUILDING SECTION B



C
A201
BUILDING SECTION C



D
A201
BUILDING SECTION D

MQN ARCHITECTS
#100 – 3313 32nd Avenue, Vernon, BC V1T 2M7
T: 250-542-1199 www.mqnarchitects.com

SEAL

CONSULTANT

NO.	REV.	ISSUE	YYYY/MM/DD
1		ISSUED FOR 25% REVIEW	2015 / 01 / 20
2		ISSUED FOR 50% REVIEW	2015 / 02 / 05
3		ISSUED FOR COSTING	2015 / 02 / 13

PROJECT TITLE

KOOTENAY OPERATIONS CENTRE

DRAWING TITLE

BUILDING SECTIONS

PROJECT:	09491
SCALE:	1 : 100
DRAWN BY:	JV
CHECKED BY:	Checker

DRAWING:

A501

MQN ARCHITECTS
#100 – 3313 32nd Avenue, Vernon, BC V1T 2M7
T: 250-542-1199 www.mqnarchitects.com

SEAL

CONSULTANT

NO.	REV.	ISSUE	YYYY/MM/DD

PROJECT TITLE

KOOTENAY OPERATIONS CENTRE

DRAWING TITLE

PERSPECTIVE

PROJECT:	09491
SCALE:	
DRAWN BY:	JV
CHECKED BY:	Checker

DRAWING:

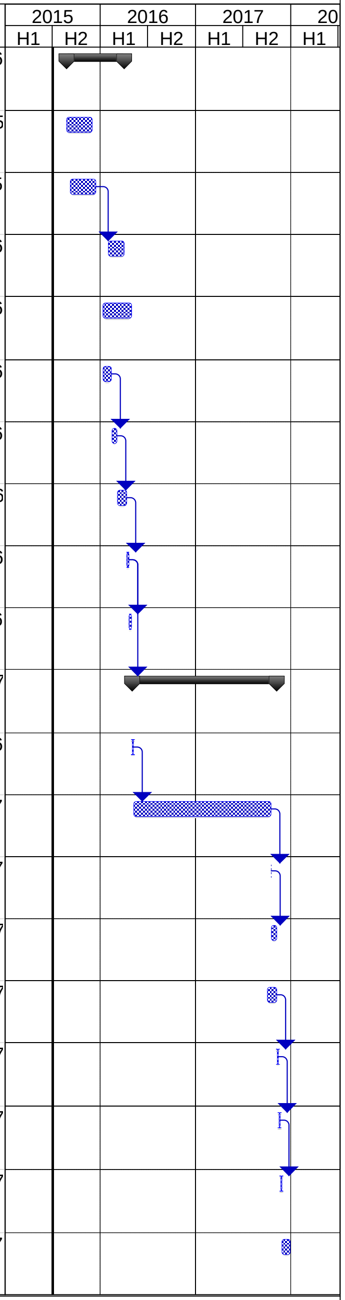
A102B

Appendix K

KOC PROJECT SCHEDULE

Proposed Project Schedule
KOOTENAY OPERATIONS CENTRE

ID	Task Name	Duration	Start	Finish
1	**DESIGN & CD'S**	159 days	Tue 25/08/15	Fri 01/04/16
2	DEVELOPMENT PERMIT APPLICATION & PROCESSING	70 days	Tue 25/08/15	Mon 30/11/15
3	CONSTRUCTION DRAWINGS	70 days	Tue 08/09/15	Mon 14/12/15
4	BUILDING PERMIT APPLICATION	45 days	Mon 01/02/16	Fri 01/04/16
5	**TENDER**	79 days	Tue 12/01/16	Fri 29/04/16
6	CONTRACT DOCUMENT PREPARATION	24 days	Tue 12/01/16	Fri 12/02/16
7	CONTRACTOR PREQUALIFICATION & NDA	15 days	Mon 15/02/16	Fri 04/03/16
8	TENDER	26 days	Mon 07/03/16	Mon 11/04/16
9	TENDER EVALUATION	6 days	Tue 12/04/16	Tue 19/04/16
10	TENDER AWARD	8 days	Wed 20/04/16	Fri 29/04/16
11	**CONSTRUCTION PHASE**	397 days	Tue 03/05/16	Tue 07/11/17
12	MOBILIZATION	4 days	Tue 03/05/16	Fri 06/05/16
13	CONSTRUCTION	377 days	Mon 09/05/16	Mon 16/10/17
14	SUBSTANTIAL REVIEW	1 day	Tue 17/10/17	Tue 17/10/17
15	FINAL DEFICIENCIES	15 days	Wed 18/10/17	Tue 07/11/17
16	OWNER INSTALLED EQUIPMENT & FURNITURE	26 days	Tue 03/10/17	Tue 07/11/17
17	**MOVE IN NOV 10/17 - PHASE 1**	2 days	Fri 10/11/17	Mon 13/11/17
18	**MOVE IN NOV 17/17 - PHASE 2**	2 days	Fri 17/11/17	Mon 20/11/17
19	**MOVE IN NOV 17/17 - PHASE 3**	2 days	Fri 24/11/17	Mon 27/11/17
20	DEMOLITION	24 days	Tue 28/11/17	Fri 29/12/17



Appendix L

PROJECT COST ESTIMATES

FILED CONFIDENTIALLY

Appendix M

PUBLIC AND STAKEHOLDER CONSULTATION

Appendix M-1

PUBLIC CONSULTATION LOG

Interested parties	Stakeholder type (agency, community, First Nations, municipal government, provincial government, federal government, media)	Type of Contact	Location	Date	Who was involved	Key Contact	Discussion	Issues raised	Resolution/Action
Union of Spiritual Communities of Christ (USCC)	Community	meeting	USCC Hall	9/30/2011	Jan Isherwood, Becky Richardson, Mike Bancroft		Site for Kootenay Ops in Ootischenia. Sale of USCC land to FBC	USCC land not large enough for FBC needs	
City of Castlegar	Municipality	Meeting	Castlegar City hall	4/30/2012	Becky Richardson, Blair Weston, Phil Markin, John Malcolm		Information on proposal to build Kootenay Ops Castlegar	Site selection, zoning	Continued dialogue
City of Castlegar	Municipality	Phone call	Castlegar City hall	5/2/2012	Phil Markin, Mike Bancroft		Alternative locations for Kootenay Ops	Site not suitable for FBC needs	
[redacted]	Union of Spiritual Communities of Christ	Meeting	USCC Hall	7/12/2012	Mike Bancroft, [redacted]		Alternative location for Kootenay Ops. Discussed proposed purchase of application site	Site not suitable for FBC needs. Too small	
City of Trail	Municipality	meeting	Trail City Hall	8/14/2012	Deiter Boggs mayor of Trail, David Perehudoff CAO, Blair Weston	Blair Weston	Conversation around Kootenay Ops proposal	Loss of jobs for Trail area. Will this mean closure of FBC gas office	Follow up with numbers around actual job movement from Trail to Kootenay Ops. Reaffirm commitment to Trail and area. No buildings closed, still well over 200 jobs in Trail area
City of Castlegar	John Malcolm	email	electronic	8/14/2012	John Malcolm, Blair Weston	Blair Weston	Castlegar council is pleased that FBC is moving forward with project		
City of Trail	Municipality	In Camera meeting	Trail Council	8/20/2012	Trail City Council, Blair weston	Blair Weston	[redacted]	[redacted]	[redacted]
MLA Katrine Conroy, NDP	Provincial government	meeting	NDP constituency office Castlegar	8/21/2012	Blair Weston, Katrine Conroy, Edina Brown	Blair Weston	Conversation around Kootenay Ops proposal	Rate impacts, job losses. Will FBC ensure adequate consultation with residents	Discussed BCUC oversight, consultation plans
Local Area Residents	Area Residents	letter		8/10/2012	Residents within 500 meters of proposed site	Blair Weston	letter informing residents of open house	no replies	
City of Trail	Municipality	Letter to John Walker		8/22/2012	Acting Mayor Rick Georgetti	Blair Weston	Corncern over Kootenay Ops proposal	Concern over loss of Jobs to Trail and area. Concern Trail council was not given enough information prior to announcing proposal. Concern over rate impact.	Follow up with numbers around actual job movement from Trail to Kootenay Ops. Reaffirm commitment to Trail and area. No buildings closed, still well over 200 jobs in Trail area. Followed up with information around how to be involved in BCUC process
Community	Community	Public Open House	USCC Hall	8/29/2012	Blair Weston, Jan Isherwood, Becky Richardson, Barry Smithson, Mike Bancroft, Dennis Swanson, Michael Leyland	Blair Weston	Proposal on Kootenay Ops. Material available in Appendix I	Traffic around building, safety of pedestrians, commercial building in residential area, impacts to sightlines, lighting, and the format of the open house	Traffic plan discussed. Walking path along roadway to be developed. Single story building and landscaping will minimize sightline impacts
Regional District of Kootenay Boundary	Local Government	Letter to BCUC delivered at open house	Open House	8/29/2012	Larry Gray Chair RDKB	Blair Weston	Conversation around Kootenay Ops proposal	Concern over loss of Jobs to Trail and area. Concern Trail residents and stakeholders were not given enough information prior to announcing proposal. Concern Trail area was not allowed to submit alternative site within Greater Trail area.	Follow up with numbers around actual job movement from Trail to Kootenay Ops. Reaffirm commitment to Trail and area. No buildings closed, still over 130 FBC jobs in Trail area
Lower Columbia Community Development Team	Community	meeting	Regional District Kootenay Boundary building	9/4/2012	Gord Derosa City of Trail council, Al Stanley RDKB, Richard Deene TECK, Steve Ash businessman, Kevin Saldern Kootenay Association for Science and Technology, Ken Holmes businessman	Blair Weston	Conversation around Kootenay Ops proposal	Loss of jobs for Trail area. Will this mean closure of FBC gas office rate impacts	
School District 20	Agency	letter		9/20/2012	David B Kneeshaw McElhanney, Ken Franklin SD20, Brian Quiring MQN	Becky Richardson	Discussion around safety of road and bus stop adjacent to proposed building	Residents concern over location if bus stop and increased traffic	Addressed in traffic plan, monitoring to see if issue arises, SD20 sees no issue
Local Area Residents	Area Residents	letter	Open House	3/22/2015	Residents within 500 meters of proposed site	Blair Weston	Informing residents of land purchase and intent to erect fence and utilize land		
[redacted]	Area Resident	Phone call	Ootischenia	4/2/2015	[redacted] Blair West	Blair Weston	Phone call after letter 3/10/2015	Traffic around building	Replied via email, asked if revised traffic plan was adequate
[redacted]	Area resident	Phone call	Ootischenia	3/30/2015	[redacted] Blair Weston	Blair Weston	Phone call after letter 3/10/2015	[redacted] phoned to say he was a local Ootischenia resident and wanted to see if there was any work available	Told him nothing right now, sent him information on FBC job website
MLA Katrine Conroy	MLA	email	NDP constituency office Castlegar	3/30/2015	Blair Weston, Edina Brown CA	Blair Weston	Question about building timelines	Wanted update on building	Discussed CPCN application
[redacted]	Area resident	Phone call	Ootischenia	3/31/2015	[redacted] Blair Weston	Blair Weston	Phone call after letter 3/10/2016	[redacted] phoned to say he was a local Ootischenia resident and wanted to see if there was any work available	Dennis sending email. FBC will follow up
John Southam	Regional District Central Kootenay Building Inspector	Phone call	Regional District Central Kootenay office, Nelson BC	3/31/2015	Blair Weston, John Southam	Blair Weston	Phone call after letter 3/10/2017	Wanted to say thanks for the update	Keep in touch
City of Castlegar	Municipality	meeting	Association of Kootenay Boundary Local Government meeting	4/22/2015	Blair Weston, mayor Chernoff	Blair Weston	Discussion around fencing and ads to local residents. Also short term plans for Castlegar ops office	none	
City of Trail	Municipality	meeting	Trail City Hall	5/8/2015	Mike Martin mayor of Trail, David Perehudoff CAO, Blair Weston	Blair Weston	Updates on project, employee movement, filing dates	concerns about building closings, wanted total count of employees in Trail and KOC building size	followed up with answers to questions
[redacted]	Area Resident	email		5/14/2015	Blair Weston	Blair Weston	Light pollution concerns and asking for copy of traffic study	Light pollution concerns and asking for copy of traffic study	followed up with answers to questions
[redacted]	Area Resident	email		5/14/2015	Blair Weston	Blair Weston	Asking for FortisBC to build playground as part of project	no playgrounds in area	Followed up with details on our community investment programs and informed her a playground wasn't part of the plan but should one be planned in the area to please contact us
[redacted]	Area Resident	email		6/15/2015	Blair Weston	Blair Weston	Asking for work materials testing for FortisBC		followed up with info and how to get on prequalified consultant / contractor list

Appendix M-2

CITY OF TRAIL LETTER AND RESPONSE 2012

HOME OF CHAMPIONS

City of Trail

Office of the Mayor

August 30, 2012

FortisBC - Electricity
Attention: John Walker, President and CEO
Suite 100, 1975 Springfield Road
Kelowna, BC V1Y 7V7

Dear Mr. Walker:

RE: OPERATIONS CENTRE PROPOSED FOR CASTLEGAR, BC

Trail City Council recently had the opportunity to meet with Blair Weston, Community and Aboriginal Relations Manager, to learn more about FortisBC's proposed plans to construct an operations centre in Castlegar, BC. It is understood that the proposed facility will consolidate Fortis' Castlegar and South Slocan offices, but will also impact a number of jobs presently provided from the Trail offices in the downtown and on Bingay Road.

Council was surprised to learn of the loss of jobs from the Trail work sites and would have hoped for a better exchange of dialogue with Fortis leading up to the announcement of this proposed new facility. The relocation of jobs from our community is particularly concerning to us and we did not feel adequately consulted in advance of this announcement, which was very disappointing in light of our positive working relationship with Fortis.

Further, the City of Trail remains concerned about the impacts of ongoing increases in electricity costs on our constituents and we would therefore expect that due consideration was given to ensure that ratepayers do not bear additional burden unnecessarily because of this proposed construction.

We appreciate FortisBC's presence in Trail and would welcome continued growth in your employment base here. We would therefore ask that you carefully consider the need to relocate positions from the Trail work sites in conjunction with the proposed new facility.

Thank you.

Sincerely,

Rick Georgetti
Acting Mayor

Explore your TRAIL

City Hall • 1394 Pine Avenue, Trail, BC, Canada V1R 4E6 • Telephone: (250) 364-1262 • Fax: (250) 364-0830
Public Works • Telephone: (250) 364-0840 • Fax: (250) 364-0831
www.trail.ca • eMail: info@trail.ca

FORTIS BC™

John C. Walker
President and
Chief Executive Officer

FortisBC Inc.
Suite 100
1975 Springfield Road
Kelowna, BC V1Y 7V7
Tel: 250-469-8090
john.walker@fortisbc.com
www.fortisbc.com

September 7, 2012

City of Trail
1394 Pine Avenue
Trail, B.C.
V1R 4E6

Dear Mr. Georgetti:

Thank you for your letter regarding our proposed Kootenay Operations Centre. FortisBC has a positive working relationship with the City of Trail. In fact, your community welcomed us when we opened our main Electricity Customer Service centre in downtown Trail. This partnership has allowed us to deliver quality customer service which is at the core of our business.

As you mention FortisBC's Community Relations representative, Blair Weston, meets regularly with the Mayor of Trail, Council, and your officials to discuss pertinent business matters, which I understand included briefings on FortisBC's proposed Kootenay Operations Centre.

The need for the new Kootenay Operations Centre is driven by the aging of our facilities in South Slocan and Castlegar in addition to the need for an Emergency Operations Centre. With careful consideration and analysis, we determined that the rate impact was lower for our customers by building a new, centralized location rather than renovating or rebuilding our current facilities.

FortisBC plans to continue its commitment to Trail and area. Currently, FortisBC is in the process of renovating and expanding its warehousing facilities on Bengay road to centralize warehousing for FortisBC to that site. This will include consolidation of the three main warehouses, including a site from Kelowna. The project includes the addition of 8,000 sq. ft. of new warehouse space and will inject approximately $1.7 million into the local economy.

Also, the $900 million Waneta Expansion Project, of which Fortis Inc. is a 51 per cent partner, occurring south of Trail has delivered tangible economic benefits to the region. The last estimate indicates that local spending on goods and services exceeded $105 million with approximately 295 enrolled workers on site.

Should you or Council have any other questions on FortisBC's business matters in the area, please feel free to contact Blair Weston directly.

Sincerely,

John Walker, President and CEO, FortisBC

Appendix M-3

PUBLIC CONSULTATION 2012

Blair Weston
Community and Aboriginal
Relations Manager
FortisBC

FortisBC Inc.
RR1 S2 C1, 3100 Station Road
South Slocan BC, V0G 2G0
250.231.0176
blair.weston@fortisbc.com
www.fortisbc.com

August 10, 2012

Dear Resident:

Open house invitation

FortisBC is seeking public input as we develop a plan to construct a new office building and warehouse in the Ootischenia area of Castlegar. The FortisBC Kootenay Operations Centre Project is required to replace existing aging facilities in the Kootenay Region, unify our long-term space requirements and meet commitments to our customers and their communities and our employees.

The proposed site for the Kootenay Operations Center is located at 120 Ootischenia Road in Castlegar. It is expected to house between 160 – 180 employees, and will be made up of approximately 30,000 square feet of office space, crew muster space and an area emergency response centre. Fleet bays and a district stores warehouse will make up an additional 15,000 square feet of space.

On August 29th, we will be holding a public open house to provide information and ask for input from our customers. Proposed building designs will be available to view and FortisBC staff will be present to answer questions. This is an open house, so if you know someone else in your community who would be interested in attending, we encourage you to extend this invitation. We also encourage your feedback on the proposal at these sessions. The feedback from this open house will be shared with the British Columbia Utilities Commission as part of the application process FortisBC is required to undertake prior to beginning a project like this.

Castlegar: Wednesday, August 29, 2012, 5 – 8 p.m.
Ootischenia Community Hall, 1119 Columbia Road

For more information, or to return written comments please contact me by:

- phoning: 250-368-2920
- emailing: blair.weston@fortisbc.com
- mailing: FortisBC Attn: Blair Weston, 1290 Esplanade Street, Trail BC, V1R 4L4

Sincerely,

Blair Weston
Community and Aboriginal Relations Manager
FortisBC

Attend a public information session

To discuss a new project in your community

FortisBC is developing a plan to construct a new office building and warehouse in the Ootischenia area of Castlegar to replace existing aging facilities in the Kootenays, unify FortisBC long term space requirements and meet our commitment to our customers and employees. Please attend our information session to learn more.

Ootischenia Community Hall
1119 Columbia Rd.
Date: August 29, 2012
Time: 5 p.m. – 8 p.m.

If you cannot attend the information session, please learn more about the project at **fortisbc.com**.

For more information, please call FortisBC at **1-866-436-7847**.

FORTIS BC™


FORTIS BC
Attend a public information session August 29
to discuss a new project in Castlegar.
Learn more

Kootenay Operations Centre

Castlegar, B.C.

Proposed Kootenay Operations Centre

FORTIS BC™

Kootenay Operations Centre

Castlegar, B.C.

Proposed Kootenay Operations Centre

The FortisBC Electric Kootenay Operations Centre Project is required to replace existing aging facilities in the Kootenay Region, unify FortisBC electric long term space requirements and meet our commitment to our customers, their community and our employees.

Proposed site: 120 Ootischenia Road, Castlegar. The site borders Columbia Road and Ootischenia Road and is in close proximity to the Highway 3 Ootischenia/Castlegar Interchange.

The building entrance will be positioned to face south on Ootischenia Road with employee and visitor parking on the west side. The building will be accessed with an entrance off Ootischenia Road. Service vehicles will exit through a right out only onto Columbia Road. The northernmost part of the site will have a yard area, which will be fenced, and secured for covered and open service vehicle parking.

Advantages of proposed site:

- centralized location for customer service calls, crew deployment and other project support staff
- preferred geographic location for emergency response centre
- convenient highway access

Number of employees: 160 – 180

Facility size: 30,000 square feet, plus 11,000 square feet of operational support space

Estimated capital cost - $16 million

Estimated rate impact 0.2%

Uses: crew muster space, office space, bench test spaces and an area emergency response centre, fleet bays and warehousing

Project Schedule

- Preparing to file Application for Certificate of Public Convenience and Necessity (CPCN) by 4 th Quarter 2012
- Project decision from British Columbia Utilities by the 2nd Quarter 2013
- Construction Document Preparation 2nd Quarter 2013
- Construction Start end of 3rd Quarter 2013
- Estimated Construction 16 months
- Occupancy January 2015

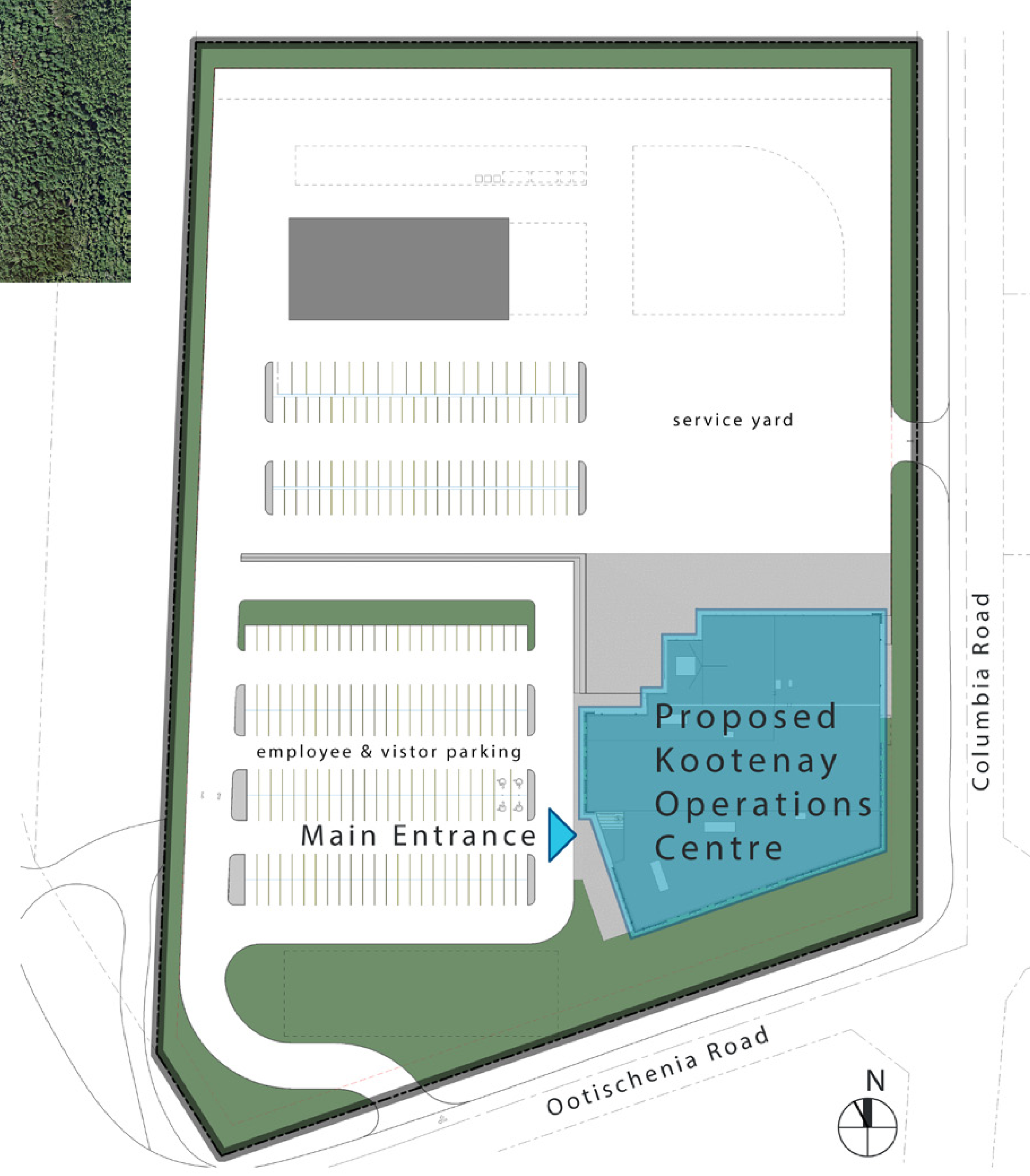
Construction Schedule

- September – December 2013 – Excavation, Foundations, Slab on Grade & Structural Steel Installation
- January – June 2014 – Exterior Wall Membranes, Roof installation, Mechanical and Electrical rough in
- June – December 2014 – Interior finish, Electrical and Mechanical, Site grading and paving
- January 2015 - Occupancy

FORTIS BC™

Kootenay Operations Centre

Castlegar, B.C.



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Kootenay Operations Centre

Castlegar, B.C.

PLANT PALLETTE

1 Ponderosa Pine	Pinus ponderosa
2 Colorado Blue Spruce	Picea pungens glauca
3 Honey Locust	Gleditsia triacanthos 'Skyline'
4 Trembling Aspen	Populus tremuloides
5 Green Ash	Fraxinus pennsylvanica
6 Freeman's Maple	Acer x freemanii
7 Arctic Fire Dogwood	Cornus stolonifera 'Farrow'
8 Red Osier Dogwood	Cornus stolonifera
9 Mock Orange	Philadelphus virginalis
10 Staghorn sumac	Rhus typhina
11 Juniper sp.	Juniperus x
12 Oregon Grape	Mahonia repens
13 Munstead Lavender	Lavandula angustifolia
14 Blue Fescue	Festuca glauca
15 Daylily sp.	Hemerocalis x
16 Japanese Barberry	Berberis thunbergi
17 Ivory Halo Dogwood	Cornus alba 'Bailhalo'
18 Feather Reed Grass	Calamagrostis acutifolia

Artist rendering represents mature/established plants and should not be interpreted as the final aesthetic at time of project completion

FORTIS BC™

Kootenay Operations Centre

Castlegar, B.C.

Columbia Road

The treatment along Columbia will be similar to that of Ootischenia, with the exception of formalized plantings at the main site entry.

It is the intent that a 5′ wide meandering gravel trail be included in the design of this buffer allowing residents to remain safely off the roadway.

Site Section - East West

Ootischenia Road

The landscape will be heavily buffered with a variety of native shrubs and trees along this roadway, providing a visual screen of the Kootenay Operations Centre to adjacent residents. Existing trees and shrubs along the property line will be preserved where possible.

Site Elevation - East

Site Elevation - South

FORTIS BC™

Kootenay Operations Centre

Castlegar, B.C.

BUILDING GREENER

The architecture of the building – it's envelope, daylight and air movement considerations – provide the primary route to sustainability.

GREEN GOALS

The design of the new Kootenay Operations Centre has been considered to operate with high energy efficiency in delivering a comfortable and healthy environment for staff.

The new Kootenay Operations Centre will be an energy efficient building resulting in low energy costs.

- Optimum space thermal comfort, indoor air quality and acoustics
- Maximum HVAC system controllability
- Passive building features and technologies
- External shading devices
- Improved building envelope insulation for roofs and walls; R40 (roof); R25 (wall)
- LowE gas-filled Windows

Elevation - West

Elevation - North

FORTIS BC™

Kootenay Operations Centre

Castlegar, B.C.

GREEN ENGINEERING SYSTEMS

The building systems have been developed to provide comfort and flexibility, within the overall goal of energy efficiency. The following systems have been proposed:

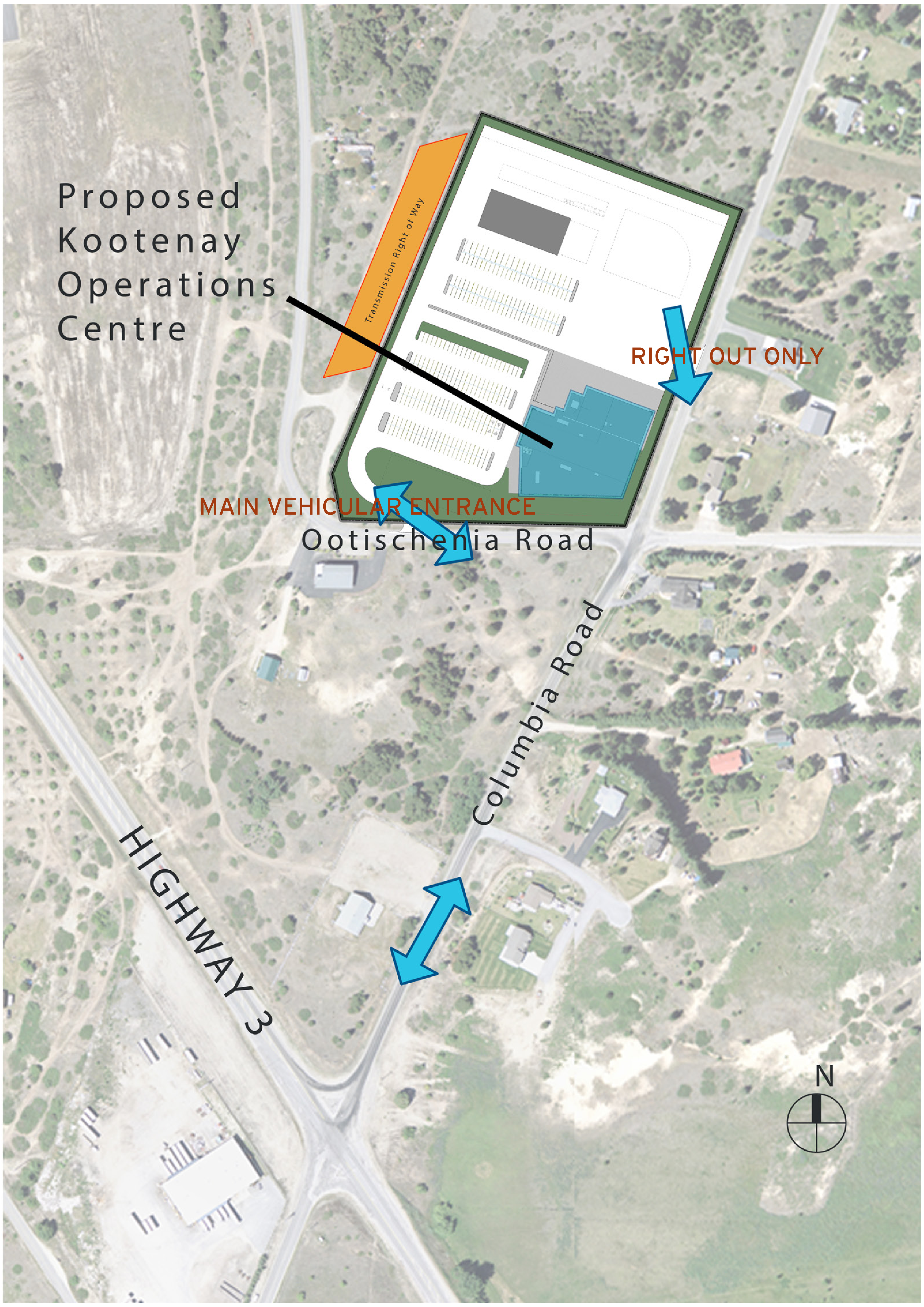
- Displacement ventilation to areas with high internal heat gains. This allows low velocity air to be supplied – at temperatures a few °C below the desired room temperature – to be used as the means of cooling. Low velocity and close to ambient internal temperature air deliver maximum efficiency for these spaces;
- Water Source Heat Pump (WSHP) system in the office space
- In the Fleet bays and warehouse, a direct gas fired radiant heating system will be applied.
- Ventilation air will be provided through Heat Recovery Ventilation
- Domestic Hot Water will be provided primarily though a Solar Thermal hot water array located on the roof.
- Energy efficient lighting and control

Proposed Kootenay Operations Centre

FORTIS BC™

Kootenay Operations Centre

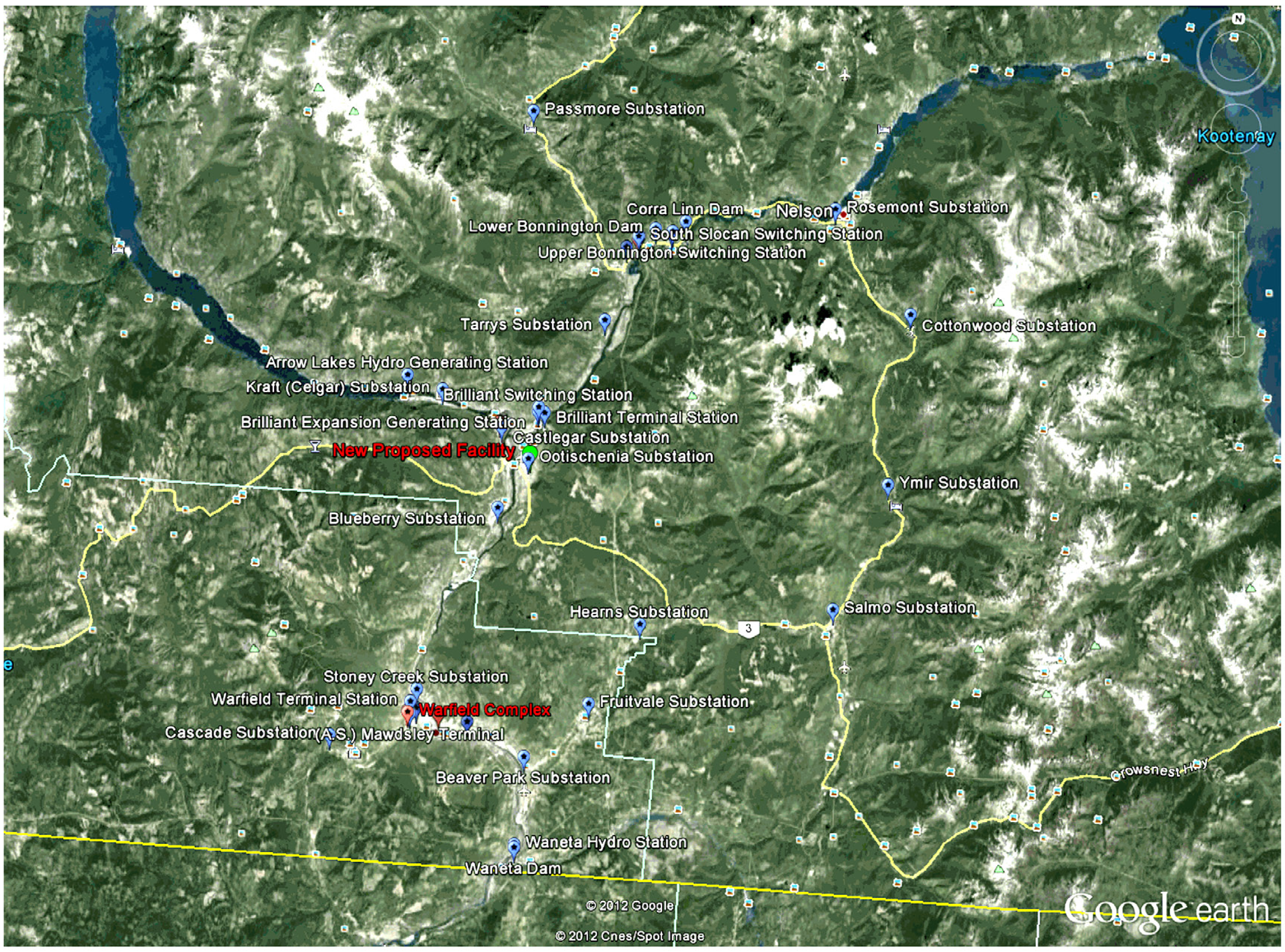
Castlegar, B.C.



FORTIS BC™

Kootenay Operations Centre

Castlegar, B.C.



Kootenay Operations Centre information session

FORTIS BC™

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session.

How did we do today?
Your feedback is important to us.

Please provide any feedback, thoughts or questions you may have:

- I think you'll have to have more info sessions for the residents of this area, they seem to be slightly un-informed.
- building drawings/projections look fantastic. the "green" aspect was very well thought out.
- I'm a fan!

May we contact you to answer your questions / provide you with information?
☑ Yes ☐ No

Your name & email address: [redacted]

Date / Location of information session you attended: Aug 29/12 Castlegar.

Thank you for your time and feedback.

Kootenay Operations Centre information session

FORTIS BC

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session.

How did we do today? DISAPPOINTED WITH A OPEN MIND.
Your feedback is important to us.

Please provide any feedback, thoughts or questions you may have:

I AM CONCERNED ABOUT PUBLIC SAFETY ESPECIALLY CHILDREN GOING TO SCHOOL OR EVEN WALKING TO FRIENDS OR NEIGHBOURS. ALSO BIG CONCERN ON ADDING A COMMERCIAL STYLE STRUCTURE TO A RURAL RESIDENTIAL AREA. ~~A~~ LOOK @ THE DROP IN VALUE FOR HOMES AS WELL.

May we contact you to answer your questions / provide you with information?

☒ Yes ☐ No

Your name & email address:

Date / Location of information session you attended: AUG 29/12

Thank you for your time and feedback.

Kootenay Operations Centre information session

FORTIS BC

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session. Please take a few minutes to provide us with your thoughts.

1. How did we do today? Please rate our information session on the type and amount of information shared (check one):

   - ☐ Information mostly useful to me
   - ☒ Information somewhat useful to me
   - ☐ Information not useful to me

2. Please rate the format of today's information session (check one):

   - ☐ This was an effective format
   - ☒ This was not an effective format SHOULD BE A OPEN FORNM WITH MINUTES
   - ☐ I have no strong opinion on the format

3. Overall, did this information session meet your expectations (check one)?

   ☐ Yes ☐ No ☒ Somewhat

4. If you had specific concerns or questions today, were they answered (check one)?

   ☐ Yes ☐ No ☒ Somewhat

5. Do you have a specific question or a topic you would like more information on? If so, please indicate here:

   TRAFFIC STUDY. ISSUES WITH CHILDREN AND PUBLIC ACCESS TO SIDES OF ROAD

   Your name & email address: [redacted]

   Date / Location of information session you attended: APG 29/12

6. Please provide any other feedback or thoughts:

   SHOULD BE. LOOKING @ DEVELOPING A DIFFRENT ROAD WAY FOR .5KM OF ROADWAY WILL BE IMPACTED ~~##~~ 10 FOLDS ON WHAT TRAFFIC IS USING IT NOW.

Thank you for your time and feedback.

Kootenay Operations Centre information session

FORTIS BC™

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session. Please take a few minutes to provide us with your thoughts.

1. How did we do today? Please rate our information session on the type and amount of information shared (check one):

- [x] Information mostly useful to me
- [ ] Information somewhat useful to me
- [ ] Information not useful to me

2. Please rate the format of today's information session (check one):

- [x] This was an effective format
- [ ] This was not an effective format
- [ ] I have no strong opinion on the format

3. Overall, did this information session meet your expectations (check one)?

[x] Yes [ ] No [ ] Somewhat

4. If you had specific concerns or questions today, were they answered (check one)?

[x] Yes [ ] No [ ] Somewhat

5. Do you have a specific question or a topic you would like more information on? If so, please indicate here:

no - staff were very informative

Your name & email address: [redacted]

Date / Location of information session you attended: Aug 29 2012

6. Please provide any other feedback or thoughts:

- ~~I have~~ I would welcome Fortis. I am impressed with your concern for traffic impact, with service vehicles.

Thank you for your time and feedback.

Kootenay Operations Centre information session

FORTIS BC

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session.

How did we do today?
Your feedback is important to us.

Please provide any feedback, thoughts or questions you may have:

I would like more consideration for not just service vehicles but employees trying to ~~avoid using~~ use highway access. Other than that I was impressed.

May we contact you to answer your questions / provide you with information?

☑ Yes ☐ No

Your name & email address: [redacted]

Date / Location of information session you attended: 29 AUG 2012

Thank you for your time and feedback.

Kootenay Operations Centre information session

FORTIS BC™

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session. Please take a few minutes to provide us with your thoughts.

1. How did we do today? Please rate our information session on the type and amount of information shared (check one):

   - ☐ Information mostly useful to me
   - ☒ Information somewhat useful to me
   - ☐ Information not useful to me

2. Please rate the format of today's information session (check one):

   - ☐ This was an effective format
   - ☒ This was not an effective format
   - ☐ I have no strong opinion on the format

3. Overall, did this information session meet your expectations (check one)?

   ☐ Yes ☒ No ☐ Somewhat

4. If you had specific concerns or questions today, were they answered (check one)?

   ☒ Yes ☐ No ☐ Somewhat

5. Do you have a specific question or a topic you would like more information on? If so, please indicate here:

____
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____
____

Your name & email address: ____________________

Date / Location of information session you attended: ____________________

6. Please provide any other feedback or thoughts:

____
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____
____

Thank you for your time and feedback.

Kootenay Operations Centre information session

FORTIS BC™

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session.

How did we do today?
Your feedback is important to us.

Please provide any feedback, thoughts or questions you may have:

May we contact you to answer your questions / provide you with information?

☐ Yes ☐ No

Your name & email address: ______________________________

Date / Location of information session you attended: ______________________________

Thank you for your time and feedback.

Kootenay Operations Centre information session

FORTIS BC

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session. Please take a few minutes to provide us with your thoughts.

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   - ☐ Information somewhat useful to me
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2. Please rate the format of today's information session (check one):

   - ☐ This was an effective format
   - ☐ This was not an effective format
   - ☐ I have no strong opinion on the format

   Not inform ~~Fat~~ Dictadareship

3. Overall, did this information session meet your expectations (check one)?

   ☐ Yes ☐ No ☒ Somewhat

4. If you had specific concerns or questions today, were they answered (check one)?

   ☒ Yes ☐ No ☐ Somewhat

5. Do you have a specific question or a topic you would like more information on? If so, please indicate here:

   School STOP
   Traffic
   Emission Pollution Light on 24hr DAY

Your name & email address: [redacted]

Date / Location of information session you attended: ______

6. Please provide any other feedback or thoughts: This is not Proper Format

   Light Traffic / Buses / WAY of ~~Change~~ evolving.

Thank you for your time and feedback.

Kootenay Operations Centre information session

FORTIS BC™

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session.

How did we do today?
Your feedback is important to us.

Please provide any feedback, thoughts or questions you may have:

May we contact you to answer your questions / provide you with information?

☐ Yes ☐ No

Your name & email address: ____________________

Date / Location of information session you attended: ____________________

Thank you for your time and feedback.

Kootenay Operations Centre information session

FORTIS BC™

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session.

How did we do today?
Your feedback is important to us.

Please provide any feedback, thoughts or questions you may have:

This should have been discussed at a meeting where concerns could be voiced before having a open house with what you would like for our residential area.

This applies to everyone in our area not only the home owners in the imediate area.

IT SURE Smells of a Done deal.

May we contact you to answer your questions / provide you with information?
☒ Yes ☐ No

Your name & email address: [redacted]

Date / Location of information session you attended: Aug 29

Thank you for your time and feedback.

Kootenay Operations Centre information session

FORTIS BC

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session. Please take a few minutes to provide us with your thoughts.

1. How did we do today? Please rate our information session on the type and amount of information shared (check one):

- ☐ Information mostly useful to me
- ☐ Information somewhat useful to me
- ☑ Information not useful to me

2. Please rate the format of today's information session (check one):

- ☐ This was an effective format
- ☒ This was not an effective format
- ☐ I have no strong opinion on the format

3. Overall, did this information session meet your expectations (check one)?

☐ Yes ☑ No ☐ Somewhat

4. If you had specific concerns or questions today, were they answered (check one)?

☐ Yes ☐ No ☑ Somewhat

5. Do you have a specific question or a topic you would like more information on? If so, please indicate here:

why build a commercial building in a RESIDENTIAL AREA - We don't want 200 plus vehicles driving past our homes - we have Children at play here.

Your name & email address [redacted]

Date / Location of information session you attended: Aug 29

6. Please provide any other feedback or thoughts:

we had a sub station ~~[illegible]~~d Jamed down our throats Now you propose a centre & its does not encroporate your sub station

Thank you for your time and feedback.

Kootenay Operations Centre information session

FORTIS BC

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session. Please take a few minutes to provide us with your thoughts.

1. How did we do today? Please rate our information session on the type and amount of information shared (check one):

   - ☑ Information mostly useful to me
   - ☐ Information somewhat useful to me
   - ☐ Information not useful to me

2. Please rate the format of today's information session (check one):

   - ☑ This was an effective format
   - ☐ This was not an effective format
   - ☐ I have no strong opinion on the format

3. Overall, did this information session meet your expectations (check one)?

   ☑ Yes ☐ No ☐ Somewhat

4. If you had specific concerns or questions today, were they answered (check one)?

   ☑ Yes ☐ No ☐ Somewhat

5. Do you have a specific question or a topic you would like more information on? If so, please indicate here:

   ___

   Your name & email address: [redacted] Aug 29/12

   Date / Location of information session you attended: ___

6. Please provide any other feedback or thoughts:

   ___

Thank you for your time and feedback.

Kootenay Operations Centre information session

FORTIS BC™

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session.

How did we do today?
Your feedback is important to us.

Please provide any feedback, thoughts or questions you may have:

May we contact you to answer your questions / provide you with information?

☐ Yes ☐ No

Your name & email address: ____________________

Date / Location of information session you attended: ____________________

Thank you for your time and feedback.

Kootenay Operations Centre information session

FORTIS BC™

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session. Please take a few minutes to provide us with your thoughts.

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- ☑ This was not an effective format
- ☐ I have no strong opinion on the format

3. Overall, did this information session meet your expectations (check one)?

☐ Yes ☐ No ☑ Somewhat

4. If you had specific concerns or questions today, were they answered (check one)?

☐ Yes ~~☑ No~~ ☑ Somewhat

5. Do you have a specific question or a topic you would like more information on? If so, please indicate here:

See my attached memo.

Your name & email address: Larry Gray lvgray@xplornet.ca

Date / Location of information session you attended: Aug. 29, 2012.

6. Please provide any other feedback or thoughts:

I would like to speak to the Utilities Commission rather than this format for the meeting. (Although I will freely admit that as an Administrator at provincial & regional levels, I have used the same technique myself for controversial issues.)

Thank you for your time and feedback.

Regional District of Kootenay Boundary

August 29, 2012

Memo to: BC Utilities Commission

From: Larry Gray, Ph.D., Chair, Regional District of Kootenay Boundary

Re: Fortis Application for Facility and Staff Centralization in a New Facility in Castlegar

I am making this presentation to the Commission to express concern over the Fortis proposal to locate a new centralized facility in Ootischenia. This decision will have a considerable impact on our community as a result of the loss of some 60 to 80 jobs, significant in a time when our business-retail community has been struggling.

I offer the following points for consideration by the Commission:

1. Although there was some initial communication with Trail's Mayor Bogs, a comprehensive announcement of this magnitude should have been provided by Fortis to the affected communities in some form prior to, or at least in conjunction with, release by Castlegar Council. This would be consistent, I believe, with good corporate citizen practice.

2. After the announcement in the media about the Castlegar facility, Fortis should have provided a media release to explain the reasons for the job moves rather than leaving it to the local politicians to seek information from Fortis and then try to explain the situation to the public.

3. As Fortis has enjoyed community support for the current facilities for many years, and considering that this is a significant reduction of jobs in our community, there should be an opportunity for us to submit an alternative to the Castlegar site proposal in the form of a facility in the Greater Trail area.

I hope that the Commission will listen to our concerns and take them into full consideration when making this important decision.

Contact Information:
Chair Larry Gray, RDKB
202-843 Rossland Avenue
Trail, BC V1R 4S8
lvgray@xplornet.ca

Kootenay Operations Centre information session

FORTIS BC™

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session.

How did we do today?
Your feedback is important to us.

Please provide any feedback, thoughts or questions you may have:

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May we contact you to answer your questions / provide you with information?

☐ Yes ☐ No

Your name & email address: ______________________________

Date / Location of information session you attended: ______________________

Thank you for your time and feedback.

FORTIS BC

Kootenay Operations Centre information session

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session. Please take a few minutes to provide us with your thoughts.

1. How did we do today? Please rate our information session on the type and amount of information shared (check one):

   - [x] Information mostly useful to me
   - [ ] Information somewhat useful to me
   - [ ] Information not useful to me

2. Please rate the format of today's information session (check one):

   - [ ] This was an effective format
   - [x] This was not an effective format
   - [ ] I have no strong opinion on the format

3. Overall, did this information session meet your expectations (check one)?

   - [ ] Yes
   - [x] No
   - [ ] Somewhat

4. If you had specific concerns or questions today, were they answered (check one)?

   - [ ] Yes
   - [ ] No
   - [x] Somewhat

5. Do you have a specific question or a topic you would like more information on? If so, please indicate here:

   Please consider paving the meandering either with blocks, brick, concrete - plain or stamped.

   Your name & email address: [redacted]

   Date / Location of information session you attended: ______

6. Please provide any other feedback or thoughts:

   I like open meetings where open discussion takes place.

Thank you for your time and feedback.

Kootenay Operations Centre information session

FORTIS BC™

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session.

How did we do today?
Your feedback is important to us.

Please provide any feedback, thoughts or questions you may have:

May we contact you to answer your questions / provide you with information?

☒ Yes ☐ No

Your name & email address: [redacted]

Date / Location of information session you attended: Aug 29, 2012.

Thank you for your time and feedback.

Kootenay Operations Centre information session

FORTIS BC™

Feedback form

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- [x] This was not an effective format
- [ ] I have no strong opinion on the format

3. Overall, did this information session meet your expectations (check one)?

- [ ] Yes
- [x] No
- [ ] Somewhat

4. If you had specific concerns or questions today, were they answered (check one)?

- [ ] Yes
- [x] No
- [ ] Somewhat

5. Do you have a specific question or a topic you would like more information on? If so, please indicate here:

The person I spoke to gave my a lot of maybe's & perhaps & might be's. I would prefer to have some concrete answers regarding other locations, specifically the airport lands.

Your name & email address: [redacted]

Date / Location of information session you attended: Aug 29 2012 Castlegar

6. Please provide any other feedback or thoughts:

I do not this proposed location used for this type of building. I do want Fortis to build this in Castlegar just not on this spot.

Thank you for your time and feedback.

Kootenay Operations Centre information session

FORTIS BC

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session.

How did we do today?
Your feedback is important to us.

Please provide any feedback, thoughts or questions you may have:

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May we contact you to answer your questions / provide you with information?

☐ Yes ☐ No

Your name & email address: ______________________________

Date / Location of information session you attended: ______________________________

Thank you for your time and feedback.

Kootenay Operations Centre information session

FORTIS BC™

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session. Please take a few minutes to provide us with your thoughts.

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   - [ ] This was not an effective format
   - [ ] I have no strong opinion on the format

3. Overall, did this information session meet your expectations (check one)?

   [x] Yes   [ ] No   [ ] Somewhat

4. If you had specific concerns or questions today, were they answered (check one)?

   [x] ~~Yes~~   [x] No   [ ] Somewhat

5. Do you have a specific question or a topic you would like more information on? If so, please indicate here:

   Your name & email address:

   Date / Location of information session you attended:

6. Please provide any other feedback or thoughts:

1 I understand that Fortis is looking for the best and most cost-effective land However I feel that with some minor creative thinking and searching (possibly re-zoning) that Fortis could find land that would be less intrusive on what is essentially a residential area and still suitable to Fortis's needs.

2 I believe that the possibility of this development moving elsewhere is very slim so what would be nice to see is an attractive privacy fence enclosing the material and heavy equipment compound to minimize the effect on a beautiful residential area.

Thank you for your time and feedback.

Kootenay Operations Centre information session

FORTIS BC™

Feedback form

Thank you for attending FortisBC's Kootenay Operations Centre information session.

How did we do today?
Your feedback is important to us.

Please provide any feedback, thoughts or questions you may have:

May we contact you to answer your questions / provide you with information?

☑ Yes ☐ No

Your name & email address: [redacted]

Date / Location of information session you attended: 2012-08-29 Ootischenia Hall

Thank you for your time and feedback.

Appendix M-4

SCHOOL DISTRICT NO. 20 KOOTENAY-COLUMBIA CONSULTATION 2012

October 24, 2012

File No: 2431-41901

Brian Quiring, MAIBC, BES, MArch
MQN Architects
#102 - 3301 24th Avenue
Vernon, BC V1T 9S8

Re: Fortis Operations Centre – School Bus Concerns expressed at Public Meeting

Dear Brian,

I spoke to Ken Franklin on September 7, 2012 about the two concerns raised at the public meeting, that you had relayed to me. Mr. Franklin is the Lead Hand for Transportation for School District 20. He was not aware of the two concerns raised at the public meeting, which are:

1. Concern with the pick-up point at the corner of the proposed Fortis site.
2. Concern with children pedestrians sharing a single ploughed lane with traffic in winter.

Ken and I agreed that monitoring the situation will be an adequate response for now. He feels that these concerns do not represent undue danger to the children for the following reasons:

- Snow ploughing – the bus drivers are always aware of the conditions and will report any unsafe situations. This has not been brought up as an issue by the operators, and additional traffic will not change this.
- Bus stop – the pickup activity occurs off the road, and all safety flashers etc. are in effect with the pickup location. This only takes a few seconds to load the children and carry on to the next stop.
- Bus stop – the location can be easily adjusted if a problem is found at the current one, but there is no reason to expect any new problem to be created.
- Bus stop – the buses pick up children all over the City and in areas of significant traffic. (The traffic study found that although traffic will increase significantly relative to current volumes, in absolute terms the traffic will not be worse than many other locations.)

Note that if snow ploughing is inadequate considering the increased use on Columbia Road, the Ministry of Transportation could be approached to adjust their snowploughs' routing priorities.

Regards,

David B. Kneeshaw, P. Eng.,
Kamloops Office Branch Manager
Engineering . Survey . Mapping . Planning

Appendix M-5

PUBLIC CONSULTATION 2015

Blair Weston
Community and Aboriginal
Relations Manager
FortisBC

FortisBC Inc.
3100 West Kootenay Rd
South Slocan BC, V0G 2G0
250-368-2920
blair.weston@fortisbc.com
www.fortisbc.com

March 10, 2015

Xxxxx
Xxxxx
Xxxxx

RE: Construction of the new FortisBC Kootenay Operations Centre in Castlegar

Hello Neighbours,

FortisBC remains committed to ongoing communication as we move forward with the construction of the new Kootenay Operations Centre in Castlegar. The FortisBC Operations Centre is required to replace existing aging facilities in the Kootenay Region, to unify FortisBC's long term space requirements and to meet our commitment to our customers, their community and our employees. The proposed building will be approximately 30,000 sq. ft. in size and is expected to house approximately 100 employees. The site will support FortisBC operations and will include office space, crew space, material storage and an area emergency response centre.

In preparation of the project, FortisBC has purchased a 10-acre parcel in Ootischenia, located at 120 Ootischenia Road. FortisBC is required to apply for a Certificate of Public Convenience and Necessity from the British Columbia Utilities Commission for approval of the building. The expected decision for this is early 2016. We expect to start construction of the new Kootenay Operations Centre shortly after, once all approvals are in place.

FortisBC will be fencing the perimeter of the site early this spring. We've contracted Arrow Fencing to complete the work on the site. After that, we will put the site to use and begin storing material onsite.

If you have any questions, feel free to contact me, Blair Weston, Community and Aboriginal Relations Manager at blair.weston@fortisbc.com or 250-368-2920.

Sincerely,

Blair Weston
Community and Aboriginal Relations Manager
FortisBC

Proposed Kootenay Operations Centre

Later this year, FortisBC will submit an application for a certificate of public convenience and necessity (CPCN) to the British Columbia Utilities Commission (BCUC) for approval to construct a FortisBC operations centre in Castlegar. If the BCUC approves the application, FortisBC expects facility construction to begin in the spring of 2016.

The proposed facility will mainly provide FortisBC with a long-term solution for replacing aging facilities and those that are reaching the end of their useful life in the Kootenays. The new operations centre will allow us to better serve our customers in the region.

For more information and to submit comments, visit **fortisbc.com/KootenayOps**, email **KootenayOpsFeedback@fortisbc.com** or call **1-866-436-7847**.

FortisBC moves ahead with plans to build operations centre

By BETSY KLINE
May 13, 2015 · 2:43 PM
0 Comments

FortisBC is going ahead with plans to build a Kootenay Operations Centre in Ootischenia. The company will be submitting an application for a certificate of public convenience and necessity (CPCN) to the British Columbia Utilities Commission (BCUC). If the application is approved construction is scheduled to begin next spring.

The new Kootenay Operation Centre will have 23,000 sq. ft. of office space, 7000 sq. ft. of warehouse space and be located at 120 Ootischenia Road on land the company purchased from the city of Castlegar in 2014. It will house operations for the Electricity branch of of FortisBC.

FortisBC spokesman David Wylie explained the choice of location: “That location really is central for us. It will help us to better serve our customers in the region and to continue to meet the operational requirements for the region.”

Wylie continued, “This is a long term solution for FortisBC for replacing aging facilities and ones that are reaching the end of their useful life in the Kootenays.”

One of those facilities is the South Slocan Operations Centre,“It is over a hundred years old. It has reached the end of its life as a comfortable and safe workplace for our employees, which is why we are looking at building something that is more energy efficient and would better serve our needs in the area.”

Upon completion of the new project, the South Slocan Operations Centre will close and the employees will be relocated to the new location. However, the current Castlegar Operations Centre will not be affected.

The new facility will have about 75 employees, consisting primarily of generation and operation staff, those that support and maintain the dams, power houses and substations. There will also be a fleet of trucks stationed at the site and warehouse operations.

According to Wylie, FortisBC has completed a traffic impact study to ensure there is no negative impact the flow of traffic in the area.

The BCUC application process is a public process and residents can register to participate in the process and provide feedback to the commission once the application has been submitted. “We have been working with residents who are surrounding the site, we have sent them letters to let them know what is going on there and trying to keep them informed as to what is happening. Certainly they can choose to be a part of the application process as well if they have questions or feedback.” stated Wylie.

More information on the project can be found at FortisBC.com\kootenayops and you can also submit feedback on the project.

Appendix N

FIRST NATIONS CONSULTATION

Appendix N-1

ARCHAEOLOGICAL PRELIMINARY FIELD RECONNAISSANCE NON-PERMIT LETTER REPORT

Tipi Mountain Eco-Cultural Services Ltd.

PO Box 957
Cranbrook BC V1C 4J6
Phone 250 420 2724
Fax 250 489 4142

Archaeological Preliminary Field Reconnaissance (PFR) Non-Permit Letter Report

Date: March 17, 2015

Prepared for: Blair Weston, Fortis BC

Prepared by: Derrick Plante, Tipi Mountain Eco-Cultural Services Ltd. (TMECS)

Re: 120 Ootischenia Road (Lot 65, Parcel A) – Fortis BC Office Building

On February 12, 2015, TMECS was presented development information pertaining to a proposed subdivision plan for Lot 65, District Lot 4598, Kootenay District Plan 4924 (Parcel Identification Parcel A [herein referred to the *subject property*]) located within the community of Castlegar, B.C (Figure 1). The subject property encompasses a total of 4.05 hectares and can be located on map sheets 082F.032 (BC TRIM) and 82F.05 (NTS) (see Figure 1 below). Currently, Fortis BC is planning on constructing a new office building, associated infrastructure and upgrades to an existing fence line at the subject property (*e.g.* parking lots, pole bunks, transformer racking, covered parking, a wash bay, a septic field and general storage). Although the current development is still in the early planning stages, an initial archaeological inspection was requested by the proponent to complete archaeological resource management requirements prior to the commencement of development work in order to avoid delays in future.

Background research for the subject property produced information concerning development of the area dating from the late 1800's. Prior to 1930, the region of Ootischenia was subject to a wide range of horticultural development, including the planting and maintenance of fruit trees, berry patches and vegetable gardens (industrial sized or more residential?). Agricultural development ceased after 1930 and the land was subsequently abandoned for roughly a dozen years. Until Ootischenia school (grades 1-8) was built on the subject property in 1942 (Melnuchuk 1984, School Days 1992). This school was active between1942 and 1986 and occupied two buildings (a new building was constructed on the same property in 1963) and several associated structures (*i.e.* library, gymnasium, storage rooms, new offices and a janitor's room were added in 1978). Due to economic pressure and decreasing enrollment numbers, the school board closed the school in 1986 (*ibid.*). Since then, the school buildings were demolished and the majority of the associated debris has been taken off-site.

Field Reconnaissance: A preliminary field reconnaissance was completed by TMECS on March 5, 2015, which involved an intensive, pedestrian-based, surface survey of the landscape delimited by the subject property. Additionally, walking survey and visual assessment was completed on immediately adjacent terrain in order to attain a better understanding of the general landscape within the area.

The subject property is located along Columbia Road (to the east) and Ootischenia Road (to the south and west) and is situated due east of the Castlegar International Airport (see Figure 1). Throughout the in-field assessment, the field crew utilized ground exposures to inspect for archaeological material (precontact and historical). The pedestrian-based survey completed throughout the subject property revealed that a significant amount of mechanical ground disturbance has previously occurred. Several remnant foundation depressions, including a playground area, and an old parking lot were noted in the southwestern portion of the subject property and are clearly visible on the ground surface. Additionally, the ground surface was notably soft in unvegetated and/or debris free sections of the subject property and appeared to have recently been worked by either a cultivator or a disk plough. The northeastern periphery of the subject property is generally vegetated (*e.g.* trees and bushes) consisting of older trees (50+ years) and juvenile trees, these areas were still disturbed, but to a lesser extent.

A supplemental traverse to the north and west were used to establish the extent of disturbance relative to the subject property and to identify the subject property's geomorphological setting. The subject property is situated roughly 200 m west of from the second terrace level and located approximately 1 km west of the Kootenay River.

Several archaeological sites have been recorded along the Kootenay River; in this area, the density of archaeological sites increases significantly at the confluence of the Columbia and Kootenay Rivers which merge together roughly 3.6 km north-northwest of the subject property. The distance of the subject property from the confluence of the two rivers and the distance from the second terrace margin lowers the archaeological potential in the development area significantly. To the north of the subject property, the vegetation and tree stand are well established; however, past ground disturbance is visible throughout the area.

Recommendations: Field inspections within the proposed **120 Ootischenia Rd (Lot 65, Parcel A)** development produced negative results, with no archaeological materials or sites being observed within the currently defined development boundaries. TMECS recommends that no additional inspections, investigations or archaeological resource management requirements be considered necessary for this proposed development, provided that anticipated ground disturbance does not extend beyond the area(s) included within this impact assessment.

To properly address an unanticipated discovery(s) of archaeological materials as a result of future developments that involve ground disturbance, please ensure staff and contractors are aware of the following:

- All ground disturbance in the immediate vicinity of the suspected find(s) must be suspended at once,
- MoFLNRO, Archaeology Branch (Doug Glaum, Manager 250-953-3357) be informed, as soon as possible, of the location of the archaeological remains and the nature of the disturbance, and
- Any other relevant First Nation communities are promptly informed about particulars of the unanticipated discoveries

Should you have any questions or require further information please contact me at your convenience.

Derrick Plante

Derrick Plante B.A.
Jr. Archaeologist
Tipi Mountain Eco-Cultural Services Ltd.
Email: derrick@tipimountain.com

Reference Cited:

Melnychuck, D.
1984 *Agricultural Strategy for Ootischenia Area.* Property Management Program, Abbotsford, B.C.

School Days
1992 *School Days, School Days Dear Old Golden Rule Days; A historical look at the buildings & people that made up District No. 9.* School District No. 9, Castlegar, B.C.

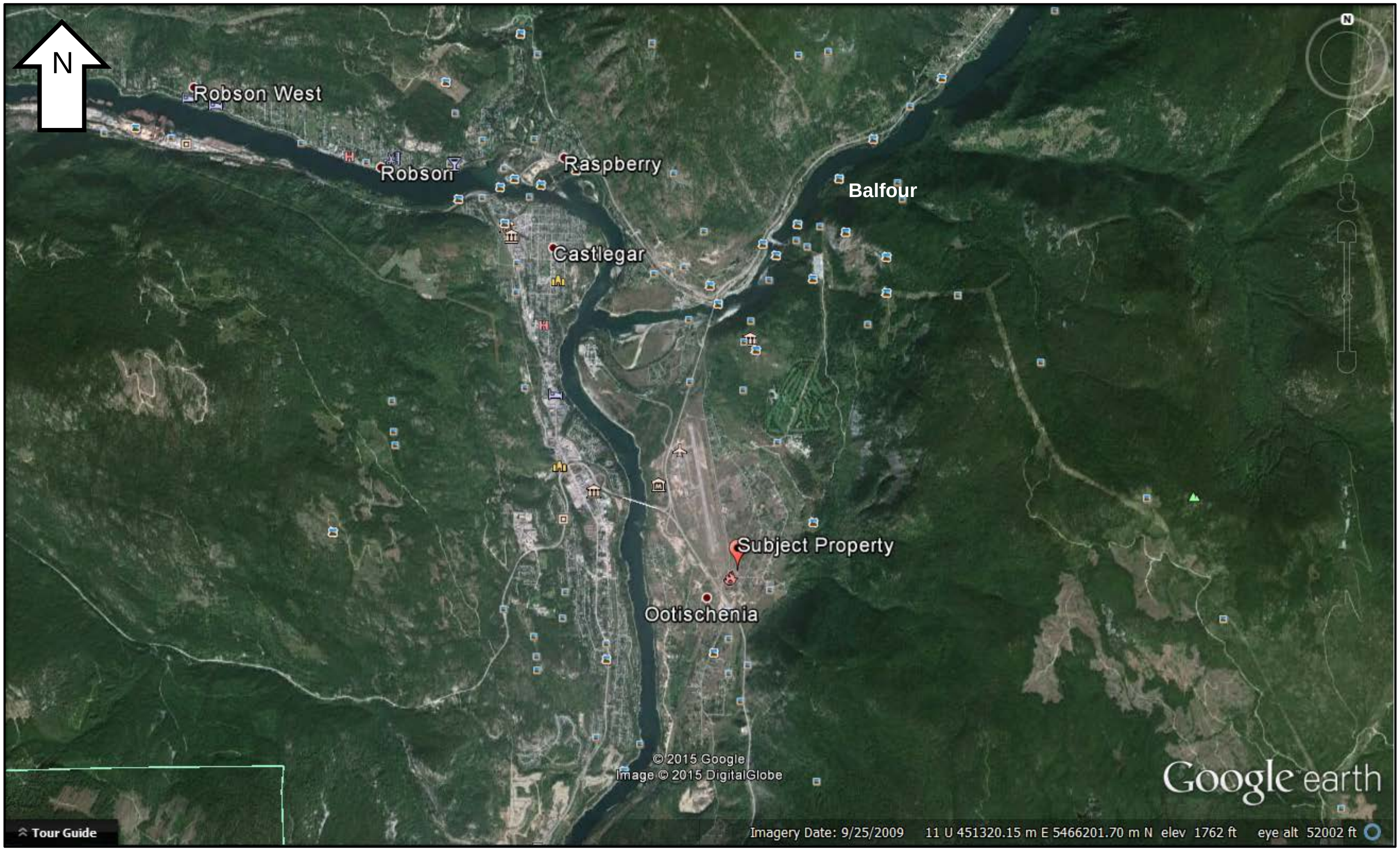

Figure 1. Project overview map

Figure 2. Topographic map displaying the current state of the subject property. Development plan will occur in southern half of the lot (highlighted in red).

Figure 3. An initial proposed site plan that displays a view of the subject property once the development is complete.

Appendix N-2

FIRST NATIONS ENGAGEMENT LIST

SOE Report

Report Name: Report
Report Date: Tue May 12 14:19:31 PDT 2015
Shape Name: unnamed
Linear Width: 1.0
Adjacency Buffer: This feature was not buffered.

CAD contact information for the area that was queried is displayed below. Note that a single First Nation boundary may have multiple contacts. As a result it is possible for a contact to show up in the list more than once.

Conflicting Features:

Contact Name	
Contact Title	Single Window Administrative Portal (SWAP)
Contact Organization	Secwepemc Nation
Contact Address	200-345 Chief Alex Thomas Way
Contact City	Kamloops
Contact Province	BC
Contact Postal Code	V2H 1H1
Contact Phone	250-828-9761
Contact Fax	250-373-0025
Contact Email	FLNRO, MOE and MEM only are to send to swap@secwepemc.ca

Contact Name	
Contact Title	Chief and Council
Contact Organization	Lower Similkameen Indian Band
Contact Address	PO Box 100
Contact City	Keremeos
Contact Province	BC
Contact Postal Code	V0X 1N0
Contact Phone	250-499-5528
Contact Fax	250-499-5538
Contact Email	referrals.coordinator@lsib.net

Contact Name	
Contact Title	Chief and Council
Contact Organization	Penticton Indian Band
Contact Address	RR 2 Site 80 Comp 19
Contact City	Penticton
Contact Province	BC
Contact Postal Code	V2A 6J7
Contact Phone	250-493-0048
Contact Fax	250-493-2882
Contact Email	referrals@pib.ca

Contact Name	Christine Saddleman
Contact Title	Natural Resource Tech
Contact Organization	Upper Nicola Indian Band
Contact Address	PO Box 3700, 2225 Village Road
Contact City	Merritt
Contact Province	BC
Contact Postal Code	V1K 1B8
Contact Phone	250-350-3342
Contact Fax	250-350-3311
Contact Email	nrtech1@uppernicola.com

Contact Name	
Contact Title	Chief and Council
Contact Organization	Okanagan Nation Alliance
Contact Address	106 3500 Carrington Road
Contact City	Westbank
Contact Province	BC
Contact Postal Code	V4T 1V4
Contact Phone	250-707-0095
Contact Fax	250-707-0166
Contact Email	director@syilx.org

Contact Name	
Contact Title	Chief and Council
Contact Organization	Okanagan Indian Band
Contact Address	12420 Westside Road
Contact City	Vernon
Contact Province	BC
Contact Postal Code	V1H 2A4
Contact Phone	250-542-4328
Contact Fax	250-542-4990
Contact Email	okibreferrals@okanagan.org

Contact Name	
Contact Title	Chief and Council
Contact Organization	Splats'in First Nation
Contact Address	PO Box 460, 5775 Old Vernon Road
Contact City	Enderby
Contact Province	BC
Contact Postal Code	V0E 1V0
Contact Phone	250-838-6496
Contact Fax	250-838-2131
Contact Email	ray_cormier@splatsin.ca

Contact Name	
Contact Title	Chief and Council
Contact Organization	Osoyoos Indian Band
Contact Address	1155 Sen Pok Chin Blvd
Contact City	Oliver

Contact Province	BC
Contact Postal Code	V0H 1T8
Contact Phone	250-498-3444
Contact Fax	250-498-6577
Contact Email	referrals@oib.ca

Contact Name	
Contact Title	Chief and Council
Contact Organization	Shuswap Indian Band c/o Kinbasket Group of Companies
Contact Address	PO Box 790
Contact City	Invermere
Contact Province	BC
Contact Postal Code	V0A 1K0
Contact Phone	250-342-6361
Contact Fax	250-342-2948
Contact Email	administration@shuswapband.net

Layers Queried Successfully:

CAD contact information for the area that was queried is displayed below. Note that a single First Nation boundary may have multiple contacts. As a result it is possible for a contact to show up in the list more than once.

Disclaimer:

The Consultative Areas Database (CAD) Public Map Service Report provides preliminary contact information for First Nations who may have with aboriginal interests identified within the area queried.

These contacts are based on knowledge currently available to the Province. Those choosing to provide information and involve First Nations early in a proposed project have the opportunity to develop mutual understanding of the interests around the project. This can be important to successful business planning and project development. CAD Public Map Service users are encouraged to explore making this contact prior to submitting an application for government authorization. This approach gives support to the Provincial consultation process and the goals of the New Relationship.

The information provided is not intended to create, recognize, limit or deny any aboriginal or treaty rights, including aboriginal title, that First Nations may have, or impose any obligations on the Province or alter the legal status of resources within the Province or the existing legal authority of British Columbia. The Province makes no warranties or representations regarding the accuracy, timeliness, completeness or fitness for use of any or all data provided in the reports.

- Copyright: http://www.gov.bc.ca/com/copyright.html
- Warranty Disclaimer & Limitation of Liabilities: http://www.gov.bc.ca/com/disclaimer.html
- Privacy: http://www.gov.bc.ca/com/privacy.html

Appendix N-3

FIRST NATIONS LETTER

Blair Weston
Community and Aboriginal
Relations Manager
FortisBC

FortisBC Inc.
3100 West Kootenay Rd
South Slocan BC, V0G 2G0
250-368-2920
blair.weston@fortisbc.com
www.fortisbc.com

Shuswap Indian Band
c/o Kinbasket Group of Companies
PO Box 170
Invermere, BC V0A 1K0

RE: NOTICE OF FILING FOR FORTISBC KOOTENAY OPERATIONS CENTRE

FortisBC remains committed to ongoing communication as we move forward with plans for the construction of the new Kootenay Operations Centre in Castlegar. The FortisBC Operations Centre is required to replace existing aging facilities in the West Kootenay Region, to unify FortisBC's long term space requirements and to meet our commitment to our customers, their community and our employees. The proposed building will be approximately 30,000 sq. ft. in size and is expected to house approximately 100 employees. The site will support FortisBC operations and will include office space, crew space, material storage and an area emergency response centre.

FortisBC is apply for a Certificate of Public Convenience and Necessity from the British Columbia Utilities Commission (BCUC) for approval of this project. Should you wish to be part of the process you can contact the BCUC directly at www.bcuc.com Commission.Secretary@bcuc.com or 1-800-663-1385.

If you would rather speak directly with FortisBC about the project, please contact me at the numbers below. I look forward to your feedback, and if you would like to be kept informed of the project's progress, please let me know.

The expected decision for this is early 2016. FortisBC has purchased a 10-acre parcel, located at 120 Ootischenia Road in Castlegar and we anticipate starting construction of the new Kootenay Operations Centre shortly after, once all approvals are in place.

I can be contacted by telephone 250.231.0176 or email at blair.weston@fortisbc.com

Respectfully;

Blair Weston
Community and Aboriginal Relations Manager
FortisBC

Appendix O

DRAFT ORDERS AND UNDERTAKING OF CONFIDENTIALITY

Appendix O-1

DRAFT PROCEDURAL ORDER

SIXTH FLOOR, 900 HOWE STREET, BOX 250
VANCOUVER, BC V6Z 2N3 CANADA
web site: http://www.bcuc.com

BRITISH COLUMBIA UTILITIES COMMISSION

ORDER NUMBER G-XX-15

TELEPHONE: (604) 660-4700
BC TOLL FREE: 1-800-663-1385
FACSIMILE: (604) 660-1102

IN THE MATTER OF
the Utilities Commission Act, R.S.B.C. 1996, Chapter 473

and

An Application by FortisBC Inc.
for a Certificate of Public Convenience and Necessity for
the Construction of the Kootenay Operations Centre

BEFORE:

(Date)

O R D E R

WHEREAS:

A. On July 9, 2015, FortisBC Inc. (FBC) applied to the British Columbia Utilities Commission (the Commission), pursuant to Sections 45 and 46 of the *Utilities Commission Act* (Act), for a Certificate of Public Convenience and Necessity (the Application) for the construction of a new operations centre located in the Castlegar area(the Kootenay Operations Centre or KOC) (the Project).

B. The Project will:

- Replace the Generation Administration Office and the Warehouse;
- Address concerns related to the System Control Centre (SCC) and Back-Up Control Centre (BCC);
- Provide a central and dedicated Emergency Operations Centre for the Kootenay region;
- Provide a central location to house the Kootenay Station Services group; and
- Provide storage for poles and pole trailers currently housed at the South Slocan Generation Site for Network Operations dispatched out of the Castlegar District Office.

C. The Application is filed in two parts: the Primary Application which contains all of the information related to the Project, and the Confidential Application which contains detailed information related to the SCC and BCC.

D. FBC proposes to start construction of the Project in late Spring 2016 and be in-service by 2017.

E. FBC estimates the capital cost of the Project in as spent dollars to be approximately $20.651 million including Allowance for Funds Used During Construction (AFUDC) and abandonment/demolition costs.

F. FBC also requests approval pursuant to section 56 of the Act for a depreciation rate of 1.9% that would be applicable to the new facility.

G. FBC requests that the Confidential Application containing detailed information related to the SCC and BCC, Confidential Appendices and Information Requests (IRs), Responses and Submissions which relate to the Confidential Information be treated as confidential during and after the hearing of the Application, in order to maintain public safety and reliability and protect FBC's critical assets and business interests. FBC further requests that, if necessary and granted by the Commission, access to and treatment of certain highly sensitive Restricted Information related to critical infrastructure be subject to a process, such as that outlined in the FBC Restricted Information Proposed Protocol, included as Appendix A to the Application.

H. The Commission has determined that a written public hearing is necessary for the review of the Application.

NOW THEREFORE the British Columbia Utilities Commission orders as follows:

1. The Application will be examined through a written public hearing process and the preliminary Regulatory Timetable, attached as Appendix A, has been established.

2. The Commission considers FBC's request for confidentiality is reasonably necessary to maintain public safety and reliability and protect FBC's critical assets and business interests. The Commission will hold detailed information related to the SCC and BCC and Project cost estimates for material and construction work confidential. Interveners may obtain access to this information by executing standard form undertakings of confidentiality. Further, access to certain Restricted Information, if necessary and granted by the Commission, will be subject to a protocol for handling and management of Restricted Information as will be confirmed by the Commission.

3. FBC must publish, as soon as possible, a notice of the Application and public written hearing process, attached as Appendix B to this Order, in local and community newspapers to provide reasonable notice to people in the affected service area and surrounding communities.

4. Persons wishing to participate as interveners or as interested parties, as described in Appendix B, should register with the Commission in writing or electronic submission by Wednesday, August 5, 2015. Interveners

should specifically state the nature of their interest in the Application and identify generally the nature of the issues that they may intend to pursue during the proceeding and the nature and extent of their anticipated involvement in the review process.

DATED at the City of Vancouver, In the Province of British Columbia, this XX day of July 2015.

BY ORDER

Original signed by:

Panel Chair/Commissioner

Attachments

An Application by FortisBC Inc.
for a Certificate of Public Convenience and Necessity for
the Construction of the Kootenay Operations Centre

REGULATORY TIMETABLE

ACTION	DATE (2015)
Intervener and Interested Party registration	Wednesday, August 5
Commission Information Request No. 1	Tuesday, August 11
Intervener Information Request No. 1	Tuesday, August 18
FBC Responses to Information Requests No. 1	Tuesday, September 22
Commission and Intervener Information Request No. 2	Tuesday, October 13
FBC Responses to Information Requests No. 2	Friday, November 6
FBC Final Written Submission	Friday, November 20
Intervener Final Written Submissions	Wednesday, December 2
FBC Written Reply Submission	Friday, December 11

PUBLIC NOTICE

BRITISH COLUMBIA UTILITIES COMMISSION

(DATE), 2015

AN APPLICATION BY FORTISBC INC.
FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY FOR THE CONSTRUCTION OF THE KOOTENAY OPERATIONS CENTRE (APPLICATION)

On July 9, 2015, FortisBC Inc. (FBC) applied to the British Columbia Utilities Commission (Commission) for a Certificate of Public Convenience and Necessity (CPCN), pursuant to Sections 45 and 46 of the *Utilities Commission Act*, to construct a new operations centre located in the Castlegar area (the Kootenay Operations Centre or KOC) (the Project). The Project will replace the Generation Administration Office and the Warehouse (Generation Facilities) which are at end of life, address concerns related to the System Control Centre (SCC) and Back-up Control Centre (BCC), provide a central and dedicated Emergency Operations Centre for the Kootenay region, provide a central location to house the Kootenay Station Services group, and provide storage for poles and pole trailers.

The proposed Project is intended to address the age, condition and potential code compliance issues of the existing Generation Facilities, and to address their proximity to certain hazards, which could limit FBC's timely and efficient response to emergencies, as well as address the following operational requirements:

- Address space constraints, functional challenges and hazards associated with the SCC and BCC facilities;
- Provide a centralized and dedicated Emergency Operations Centre for generation and transmission & distribution operations;
- Centralize the Kootenay Station Services group for efficiency; and
- Address yard space limitations for efficiency and cost savings.

FBC proposes to start construction of the project in late Spring 2016 and be in-service by 2017. FBC estimates the capital cost of the Project in As-Spent dollars to be approximately $20.651 million including Allowance for Funds Used During Construction (AFUDC) and abandonment/demolition costs.

HOW TO GET INVOLVED

Persons wishing to actively participate in the proceeding must register as an intervener through the Commission's website at www.bcuc.com or in writing by Wednesday, August 5, 2015. In their registration, interveners must identify the issues they intend to pursue and indicate the extent of their anticipated involvement in the review process. Interveners will each receive a copy of all non-confidential correspondence and filed documentation, and must provide an email address if available.

Persons not expecting to actively participate, but who have an interest in the proceeding, should register as an interested party through the Commission's website or in writing, by Wednesday, August 5, 2015, identifying their interest in the proceeding. Interested parties receive a copy of the Decision when it is released.

Letters of comment on the Application will also be accepted. All submissions and/or correspondence received relating to the Application are provided to the Panel and all participants in the proceeding. Submissions are placed on the public record and posted to the Commission's website. By participating and/or providing comment on the Application, you agree that all submissions will be placed on the public record and posted on the Commission's website.

VIEW THE APPLICATION

The Application and all supporting documentation are available on the Commission's website on the "Current Applications" page. If you would like to review the material in hard copy, it is available to be viewed at the locations below:

British Columbia Utilities Commission Sixth Floor, 900 Howe Street Vancouver, BC V6Z 2N3 Commission.Secretary@bcuc.com Phone: 604-660-4700 Toll Free: 1-800-663-1385 <insert bcuc website link>	**FortisBC** Suite 100, 1975 Springfield Road Kelowna, BC V1Y 7V7 Or 16705 Fraser Highway Surrey, BC V4N 0E8 http://www.fortisbc.com/About/RegulatoryAffairs/ElecUtility/CPCN/Pages/Kootenay-Operations-Centre-CPCN-Project.aspx

FOR MORE INFORMATION OR TO REGISTER

For more information or to register please contact Ms. Erica Hamilton, Commission Secretary using the contact information above.

Appendix O-2

DRAFT FINAL ORDER

BRITISH COLUMBIA UTILITIES COMMISSION

ORDER NUMBER C-XX-16

SIXTH FLOOR, 900 HOWE STREET, BOX 250
VANCOUVER, BC V6Z 2N3 CANADA
web site: http://www.bcuc.com

TELEPHONE: (604) 660-4700
BC TOLL FREE: 1-800-663-1385
FACSIMILE: (604) 660-1102

DRAFT ORDER

IN THE MATTER OF
the Utilities Commission Act, R.S.B.C. 1996, Chapter 473

and

An Application by FortisBC Inc.
for a Certificate of Public Convenience and Necessity for
the Construction of the Kootenay Operations Centre

BEFORE:

(Date)

WHEREAS:

A. On July 9, 2015, FortisBC Inc. (FBC) applied to the British Columbia Utilities Commission (the Commission), pursuant to Sections 45 and 46 of the *Utilities Commission Act* (Act), for a Certificate of Public Convenience and Necessity (the Application) for construction of a new operations centre located in the Castlegar area (the Kootenay Operations Centre or KOC) (the Project);

B. The Project will:

- Replace the Generation Administration Office and the Warehouse;
- Address concerns related to the System Control Centre (SCC) and Back-Up Control Centre (BCC);
- Provide a central and dedicated Emergency Operations Centre for the Kootenay region;
- Provide a central location to house the Kootenay Station Services group; and
- Provide storage for poles and pole trailers currently housed at the South Slocan Generation Site for Network Operations dispatched out of the Castlegar District Office;

C. The Application is filed in two parts: the Primary Application which contains all of the information related to the Project, and the Confidential Application which contains detailed information related to the SCC and BCC;

D. FBC proposes to start construction of the Project in late Spring 2016 and be in-service by 2017;

E. FBC estimates the capital cost of the Project to be approximately $20.651 million including Allowance for Funds Used During Construction (AFUDC) and abandonment/demolition costs;

F. FBC also requests approval pursuant to section 56 of the Act for a depreciation rate of 1.9% that would be applicable to the new facility;

G. A written public hearing process was conducted including two rounds of information requests;

H. The Commission Panel has considered the evidence and submissions and concludes that the Project is in the public interest and that a CPCN should be granted.

NOW THEREFORE with Reasons attached as Appendix A to the Order, the Commission orders as follows:

1. Pursuant to Sections 45 and 46 of the *Utilities Commission Act*, a Certificate of Public Convenience and Necessity is granted to FBC for the construction of the Kootenay Operations Centre, as applied for in the Application.

2. Pursuant to Section 56 of the Act, a depreciation rate of 1.9% is approved to be applicable to the new facility.

3. FBC must provide the Commission an updated Total Project Cost Estimate when the construction contract is awarded.

4. FBC shall file with the Commission a Final Report, within six months of the actual completion of the Project, that provides a complete breakdown of the final costs of the Project, compares these costs to the cost estimate in the Application, and provides an explanation and justification of material cost variances.

DATED at the City of Vancouver, In the Province of British Columbia, this day of <MONTH>, 2016.

BY ORDER

Appendix O-3

UNDERTAKING OF CONFIDENTIALITY

FortisBC Inc. (FBC)
Application for a Certificate of Public Convenience and Necessity for Construction of the Kootenay Operations Centre

CONFIDENTIAL Undertaking

I, ______________________, am a participant acting for ______________________________ in the matter of the review of FBC's Application for a Certificate of Public Convenience and Necessity for Construction of the Kootenay Operations Centre*.*

In this capacity, I request access to the confidential information. I understand that the execution of this undertaking is a condition of an Order of the Commission, and the Commission may enforce this Undertaking pursuant to the provisions of the *Administrative Tribunals Act.*

I hereby undertake

a) to use the information disclosed under the conditions of the Undertaking exclusively for duties performed in respect of this proceeding;

b) not to divulge information disclosed under the conditions of this Undertaking except to a person granted access to such information or to staff of the Commission;

c) not to reproduce, in any manner, information disclosed under the conditions of this Undertaking except for purposes of the proceeding;

d) to keep confidential and to protect the information disclosed under the conditions of this Undertaking;

e) to return to FBC, under the direction of the Commission, all documents and materials containing information disclosed under the conditions of this Undertaking, including notes and memoranda based on such information, or to destroy such documents and materials and to file with the Commission a certification of destruction at the end of the proceeding or within a reasonable time after the end of my participation in the proceeding; and

f) to report promptly to the Commission any violation of this Undertaking.

Dated at __________________________ this ______day of ____________, 2015.

Signature: ______________________________

Name: ______________________________
(please print)

Address: ______________________________

Telephone: ______________________________

Fax: ______________________________

E-mail: ______________________________

Appendix O-4

UNDERTAKING OF CONFIDENTIALITY FOR RESTRICTED INFORMATION

Form A

ACKNOWLEDGEMENT

BY COMMISSIONERS and COMMISSION STAFF

I, ____, in my capacity as [circle one] a Commissioner for the British Columbia Utilities Commission (the "Commission"), or a member of Commission staff, am responsible for the review of the matter of the FortisBC Inc. (FBC) Application for a Certificate of Public Convenience and Necessity for the Construction of the Kootenay Operations Center (the "Application"). In this capacity, I have been allowed access to information that has been identified and marked by FBC as "Restricted Information" in the record of this proceeding for the Application.

I understand the obligations set forth in section 12 of the *Utilities Commission Act* ("Act"). I further understand that sections 106(1)(b) and (j) of the Act make the following acts an offence respectively:

> "a person who does, causes or permits to be done an act, matter or thing contrary to this Act or omits to do an act, matter or thing required to be done by this Act"; and
>
> "except so far as the person's public duty requires the person to report on or take official action, an officer or employee of the commission, or person having access to or knowledge of a return made to the commission or of information procured or evidence taken under this Act, other than a public inquiry or public hearing, who, without first obtaining the authority of the commission, publishes or makes known information, having obtained or knowing it to have been derived from the return, information or evidence";

I hereby acknowledge that:

1. I have reviewed, and will comply with, the specifics of the Restricted Information Protocol that has been established by the Commission; and
2. The Restricted Information continues to be confidential after the Commission's review of the Application is complete until such time as FBC confirms in writing that there is no longer a need to hold the Restricted Information in confidence.

Dated at ______________________________ , ___________________ this _____ day of _________ , 2015.

Signature: ______________________________________

Address: ______________________________________

Name: ____
[please print]

____

Telephone: ______________________________________

Email: ____

Form B

UNDERTAKING OF CONFIDENTIALITY FOR RESTRICTED INFORMATION

BY INTERVENERS

I, ___________________________, in my capacity as [circle one] legal counsel, consultant, or expert, employed by [name of law firm or organization]____, representing the interests of [name of registered intervener or intervener group]____, in the matter of the FortisBC Inc. (FBC) Application for a Certificate of Public Convenience and Necessity for the Construction and Operation of the Kootenay Operations Center (the "Application") and the review of the Application by the British Columbia Utilities Commission (the "Commission").

In this capacity, I have been granted by the Commission access to information that has been identified and marked by FBC as "Restricted Information" in the record of this proceeding for the Application. I understand that the execution of this Undertaking is a condition of an Order of the Commission for access to review the Restricted Information and that the Commission is authorized to and can enforce this Undertaking pursuant to the provisions of the *Administrative Tribunal Act*.

I hereby undertake:

(a) to hold in confidence the Restricted Information and not to disclose the Restricted Information to anyone, except to the person within the Commission who has been designated to administer and manage the Commission process for accessing the Restricted Information or to a person who has also executed this Undertaking and been granted access to the Restricted Information by the Commission;

(b) to use the Restricted Information disclosed under the conditions of this Undertaking exclusively for the purposes of preparing information requests, submissions, and rebuttal evidence (if any) on behalf of a registered intervener or the Commission in the course of the Commission's review of the Application;

(c) not to, or not to attempt to, duplicate, record, or otherwise reproduce in any manner, any Restricted Information disclosed under the conditions of this Undertaking without prior consent of FBC;

(d) if access to the Restricted Information has been granted and the Restricted Information has been provided or reproduced, including any related notes, reports, information requests, and memoranda based on the Restricted Information, to keep all hardcopies of any material associated with the Restricted Information in a restricted location (locked cabinet, room or drawer);

(e) within 10 days after the Commission's review of the Application is completed , at the option of the undersigned,

   a. to return to FBC the Restricted Information that has been provided or reproduced, including any related notes, reports, information requests, and memoranda based on the Restricted Information, or

   b. to destroy the Restricted Information that has been provided or reproduced, including any related notes, reports, information requests, and memoranda based on the Restricted

Form B

UNDERTAKING OF CONFIDENTIALITY FOR RESTRICTED INFORMATION

BY INTERVENERS

Information and file with the Commission (with copy to FBC) a certificate or affidavit of destruction;

(f) to promptly report to the Commission (with a copy to FBC) any use or disclosure of the Restricted Information not provided for or allowed by this Undertaking of which it becomes aware; and

(g) to continue to hold in confidence the Restricted Information after the Commission's review of the Application is complete until such time as FBC confirms in writing that there is no longer a need to hold the Restricted Information in confidence.

Dated at ______________________________ , ___________________ this _____ day of _________ , 2015.

Signature: ______________________________________ Address: ______________________________________

Name: ____ ____
[please print]

Telephone: ______________________________________ Email: ____