INTEGRATED INFRASTRUCTURE SERVICES
Facility Engineering Services
Facility Planning & Design
Facility Infrastructure Delivery

Facility Design & Construction Consultant Manual

Volume 1

COE-IM-GUIDE-0001

Design Process and Guidelines v08

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Edmonton, Alberta
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Date of Issue: 2022-11-21

Contents

1. Introduction

1.1. Purpose and Scope

1.1.1. This document is intended to be used for the following purposes:

1.1.1.1. A reference for consultants providing services for new building Projects and renovations to existing facilities owned or operated by the City of Edmonton (CoE).

1.1.1.2. A resource for the CoE when reviewing and evaluating the work performed by architectural and engineering firms on CoE facility Projects.

1.1.2. This document is Volume 1 of 2 and is divided into the following sections:

1.1.2.1. Section 1 – Introduction: Establishes the scope of the document and gives general contact information.

1.1.2.2. Section 2 – Design Process: Describes the information flow on a typical Project, standard deliverables expected at each milestone, and an overview of minimum document and CAD standards to be followed.

1.1.2.3. Section 3 – Design Guidelines: Describes City policies and design guidelines and their relative administrative procedures specific to the CoE that are to be considered when designing buildings. The contents of this section may not apply to all building Projects, review with your Professional Service Agreement (PSA) and/or standing arrangement Project call-up to confirm if required.

1.1.3. Consultant Manual - Volume 2 of 2 contains the following section:

1.1.3.1. Section 4 – Technical Guidelines: Discipline specific guidelines to consider for the design and construction of facilities for the CoE.

1.1.4. The Consultant is expected to follow professional judgment as well as all applicable codes and regulations. Projects may have specific requirements that supersede some material presented in this document. These requirements will be communicated to the Consultant at the outset of the Project or during design as the need arises. When a deviation from these guidelines is either required CoE approval shall be documented in writing.

1.1.5. Content from this manual must not be copied directly into any Project deliverables, unless noted otherwise. Note: this does not apply to fire alarm dialer and typical security and card access details in volume 2.

1.1.6. Request the latest versions of the standard documents and templates from the CoE Project Manager.

1.2. Definitions

Unless otherwise specified, words used in this document have the same meaning as defined in the Professional Service Agreement (PSA).

1.2.1. Basis of Design (BOD): A document that records the concepts, calculations, decisions, and product selections used to meet the Owner's Project Requirements (OPR) and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

1.2.2. Consequential Change: Any change to a Professional Work Product (PWP), usually effected during PWP Implementation, that has a material effect on the integrity of the design and/or requires input and approval from the authenticating Licensed Professional.

1.2.3. Design Criteria: Target goals for the design (temperatures, humidity, lighting levels, structural loadings, etc.)

1.2.4. Growth (Scope): Investment in the upgrade of existing infrastructure assets or development of new infrastructure assets (created or acquired), which increase the value of the overall portfolio of assets. These actions increase or add to the intended level of service provided by the City's portfolio of infrastructure assets.

1.2.5. Mandatory vs. Non-Mandatory:

1.2.5.1. These guidelines include both mandatory and non-mandatory recommendations. Applications of these guidelines are based on the use of the following terminology:

.1 Must and/or Shall - denotes a mandatory City of Edmonton requirement,
.2 Should - denotes a recommended but non-mandatory City of Edmonton requirement,
.3 May - denotes an optional City of Edmonton requirement.

1.2.6. Professional Services Agreement (PSA): The agreement the Consultant enters into with the City to perform the Work. This document includes all documents listed within the Contract Form.

1.2.7. Renewal: Investment in existing infrastructure to restore it to its former condition and may extend its service life. Capital investment in renewal extends the period of service potential but does not change the replacement value, and so does not increase the size of the infrastructure asset portfolio. The renewal includes rehabilitation and replacement. (C598 Policy)

1.2.7.1. Rehabilitation: The action of restoring or replacing parts or components of an infrastructure asset to a former condition or status. Generally involves repairing the asset to deliver its original level of service without resorting to significant upgrading or renewal, using available techniques and standards. (C598 Policy)

1.2.7.2. Replacement: The action of replacing an infrastructure asset so as to provide a similar, or an agreed alternative, level of service. (C598 Policy)

1.2.8. Technical Review: The process in which the Project Manager circulates Consultant deliverables for review, markup, or comment from Internal City Project stakeholders. Technical reviewers typically include the Commissioning Agents, Construction Managers and the City of Edmonton(CoE) (Project Business Area, Architectural Services, Engineering Services, and

Facility Maintenance Services - Project Review Team (PRT). Reviews may include other CoE stakeholders including Open Spaces - Landscape Architect, Heritage Planning, Corporate Security, and others.

1.3. Contact Information

1.3.1. The latest version of this document may be obtained in electronic format from the CoE Website, the Project Manager, or by contacting the individual below.

1.3.2. Please note all additions and changes made to the Consultant Manual Volumes 1 and 2 have been highlighted in orange.

1.3.3. Consultant input to the progressive updating of this document is invited, address comments to the supervisor of Facility Engineering. Comments and feedback regarding CAD Drawing standards please address comments to:

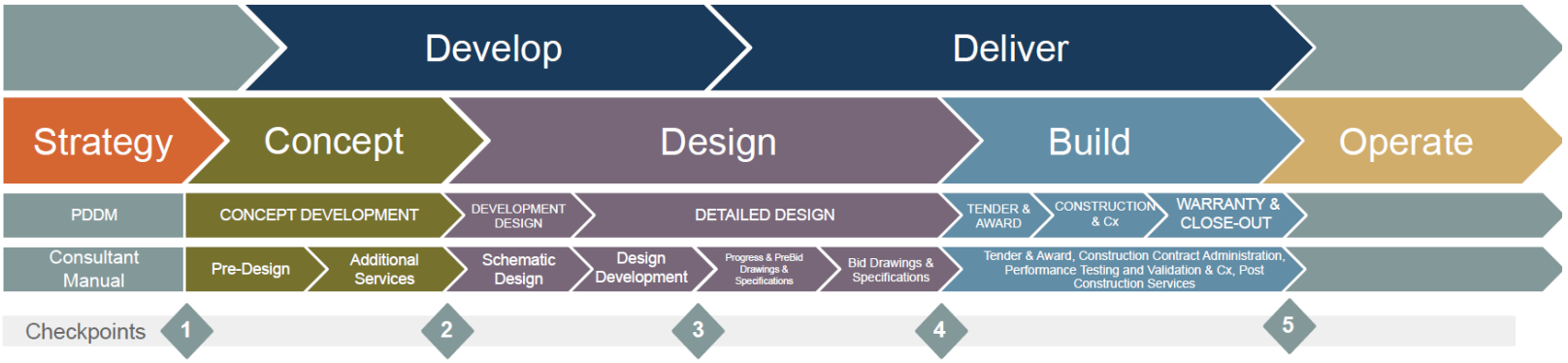
Supervisor, Facility Engineering
Facility Engineering Services
Infrastructure Planning & Design
Integrated Infrastructure Services
13th Floor, Edmonton Tower
10111 – 104 Avenue
Edmonton, AB T5J 0J4
bsafacilityengineering@edmonton.ca

VER	Date	Revision Summary
08	2022-11-21	Updated formatting
07	2022-11-02	Additions / revisions highlighted in orange
07		Additions / revisions not highlighted • Defined terms capitalized (not italicized) • Use of defined terms from the PSA • Removing trade-specific language, or adding definition e.g. Basis of Design • Use of abbreviations after 1st instance e.g. City of Edmonton = CoE • Remove conflict between different sections of the manual and the PSA • Keeping consistent (ie) definition of "what" services required located in the PSA, and process, "how" or "why" in the Consultant Manual • Eliminate redundant information • Use of clear, concise language (i.e.) removing emphasis unless absolutely required etc. • Additions / revisions highlighted in
06	2021-11-02	Updated section 3 numbering
05	2021-09-10	Additions / revisions highlighted in green
04	2019-07-26	Additions / revisions highlighted in yellow
Printed or downloaded copies of this document are not controlled and may not be the current version.		

2. Design Process

2.1. *Project Development and Delivery Model (PDDM)*

2.1.1. The Project Development and Delivery Model (PDDM) is the approach that the City takes to enhance capital infrastructure project oversight. This process involves structured reviews of projects at key points throughout the Project life cycle. Below is an illustration of the approximate alignment of Consultant Deliverables with the City's internal PDDM checkpoint system.



2.2. *Project Communication*

2.2.1. General

2.2.1.1. The CoE will assign a Project Manager for deliverables up to Design Development and a Project Manager for Working Drawing to Post Construction. At the end of Design Development, a transition will occur in which the Project Manager assigned will switch as the Consultant's single point of contact within the City.

2.2.1.2. The Prime Consultant is to appoint one person to be the primary contact on the design team. If the design team consists of multiple sub-consultants in multiple firms, all official correspondence and submissions to the CoE should be through the Prime Consultant.

2.2.1.3. Any discussion between members of the design team that affects the Project design, cost, or schedule should be recorded in writing by the Prime Consultant and forwarded to all relevant team members, including the Project Manager. Internal discussions between the Consultant and their sub-consultants are to be documented internally. It is the responsibility of the Consultant to alert the Project Manager of any internal discussions that may affect the Project scope, budget, schedule, etc.

2.2.1.4. The CoE uses the Google ecosystem for email, calendaring, and most documents. The Consultant will make every effort to use Google for file transfers to, and developing collaborative documents with, the CoE.

2.3. Project Delivery Models

2.3.1. The scope and language within the Facility Design and Construction Consultant Manuals are written to reflect a traditional Project Delivery method, and portions may not suit all delivery methods of Project Delivery, or contractual relationships. Unless specifically noted, the Consultants should assume all deliverables and technical requirements are required. The Consultant is encouraged to seek clarification on any deliverables which they feel should be excluded from the Project for consideration. The CoE will review any comments provided and may issue a change incorporating these considerations.

The CoE may elect to use any of the following methods for Project delivery;

.1 Design Bid Build
.2 Construction Management
.3 Integrated Project Delivery
.4 Progressive Design-Build
.5 Standard Design-Build (with Bridging Consultant)
.6 Public Private Partnership
.7 Other

2.4. Consultant Deliverables

2.4.1. Introduction

2.4.1.1. This section outlines typical deliverables at key Project milestones. It is understood that all projects are different and the contents of this section may not wholly apply to all projects. For example, smaller Projects may consist of scaled-down reports, Rehabilitations may remove deliverables unrelated to the project, or a larger project may be phased in such a way that more or less is required from the consultant at each phase.

Modifications to consultant deliverables required for Projects are identified in the Professional Services Agreement (PSA), or in the case of a standing arrangement, in the Project Call-Up request for proposal.

2.4.1.2. The Consultant shall submit an electronic copy of all Consultant deliverables for the City's review and approval. Following the review and completion of any required corrections, the final deliverable shall be submitted via electronic PDF version. Confirm with the Project Manager if hard copies are required.

2.4.1.3. All submissions will be subject to a Technical Review.

.1 The Consultant is to respond to all Technical Review comments in writing to the Project Manager prior to commencing work on the next submission. These written responses are to be included in the next submission in an appendix.
.2 In some cases, the Consultant may be required to re-submit based on the nature of the comments.
.3 Comments received from the CoE do not absolve the Consultant of their responsibility to comply with all applicable codes and regulations.

2.4.1.4. Typically a Technical Review will be completed once per milestone. Additional submissions may be requested in PSA or provided by the Consultant to demonstrate progress. These will not normally be subject to a Technical Review. Extraordinarily large projects or major revisions may be an exception and have an extra Technical Review.

2.4.2. Pre-Design & Additional Services

The purpose of the pre-design phase is to provide both the City and the Consultant with a foundation and necessary information for design decision-making. During pre-design, the purpose and objectives of the design-construction program are established. (The Canadian Handbook of Practice for Architects, RAIC 2020)

Refer to your PSA Description of Work and/or Project Call up for definition of pre-design and/or additional services required for the Project;

2.4.2.1. Functional Programming

.1 In preparing a functional program, the consultant's main task is to examine the stakeholder's facility and operations in detail so as to define their needs and objectives. These requirements will establish criteria for evaluating potential design solutions or other strategic alternatives. This phase typically consists of a functional programming report explaining the guiding principles for future work, defining zones and individual spaces to be developed, the planned operational model, relationship diagrams as necessary to show working and physical relationships, the total gross area, and a construction estimate.

.2 The report is to include the following:

.1 A written description of the goals and objectives of the facility

.1 What is the nature and scope of the Project parameters, needs, and opportunities
.2 What information is required to develop an appropriate architectural response?

.2 Description of desirable activities and operations to be included, and divided into regularly occurring, seasonal, or occasional. Include interior and exterior activities.

.3 Description of spaces required to support those chosen activities and operations

.1 How much and what type of space is needed?
.2 What space will be needed in the future to operate efficiently and/or meet the needs of the community? Future planning is to be determined on a Project-by-Project basis.
.3 Include any important or unique physical characteristics of these defined spaces, such as size, desired materials, acoustic properties, special lighting, ventilation, or temperature requirements, etc.

.4 Description of how the building will be operated and by whom, including hours of operation, maintenance, security, and shipping, building access/control, garbage, and recycling and receiving requirements.

.5 Requirements from stakeholders including the community.

.6 Summary of public/stakeholder engagement and how results impacted the program.

.7 Description of the existing site conditions, and any restrictions on how the site can be used, such as zoning restrictions, community concerns, and transportation access.
.8 Functional adjacencies by individual space and/or by zone, depending on the building size and complexity. Suggestions for options may be required to be provided as well.
.9 Cost-sensitive items that the design team must respond to during the design phase, and any elements with significant impacts for funding of construction and/or operating costs.
.10 Criteria that will govern the future planning of urban design elements, site planning, architecture, interior design, and building systems.
.11 Summary of plans, documents, codes, standards, policies, etc. that need to be considered in the building design.
.12 An explanation of the strategy for determining what spaces can or cannot be shared between user groups, or spaces that will have multiple uses, where applicable.
.13 An explanation of the strategy for phasing and future expansion, where applicable.
.14 A complete list of participants including advisory committees who were consulted during the programming process.
.15 Include a description of assumptions around accommodating future growth.
.16 If any risks are involved with deferring the Project.
.17 Risks related to the Project.

.3 Attachments must include

.1 Preliminary room data sheets for major space types, where sizing is furniture or equipment dependent, or where any extraordinary mechanical or electrical requirements are required. Consultants may use their typical room data sheet template and circulate a copy to the Project Manager for review and approval for use.
.2 Staff and occupancy summary (table), including a description of shifts where applicable.
.3 Facility parking requirements (table), and staff parking requirements (table), including the number of electrified stalls for block heaters.
.4 Space list spreadsheet including unit net areas and projected gross up factor, for a total area in square meters.
.5 Space adjacency diagrams, either for groups of spaces or for individual spaces, depending on the size of the facility.
.6 Lighting Control System (LCS).
.7 Alternative fuel technologies (e.g.: all electric, geothermal), renewable energies solutions, and/or energy storage solutions.

.4 This submission must include a Class 5 cost estimate. Refer to Appendix C - Construction Cost Estimates.
.5 Grossing factors should be justified with an explanation of their comparative source. If the building has individual ‘suites’ or independent zones, then a grossing factor should be applied to each of those identified zones, and a separate grossing factor applied to the building as a whole.

.6 Refer to Consultant Manual Volume 2, Mechanical and Electrical sections, for descriptions of space requirements for service spaces.
.7 Where the sizes of certain building systems components can be determined during programming, include those as individual spaces rather than as part of a percentage grossing, e.g. Network Access Rooms (NAR), janitor closets, and public washrooms should be itemized within the program.
.8 All office spaces for CoE facilities need to be programmed and sized in accordance with the Corporate Space Guidelines, as outlined in Administrative Directive A1407B: Provision of Office and Special Purpose Accommodation for Civic Staff.

2.4.2.2. Functional Program Validation

.1 Verify the accuracy of the decisions made in the original functional program including but not limited to; number and size of individual spaces, overall size, operational model, growth model, and any cost estimates.
.2 Where a conflict between the functional program and current industry standards and or City/Stakeholder input occurs, provide a brief summary of the required changes which can be appended to the functional program for future reference.

2.4.2.3. Scope Validation (Renewal Projects)

Scope validation is required to manage the development and prioritization of an in-depth scope of work and related cost estimates. It is developed by reviewing existing documentation available, and by meeting with the relevant stakeholders across the CoE organization to gather information and make recommendations about scope priorities. The scope validation report will be used by the City to determine which scopes should move forward for the design phase and be completed within the present project budget, a change in budget, or be deferred for later work.

.1 Scope Validation: Information Gathering

.1 Review of existing City supplied information, e.g., building condition assessments, scope register, etc.
.2 Recommendation for, and definition of, any non-destructive or destructive testing required to verify existing conditions.
.3 An on-site scope confirmation exercise:

.1 engagement with key stakeholders (identified by the City) to determine whether there are other issues related to the operations or maintenance of the building systems that may require additional consideration.
.2 review of the facility to determine whether there are any emergent scope items since the production of the last Building Condition Assessment (BCA).
.3 review the facility to confirm the validity of all scope items listed using the City of Edmonton Condition Rating Scheme Table - refer to Appendix E;

.1 advise if items rated as A, B, or C have since degraded to a D or F condition.
.2 advise if an item rated A, B, or C has to be replaced due to an interdependency with a D or F item
.3 advise if any scope items have been repaired/replaced post BCA.

.4 advise on whether any renewal scope items merit full replacement, and what service life (in years) remains for these items.
.5 advise whether a full asset replacement or selective repair/replacement is recommended, especially for scope items that cover large areas such as flooring, ceilings, etc.
.6 advise if the Consultant disagrees with any items rated as D or F.

.4 Review the stated scope of renewal work in its existing condition for compliance with the latest National Building Code (Alberta Edition), Alberta Occupational Health and Safety Code, Canadian Electrical Code, and ASHRAE and incorporate the changes necessary to ensure safe operation. For all code compliance recommendations please validate whether the asset is also recommended for renewal due to its condition irrespective of code issues.

.2 Scope Validation: Prioritization

.1 Establish a prioritization of scope based on life safety and building systems that are at critical risk of failure; code upgrades (including recommended barrier-free upgrades); and energy efficiency impacts, duration of construction schedules required for the scope of work, and any guidelines of scheduling shutdowns. Prioritization will need to be completed with input from the key stakeholders identified.

.3 Scope Validation: Growth Scope

.1 Clearly show the City's defined scope separately from any growth scope recommended by the consultant or requested by Stakeholders during the Scope Validation process. Any growth scope items will require an application for additional funding outside the approved Construction Budget.

.4 Scope Validation: Cost Estimate

.1 Once the full scope of work is defined, a Class 4 Cost estimate shall be completed.
.2 Identify and provide cost estimates for scopes of work that were not identified in the original scope register provided by the City, but are directly related and required due to the work requested by the City. ie) upgrading a service, firestopping, etc.

2.4.2.4. Sustainable Design

.1 Refer to Section - Sustainable Design for the design requirements associated with providing additional services as may be required for each relevant Administrative Procedure, including:

.1 Energy Modelling
.2 Greenhouse Gas (GHG) Energy & Cost Tracking for Existing Buildings
.3 Climate Risk & Vulnerability Assessment
.4 Future Proofing
.5 Leadership in Energy and Environmental Design (LEED)

2.4.2.5. Measured Drawings

.1 Ascertain the purpose of the measured drawings and the accuracy required. After confirming the purpose with the City, coordinate measurements, augment with photographs and field notes, and prepare drawings.

.2 The Consultant shall use any information provided by the City, the measured drawings, and/or the 3D scans to prepare drawings required for the scope of work, in electronic (AutoCAD) and PDF formats to the City. These may include a basic site plan, floor plan(s), roof plan, exterior elevations, and building sections.

2.4.2.6. Accessibility Audit

.1 A full facility accessibility audit is generally required for renewal Projects of existing City-Owned buildings.

.2 The purpose of the accessibility audit is to determine the current level of accessibility for people with disabilities. The audits will be based on a checklist and is intended to identify deficiencies and provide a high-level cost estimate for improvements. This audit is intended as a starting point to address current deficiencies in the facility. Renovations to address deficiencies may not be included in the scope of the Project, but may inform future funding requests. Consultant Services to complete the accessibility audit scope shall include the following:

.1 Accessibility Audit: Conduct an accessibility audit on the facility based on the sample checklist and prepare an audit report to include the following:

.1 Assessment of existing scenario to identify deficiencies
.2 High-level recommendations to address deficiencies.
.3 High-level cost estimate (Class 4) for each recommendation

.2 Accessibility Audit Report: A report capturing findings of the audit and recommendations to address deficiencies with a high-level cost estimate. At a minimum, the report must contain the following information:

.1 Executive summary
.2 Accessibility Audit
.3 Checklist with photographs, recommendations to address deficiencies, and cost estimate (class 4) for each recommendation
.4 Cost summary

.3 The City will provide a facility accessibility audit for existing buildings - checklist for the consultant to use for these purposes.

2.4.2.7. Historical Review

.1 Provide a Historic Building Record as defined in Historic Resources.
.2 Provide a Historic Building Condition Assessment as defined in Historic Resources.
.3 Provide a Conservation Plan as defined in Historic Resources.

2.4.2.8. Zoning Bylaw and Code Review

.1 For existing buildings;

.1 Provide a National Building Code - Alberta Edition, Fire Code, and life safety systems Compliance review, including photos, where possible.
.2 Identify a priority of the deficient items on a scale of 1 to 3, 1 being highest priority (for e.g. life safety) and 3 being lowest priority.
.3 Recommendations and elaboration on attaining compliance on non-compliant items with a class 4 cost estimate for each item.
.4 If any addition is being sought as part of the scope of work, provide a description if the existing building meets zoning bylaw rules and regulations for the existing land use area.

.2 For new construction:

.1 Occupancy classification as per the latest Building Code
.2 Permitted fire separations and the general construction type(s) of the proposed building
.3 Any variances that may be applied to the Project when applying for municipal permits.
.4 Description of any zoning land use area and permitted discretionary or prohibited uses.
.5 Any regulations or other building codes or standards that need to be considered at the project outset.

2.4.2.9. Concept Design

.1 Confirm with the Project Manager what City-supplied information is available, such as site survey, geotechnical studies, environmental site assessments, parking studies, etc.

.2 The concept design report must include the following;

.1 Preliminary design and construction schedule
.2 Authentication & validation of the Concept Design Report in accordance with the AAA/APEGA practice standards and their Interface Management plan.
.3 Architectural
.1 Review the site of the Project and assess the suitability of the site to accommodate the City's Project. Comment on site constraints, ability to support future additions and alterations, and potential impact of proposed developments in the vicinity of the site.
.2 Building massing studies (provide minimum 3 options)
.3 Architectural parti diagrams.

.4 Structural

.1 List of applicable codes including building importance factor
.2 Use and occupancy loading

.3 Environmental loading forming the Basis of Design

.5 Mechanical and Electrical

.1 Outline of proposed systems
.2 Innovative mechanical and electrical systems should be considered.
.3 Note: new and emerging technologies should be clearly identified complete with a review of their respective application challenges and benefits as applicable.
.4 Service entrances shall be sized to accommodate the ultimate energetic demand of the site and facilitate future growth.
.5 The electro-mechanical infrastructure servicing Mission Critical Systems shall be clearly identified including all required considerations for redundant schemes (e.g.: N, N+1, 2N, 2(N+1). The redundancy level of the electrical infrastructure shall match the redundancy of the mechanical systems it services. Key components of this infrastructure shall also be sized based on ultimate capacity and future growth requirements as applicable.
.6 Key components of the electro-mechanical infrastructure which would be difficult to replace due to a foreseeable future growth shall be clearly identified and sized based on the ultimate energy demand of the site. Both ultimate demand and future growth targets shall be confirmed with the city and discussed in a cost benefit study outlining the cost of doing a future retrofit vs the cost of sizing the service entrance for its ultimate capacity immediately.

.6 Sustainability

.1 Preliminary review of Policy C627 Climate Resilience Policy and related Administrative Procedures refer to section - Sustainable Design for further information.
.2 Preliminary review of the City's specific LEED requirements and discussion of sustainable design strategies.
.3 Building Energy Modelling:
.1 Refer to Section - Sustainable Design for building energy modelling guidelines.

.7 Class 4 cost estimate. Refer to Appendix C: Construction Cost Estimates.

2.4.2.10. Construction Cost Estimate Reconciliation:

.1 At the end of each milestone, the Consultant shall reconcile discrepancies between the Consultant's Construction Cost estimate and an estimate prepared by a third party contracted by the City, for Level 3 elemental or divisional, where there is a positive or negative variance of at least 10%.

.2 The City's Project Manager shall provide Construction Cost estimate commentary, as applicable, within seven Working Days of receiving the Construction Cost Estimate.

.3 The Consultant shall provide feedback on the City comments and re-submit an updated Construction Cost estimate, if applicable, within three Working Days of receiving the City comments.

.4 The City's Project Manager shall, within three Working Days of receiving the updated cost estimate, tabulate both the third-party Construction Cost estimates and Consultant's Construction Cost estimate into Uniformat Summary reconciliation spreadsheet at Element/Level 3 and share reconciliation spreadsheet with both parties in advance of the reconciliation session.

.5 The City's Project Manager shall schedule and facilitate the reconciliation session. Construction Manager's and Consultant's cost estimator/quantity surveyor are required to attend.

.6 Reconciliation comments shall be recorded in spreadsheet format, by the City Project Manager to understand what might be the reasoning for variance. The objective of the reconciliation session is not that one party accepts costs or quantity of the other party, rather it is a project team effort to ensure both cost estimates align in terms of scope, quantity, unit cost, allocation, etc.

.7 If the Consultant's final Construction Cost estimate has changed as a result of the reconciliation session, the Consultant shall re-submit the Construction Cost estimate within five Working Days after the Reconciliation Session.

.8 The City's Project Manager shall, within three Working Days, tabulate construction manager's and Consultant's Final Costs into a Uniformat Summary Reconciliation Spreadsheet at Element/Level 3 (as defined in ASTM 1557-09(2015)). If Level 3 elements are within 10%, the reconciliation process is complete.

.1 If the reconciled Construction Cost estimate for any phase or stage exceeds 10% or is significantly below the latest approved Construction Budget, the Consultant shall participate with the construction manager and/or quantity surveyor in order to modify the design or alternatives as may reasonably be required to adjust the construction design, scope or materials to ensure that the cost estimate aligns to the latest approved Construction Budget, or, if directed by the City, provide assistance in recommendations to the City to revise the Construction Budget or evaluate scope for the Project;

2.4.2.11. Public Engagement Material

.1 The public needs key information to support effective engagement. Communication strategies and tactics that support broad understanding and awareness of the Project, and its relationship to the City Strategies, will build capacity within the public, promote higher-quality informed input, and shape how the Project is perceived.

.2 Public Engagement and communication materials may include event advertising, roadside information signs, roll plans, display boards, videos, fact sheets, information pamphlets,

invitations, letters, mailouts, postcards, email updates, City of Edmonton Project web content, and City of Edmonton Project newsletter content.

.3 Communication materials requested from the Consultant to support the Public Engagement activities shall;

.1 Follow City of Edmonton Visual Identity Standards.
.2 Follow City of Edmonton's Public Engagement Spectrum, and
.3 Follow Public Engagement Language guidelines and Writing Standards
.4 Include messaging and key communication points addressed in a consistent manner with stakeholder conversations,
.5 include demonstration on how the design addresses City Strategies including, but not limited to, universal accessibility and climate resiliency.
.6 integrate technical content (such as drawings, renderings, and fly-throughs) where possible.
.7 be "print-ready" size and/or appropriate graphic quality,

.4 All materials must be reviewed and approved by the City of Edmonton Communications and Engagement team.

2.4.3. Schematic Design (Technical Review)

2.4.3.1. This phase typically consists of a schematic design report with drawings as necessary to illustrate the designs presented. Note that if no prior submission has occurred, then the deliverables from the previous phase are to be included at this time.

2.4.3.2. If applicable, the Project Manager will initiate percent for art process, as described in the Percent for Art Process section.

2.4.3.3. If applicable, the Consultant will complete Edmonton Design Committee pre-consultation documentation and review process as defined in Edmonton Design Committee.

2.4.3.4. Land Survey: Assist the City in identifying information required from the survey, using a City-Supplied checklist.

2.4.3.5. Soils Investigation: Coordinate with the City's Geotechnical and engineering consultants as to the identification of information required from the report, including proposed borehole locations to suit the Project. The Consultant shall incorporate the soil investigation requirements into their Work.

2.4.3.6. Toxic and Hazardous Materials Information: Coordinate with the City and the City's Toxic and Hazardous Waste and engineering consultants to identify the scope, work area, and information required from the testing report. The Consultant shall incorporate the City's Toxic and Hazardous Waste and engineering consultants' testing reports and abatement specifications into their Work.

2.4.3.7. The Schematic Design Report is to include the following:

.1 Project background, site information, context plan, aerial photos, existing site photos, and zoning plan.
.2 Changes to the Project as a result of Pre-Design submission, or subsequent discussions.

.3 Preliminary Design and Construction schedule.
.4 A detailed work breakdown schedule to implement the recommended design option.
.5 Specifications: The identification of product / equipment which shall be single sourced due to either project specific needs or due to operational constraint, or due to compatibility issues with existing systems already present on site.
.6 Written summary of which design guidelines and standard documents were considered, in addition to the Facility Design & Construction Manual - Volume 2. The summary shall also include the identification of design elements that deviate from requirements found in all relevant guiding documents. Refer to 'Design Guidelines and Reference Standards' section of this manual.
.7 Authentication & validation in accordance with the AAA/APEGA practice standards and their Interface Management plan.
.8 Architectural

.1 Building Code summary and occupant load calculation, including a discussion on any anticipated problems and solutions.
.2 Zoning bylaw compliance review.
.3 Description and elaboration of the three (3) architectural designs, including a recommendation for one of the design options. Show locations for future expansion if required.
.4 Update any room data sheets that were required in the Programming Document.

.1 Updates should consider how building zones are secured. For multi-tenant spaces, metering strategies need to be developed to properly separate utliity cost, if required.

.5 Area and space comparison table showing deviations from site and building functional program requirements, and a written description of any deviations that are not 'space-based', such as Project goals and objectives, etc.

.1 Grossing factors must be justified with an explanation of their comparative source. If the building has individual 'suites' or independent zones, then a grossing factor should be applied to each of those identified zones, and a separate grossing factor applied to the building as a whole.

.6 Written summary on any outcomes from meetings with; CoE development permit pre-application meeting, transportation, and/or drainage departments that will be required to be incorporated into the design.
.7 Written summary of barrier-free design for the Project. All renovations and upgrades shall strive to achieve the highest level of universal accessibility feasible for that project.
.8 Summary and responses to the GBA+ fundamental questions.
.1 Written summary of effects of differential movement of slabs placed on grade, specifically potential effects on serviceability and finishes. Tolerance for any accepted risk should be clearly communicated.
.2 Concept of building envelope to be provided.

.9 Structural

.1 General description of the proposed foundation system based upon the geotechnical report.
.2 General description of the proposed structural system and materials to be used.
.3 Discussion, cost benefit analysis, and recommendation of slab on grade vs. structural slab.
.4 Discussion on the re-use of any existing structure, complete with assumptions and limitations associated with reuse.
.5 Discussion on any items requiring CoE direction, with advantages and disadvantages, risks, and estimated financial costs for each, to allow for an informed decision to be made.
.6 Cost benefit analysis, with the aid of an assigned geotechnical engineer, to determine if pile load testing is suitable.
.7 Discussion of predicted differential settlement for slabs placed on grade (see Architectural)
.8 Discussion of corrosion mitigation measures for parkades and pool systems.

.10 Mechanical

.1 Design Criteria.
.2 Applicable codes and regulations.
.3 Discussion of proposed utility services.
.4 Description of proposed mechanical systems and approximate system-level heating, cooling, and ventilation design loads in the report.
.5 Discussion of mechanical equipment efficiencies, including, but not limited to, boiler efficiency, domestic hot water heater efficiency, chiller Coefficient of Performance (COP), fan and pump efficiencies, motor efficiencies, and heat recovery efficiency (provide justification if heat recovery is not included).
.6 Discussion of the suitability of the space allocated for mechanical systems
.7 Details of any existing equipment or systems intended to be reused.

.11 Electrical

.1 General description of proposed electrical systems.
.2 Preliminary service calculation.
.3 Consideration for power quality related issues originating from the installation of multiple non-linear loads. (VFD's, EV chargers, all electric heating systems, etc.)
.4 Discussion of proposed utility services. This discussion shall clearly identify:

.1 Current and power:

- Installed load in kW / kVA,
- Expected site's minimum and peak demand in kW / kVA,
- Expected site's harmonic current proportion VS fundamental current proportion for the site's minimum and peak demand,
- An identification of all large intermittent loads and their expected power demand pattern such as EV chargers level 2 and level 3

.2 The service entrance maximum energy capacity:

- The service entrance maximum capacity in kW.h / kVA.hr over a 24hr period
- Expected site's minimum and peak demand in kW.h / kVA.hr over a typical 24 hr period and based on seasonal energy consumption changes, if any
- If required: the size of an energy storage system capable of acting as both an energy storage unit and a peak shaving unit

.5 Discussion of the site's emergency generator.
.6 Discussion of the site's electrical redundancy requirements.
.7 Discussion of the suitability of the space allocated for electrical systems.
.8 Description of the security system operation and related site specific security requirements.
.9 Description of the Audio Visual (A/V) system operation.
.10 Discussion of systems and equipment being considered for LEED credits.
.11 If required: Description of renewable energy systems such as PV solar arrays, distributed generator systems, etc...

.12 Landscape

.1 General description of proposed landscape design.
.2 Discussion of sustainable, low impact design features or systems being considered e.g., avoiding irrigation, rainwater collection, use of native species of trees, shrubs or plants.

.13 Sustainability

.1 Building Energy Modelling

- Refer to Section - Sustainable Design for Building Energy Modelling guidelines.

.2 Preliminary LEED scorecard
.3 Response to items identified in LEED Responsibilities items .1 thru .14 including justification where LEED credits identified in the Section - Specific LEED Credit Requirements may not be pursued.
.4 Emissions Neutral Objectives

.1 Discuss how the Project will meet the requirements of the C627 Climate Resilience Policy. Identify the means and methods of achieving the policy relevant to the applicable Administrative Procedure.
.2 Discuss best ways to integrate distributed generators within the facility which comply with the CoE Solar Photovoltaic Program and/or other technologies.
.3 Discuss best ways to integrate zero carbon emission mechanical systems (example heat pump, geothermal field, and other upcoming technologies…) either upon project initiation or in the future (consider electrical spare capacity to accommodate future upgrade). Coordinate with other disciplines such as architectural and mechanical to confirm emissions neutral objectives, future growth, and resulting power demand.

.4 Discuss opportunities to integrate grid-tied energy storage system to accommodate electrical peak demand (peak shaving) and energy storage (PV energy surplus).

.5 Discuss how the project will comply with the limits published in the IEEE 519 and how the building power quality will be kept within acceptable limits.
.6 Outline any deviations from the Projects Measurement and Verification Plan.(If in Project scope). Refer to your *Professional Service Agreement for details.*
.7 Provide Life Cycle Costing Evaluation.
.8 Provide Embodied Carbon Analysis (if in Project scope).
.9 Provide Future Proofing considerations as defined in Section - Sustainable Design
.10 Provide Greenhouse Gas tracking report (if in Project scope). Refer to, Sustainable Design
.11 Provide Climate Risk and Vulnerability Assessment.
.12 Recommend growth strategy for future integration of electric vehicle charging stations level 2 and 3.

2.4.3.8. Drawing(s) are to include the following but are not limited to:

.1 Architectural

.1 Location plan, site plan, schematic floor plans, schematic building sections, conceptual envelope assembly (roof, walls, and floor), details, and specific details to Project
.2 Consultants should include more drawings or details required to explain the concept of the Project.

.2 Structural

.1 Layout of foundation plans (complete with grid lines) with respect to the existing structure and/or plot of land.
.2 Preliminary framing plan with proposed lateral restraint locations.

.3 Mechanical

.1 Site Plan: existing and proposed utility services.
.2 Plumbing Plan: domestic, storm, and sanitary mains.
.3 Heating/Cooling Plan: hydronic mains.
.4 Ventilation Plan: ductwork mains.
.5 Fire Protection Plan: fire mains.
.6 Locations of major pieces of mechanical equipment.
.7 Developed schematics of the following systems:

.1 Heating
.2 Cooling
.3 Ventilation
.4 Plumbing
.5 Pool Systems

.6 Arena Refrigeration System
.7 Gas Detection

.8 Mechanical schematics shall indicate design parameters for inlet and outlet temperatures, pressure, and flow rates where feasible.
.9 Mechanical room plan with major equipment positioned and service clearances shown (equipment maintenance and walking paths to access all equipment with a dolly)

.4 Electrical

.1 Location and general single-line arrangement of;

.1 major distribution equipment
.2 site generation
.3 utility connections
.4 installing a distributed generator system
.5 installing level 2 or level 3 electric vehicle charger
.6 installing an energy storage system

.2 Electrical room plan with major equipment positioned and service clearances shown.
.3 Details of any existing equipment or systems intended to be reused.
.4 Site plan with existing and proposed utility services routing, outdoor transformers, generators, energy storage system as applicable.
.5 Electrical raceways between service rooms.
.6 Preliminary layout of network access rooms to ensure adequate equipment space. Refer to Volume 2 Appendix B - IT Infrastructure Design Guideline for more information.
.7 Preliminary layout of Security and Card Access devices with intrusion zone(s) identified. Refer to Volume 2 Appendix C - Security and Card Access Design Guideline for more information.
.8 (For mission critical facilities and if mandated by scope of work) Clearly demonstrate the full segregation between:

.1 The routing of the electrical services coming from different sources and distribution system servicing redundant components,
.2 Redundant capacity components (distribution centers, transformers, generators, UPS, charger, rectifiers, battery banks, inverters, fuel storage)
.3 Diversity between utility sources if practical

.5 Civil / Landscaping / Site Plan

.1 Preliminary site location of the building and surrounding facilities.
.2 Preliminary landscaping plan, including drainage and grading.

2.4.3.9. This submission shall include a Class 3 cost estimate. Refer to Appendix C: Construction Cost Estimates.

2.4.4. Design Development (Technical Review)

2.4.4.1. This phase typically consists of a report and drawings. The consultant develops the approved option in the Schematic Design report into a submission that provides sufficient detail on how all building components are incorporated to satisfy the City's Project requirements.

2.4.4.2. If applicable , at the beginning of design development, the Project Manager will re-initiate the percent for art process, as defined in the Percent for Art Process section, by arranging a meeting with the Edmonton Arts Council.

2.4.4.3. If applicable, the Consultant will complete the development permit application and Edmonton Design Committee formal-consultation review process as defined in Edmonton Design Committee.

2.4.4.4. The Design Development Report is to include the following:

.1 Changes to the Project requirements as a result of the Schematic Design submission, or subsequent discussions.
.2 Description of the systems mentioned in previous reports, revised and expanded upon to provide a more detailed description. Unapproved options are discarded and approved alternative(s) are discussed in greater detail.
.3 Outline specification containing all design disciplines. The outline specification shall include an itemized list, using brief, concise statements, of significant materials, systems, and equipment and their criteria and levels of quality. Any criteria having a special cost impact must be included.
.4 Specifications: The identification of product / equipment which shall be single sourced due to either project specific needs or due to operational constraint, or due to compatibility issues with existing systems already present on site.
.5 Authentication & validation of the Design Development Report in accordance with the AAA/APEGA practice standards and their Interface Management plan.
.6 Preliminary Design and Construction schedule.
.7 In consultation with CoE, a section titled, "Work At Height" will be completed. This section shall discuss and graphically show the following:

.1 Clearly show the intended rooftop working zone(s) on the roof plan. Refer to Vol 2 Roof section for rooftop work zone minimum requirements.
.2 Identify Confined Space and Restricted Space locations as defined by the Alberta Occupational Health and Safety Act.
.3 Equipment that will be placed at elevated locations (3 m or above).
.4 Access to elevated platforms and equipment.
.5 Access to internal and external glazing, fixtures, and equipment requiring maintenance.
.6 Identify equipment and fixtures requiring mobile lifts for maintenance and repair.
.7 Identify equipment and fixtures requiring scaffolding for maintenance and repair.
.8 Rationale for proposed locations.
.9 Methods on controlling risks to be incorporated into the final design.
.10 Refer to Volume 2 - Design loads for Lift Equipment Commonly used by the City.

.8 Written summary of which design guidelines and standard documents were considered, in addition to the Facility Design & Construction Manual - Volume 2. The summary shall also include the identification of design elements that deviate from requirements found in all relevant guiding documents. Refer to 'Design Guidelines and Reference Standards' section of this manual.
.9 Updated work breakdown schedule.
.10 Architectural

.1 Summary of applicable code requirements including any responses to comments raised by Authorities Having Jurisdiction (AHJ).
.2 Description of design features.
.3 Area and space comparison table showing deviations from site and building functional program requirements and a written description of any deviations that are not 'space-based', such as Project goals and objectives, etc.
.4 Update of any room data sheets that were required in the functional program document.
.5 Summary of approaches for acoustic separation or isolation for acoustically sensitive spaces.
.6 Summary of approaches for CPTED principles, and active building security systems
.7 Summary and responses to the GBA+ fundamental questions.
.8 Interior and Exterior Color Boards. Alternatives should be presented to the City in advance and final selections shown in the report.
.9 Building Code Review.

.1 Building Code analysis
.2 Fire/Smoke separations
.3 Exiting requirements
.4 Floor separation requirements
.5 Hazardous area locations (coordinated with electrical and mechanical disciplines for the identification of any required toxic fumes extraction systems, explosive atmosphere mitigation systems, and intrinsically safe equipment requirements)

.10 Written summary of barrier-free design elements in the Project.
.11 Provide a description of the proposed Building Envelope systems and explanation of any proposed deviations from the Facility Design & Construction Consultant Manual - Volume 2 "Building Envelope".

.1 Describe where water, snow and ice shed safely.
.2 Indicated any internal environmental separations which will be required
.3 Indicate minimum thermal resistance (RSI) effective values for each building envelope system (entire wall).

.12 If applicable, a written summary documenting any developments regarding the Percent for Art process.
.13 If applicable, a written summary of the Edmonton Design Committee process as defined in the Edmonton Design Committee section.

.11 Structural

.1 All loading requirements listed in General Notes, including but not limited to:

.1 Dead load,
.2 Use and occupancy live load, with special attention to file storage and computer server room requirements
.3 Environmental, base snow, and rain loading will be indicated in the General Notes. Snow drift diagrams will be provided on appropriate plans.
.4 Vehicular loading (including axle load & spacing, wheel spacing & type, and vehicle model forming the Basis of Design), including manlift requirements as defined in Volume 2.
.5 Soil surcharge for below grade structure
.6 Indicate if the backfill forming the Basis of Design is clay or free-draining granular.
.7 Notable and outstanding items from mechanical & electrical.

.2 Foundation system described in detail.
.3 Subgrade preparation is described and finalized. Predicted movement (if slab on grade) must be identified.
.4 Framing system described in detail.
.5 Locations requiring special attention and/or unusual loading requirements described in detail.
.6 Confirm or discuss changes to previously made assumptions.

.12 Mechanical

.1 Design Criteria.
.2 Applicable codes and regulations.
.3 Detailed discussion of proposed utility services.
.4 Complete description of all mechanical systems, equipment, and their associated capacities
.5 Present the final system-level heating, cooling and ventilation design loads in the report.
.6 Discussion of the suitability of the space allocated for mechanical systems.
.7 Details surrounding mechanical equipment efficiencies including, but not limited to, boiler efficiency, domestic hot water heater efficiency, chiller Coefficient of Performance (COP), heat pump COP, fan and pump efficiencies, motor efficiencies, and heat recovery efficiency (provide justification if heat recovery is not included).
.8 Details of any existing equipment or systems intended to be reused.
.9 Discussion of Building Automation System.
.10 Description of proposed plumbing fixture types.
.11 List of all mechanical equipment to be serviced by emergency power.
.12 Coordinated with architectural and electrical disciplines: Hazardous area locations (coordinated with electrical and mechanical disciplines for the identification of any required toxic fumes extraction systems, explosive atmosphere mitigation systems,

and intrinsically safe equipment requirements, review gas detection strategies with instrumentation specialists)

.13 Electrical

.1 Complete description of all electrical systems with explanation given to achieving the OPR. In particular, highlight reserve capacity for future growth (future electric mechanical systems, distributed generators, and energy storage). This includes transformer and distribution system electrical loading as well as physical space in designed equipment or for new equipment.
.2 Product data sheets on all major components and luminaires.
.3 Discussion of energy efficient concepts and energy efficiency initiatives;

.1 EV integration
.2 Distributed generation integration
.3 Energy storage integration
.4 Analysis of energy and power demand of all mechanical systems installed to reduce carbon footprint or achieve zero carbon emissions.

.4 Utility service, site generation and major feeder load calculations.

.1 Define redundancy level for both power sources and distribution path.
.2 Coordinate with mechanical discipline to ensure electrical redundancy is adequate for the mechanical redundancy levels.

.5 Review exterior lighting scope to identify security or street lighting assets. Security lighting will require coordination with Facility Engineering Services.

.1 Street lighting will require a separate submission as per City construction standard volume 6. This applies to both temporary (during construction) and permanent construction.
.2 This includes identifying best strategies for maintaining existing lighting asset types C22.3 or replacing them with new assets classified as C22.1.

.6 Coordinated with architectural and mechanical disciplines: Hazardous area locations (coordinated with electrical and mechanical disciplines for the identification of any required toxic fumes extraction systems, explosive atmosphere mitigation systems, and intrinsically safe equipment requirements, review gas detection strategies with instrumentation specialists)
.7 Coordinate with City Stakeholders (Operations, Corporate Security, FMS Security and Facility Engineering services) on door access and CCTV requirements.

.14 Landscape / Civil / Site

.1 Complete description of landscape design strategy, including outdoor amenity spaces, parking island development, species selection, site furniture, and lighting.
.2 Complete description of civil/site design strategy.

.15 Environmental

.1 Completed "Design Environmental Permit Approval Checklist". Note all outstanding items that must be determined during detailed design. Refer to section – Environmental Management (Enviso) for more information.

.16 Sustainability

.1 Building Energy Modelling

.1 Refer to Section - Sustainable Design for building energy modelling guidelines.

.2 Updated LEED scorecard.
.3 Response to items identified in LEED responsibilities items .1 thru .14. Include justification where LEED credits identified in section Specific LEED Credit Requirements may not be pursued. Identify requirements for credits that will primarily be the City's responsibility to achieve.
.4 Discuss how the Project will meet the requirements of the C627 Climate Resilience Policy. Identify the means and methods of achieving the policy relevant to the applicable Administrative Procedure.
.5 Update outline of any deviations from the Projects Measurement and Verification Plan, if required. Refer to your PSA.
.6 Provide any changes/updates to Life Cycle Costing Evaluation.
.7 Provide any changes/updates to the Embodied Carbon Analysis (if required).
.8 Provide future proofing considerations as outlined in section - Sustainable Design.
.9 Provid any implemented risk mitgation strategies and/or changes to Climate Risk and Vulnerability Assessment.

2.4.4.5. Drawings are to include the following:

.1 Architectural

.1 Proposed envelope assemblies and effective R values.
.2 Site plan
.3 Floor plan(s), roof plan(s), reflected ceiling plan(s), Work at Height Plan(s)
.4 Building sections
.5 Typical wall section(s), including any typical conditions which may affect environmental separation performance
.6 Interior elevations of major spaces
.7 Room finishes schedule
.8 Door and window schedule
.9 Furniture layout
.10 Exterior elevations
.11 Site details; fencing, gates, paving patterns, screening elements etc.

.2 Structural

.1 General notes.
.2 Foundation plan.

.3 Floor framing plan (all elevations).
.4 Wall framing plan.
.5 Roof framing plan.
.6 Lateral bracing is located on plans.

.3 Mechanical

.1 Site Plan: utility service connections, utility service sizes, utility meter, and fire department connections.
.2 Roof plan: locations of drains, rooftop equipment, and air intake and exhaust locations.
.3 Plumbing plan: fixtures, floor drains, cleanouts, plumbing, and drainage mains.
.4 Heating / Cooling plan: hydronic mains, branch lines, and layout of any terminal units.
.5 Ventilation plan: single line distribution mains and layout of terminal units.
.6 Fire protection plan: fire mains, fire protection zone boundaries, and sprinkler tree location.
.7 Show locations of major pieces of mechanical equipment.
.8 Developed mechanical system schematics

.1 Heating
.2 Cooling
.3 Ventilation
.4 Plumbing
.5 Pool Systems
.6 Arena Refrigeration System
.7 Gas Detection: Show all sensors, controllers, strobes, horns, etc.

.9 Mechanical schematics shall indicate design parameters for inlet and outlet temperatures, pressure, and flow rates where feasible.
.10 Mechanical schematics to show all building automation devices including those that measure air and water flow, temperature, and pressure along with any control devices such as control valves or balancing dampers.
.11 Mechanical room drawings shall show the items specified below:

.1 Mechanical room plans shall have a minimum scale of 1:50 with equipment, piping, ductwork, and service access clearances (equipment maintenance and walking paths to access all equipment with dolly). Provide lower level and upper level plans with minimum of two (2) section views to clearly illustrate equipment heights, pipe and duct heights and clearances, vertical clearances, etc.
.2 Where mechanical room drawings are modelled in three dimensions (3D), isometric views shall be shown on drawings.
.3 Any piping or ductwork in the mechanical room larger than 4” shall be shown as a double line to indicate true size.

.12 Pool Design: Coordinate and show all main piping and equipment, including pumps, filters, surge tank, chemical treatment, and pool inlets and outlets.

.13 Arena Design: Coordinate and show all main piping and equipment including pumps, chillers, cooling towers, fluid coolers, etc.

.4 Electrical

.1 Electrical site plan identifying type and route of power & low tension services, and location of major equipment such as utility transformers.
.2 Site lighting plan identifying preliminary locations of exterior luminaires. May be included on electrical site plan. Include photometric, isolux layout.
.3 Preliminary electrical and communication room(s) plan with major equipment (including any future planned equipment) positioned and service clearances shown.
.4 Location and preliminary size of site generation and associated equipment (i.e. ATS, load bank, etc.)
.5 Preliminary Security and Card Access riser diagram. Show all intrusion zones, devices and panels both on floor plan and in tabular format. Refer to Volume 2 Appendix C - Security and Card Access System Design Guidelines for more information. Preliminary security camera layout. Indicate proposed location of headend equipment.
.6 Typical room layout(s). Preliminary electrical rooms and space layout including spare space(s) for future expansion(s) and clearance around equipment for maintenance and code compliance,
.7 Typical site layout including service entrance cable routing, pad mounted equipment (generators, transformers, fuel tanks), EV chargers including spare space(s) for future expansion(s) and clearance around equipment for maintenance and code compliance,
.8 Hazardous classification study and related design (e.g.: H2, H2S, natural gas, methane, propane or other flammable or combustible gasses or fuels, or dust)

.1 Layout drawings identifying various indoor and outdoor classified zones as required and including clearance and type of electrical equipment required in said zone (i.e.: intrinsically safe or others).
.2 The requirement for indoor spaces with negative or positive pressurization shall be identified and coordinated with the mechanical and architectural disciplines where applicable to prevent cross contamination of dangerous volatile substances (flammable or explosive) between different spaces with different classification.

.9 Preliminary single line diagram. Include load calculation and expected fault levels. For any project, a complete facility single line diagram shall be provided. Partial documentation will not be accepted.
.10 Riser diagrams for all building systems, including structured wiring (IT), security, Closed Circuit Television System (CCTV), fire alarm, audio visual systems public address, etc. Factor additional conditions as stipulated in the police, ETS/LRT, and fire rescue functional programs.
.11 Preliminary audio visual system paging zone layout.
.12 Preliminary structured wiring riser diagram that clearly demonstrates all major components and their interrelation.

.13 Preliminary plan layouts of the NAR(s) showing all major equipment.
.14 Illumination levels and uniformity calculations for all interior spaces; include photometric, isolux layout in drawings.
.15 Target interior and exterior lighting power densities.
.16 Service drawing indicating lift path from outside through building and reviewed by a structural engineer for floor loading.
.17 Lightning protection risk assessment. The assessment shall be based on the methodology prescribed by the CSA B72 “Installation code for lightning protection systems”
.18 Submit applicable deliverables for the PV system in compliance with the PV Solar Design Guideline (Volume 2).

.5 Landscape / Civil / Site

.1 Landscape plan and site details as per development permit application requirements.

2.4.4.6. This submission shall include a Class 3 cost estimate. Refer to Appendix C: Construction Cost Estimates.

2.4.5. Working Documents – Progress Submission (Technical Review)

2.4.5.1. In this phase, the consultant further develops the approved design development submission into a complete set of in-progress Drawings and Specifications. This submission is reviewed to ensure the documents have incorporated all approved elements from previous submissions to the City’s satisfaction. This allows for the identification of issues at an early stage, minimizing re-work and helping to keep the Project on schedule.

2.4.5.2. **(If applicable) Control Narrative:** A early draft of the control narrative shall be provided to define the required mode of operation for programmable systems:

.1 Normal Operations;
.2 Alternate Operation.
.3 Mode of failure.

2.4.5.3. **Specifications:** Provide a preliminary outline including a table of contents and the identification of all required key systems.

2.4.5.4. The use of a percentage value to describe the overall submission is discouraged. It is expected that disciplines such as civil, structural, and architectural will work ahead of other disciplines to ensure information necessary to maintain the design schedule is available and not subject to significant changes.

2.4.5.5. The Progress Submission(s) are to include the following:

.1 Architectural & Interior Design

.1 Zoning and code summary.
.2 Fire separations to be indicated on plans.

.1 Acoustic separation to be indicated on plans
.2 Indicate minimum effective RSI values required by code for each building

envelope system.

.3 General notes.
.4 Partition assembly legend. Exterior and interior wall types are listed.

.1 Indicate minimum effective RSI value.

.5 Site plan.
.6 All plans included and are to be substantially complete. This includes floor plans, reflected ceiling plans, roof plan, and updated Work at Height Plan(s) - see below.
.7 All equipment and furniture locations are shown for coordination. If furniture selection is within the Consultants scope, preliminary furniture selections shall be provided, for review by the City Accomodations team
.8 Exterior elevations, all located and drawn. Notes to be substantially complete.
.9 Building sections, all located and drawn. Notes to be substantially complete.
.10 Wall sections, all located and drawn. Notes to be substantially complete.
.11 Enlarged plans for areas such as bathrooms, kitchens, and other specialty areas, all located and drawn.
.12 Plan details: Typical shown. Atypical located but may not be detailed.
.13 Section details: Typical shown. Atypical located but may not be detailed.
.14 Room finishes schedule/drawing to be substantially complete. Show patterns for finishes in drawing, if applicable.
.15 Doors and windows schedule to be substantially complete.
.16 Interior elevations, all located and drawn.
.17 Millwork plans, elevations, and sections. Millwork details are located but may not be complete.
.18 All work by other disciplines presented in this submission has been coordinated.
.19 Specification sections for all building materials, systems and assemblies must be included.

.20 Submission of list of miscellaneous metal elements within the (Metal Fabrication 05 50 00) requiring fabrication. This section shall be coordinated with all sub disciplines on the team.
.21 Reflected ceiling plan drawings should identify the locations of all equipment mounted within or concealed above finished ceiling space and must identify proposed maintenance access locations directly on the drawing. These locations and access requirements should be coordinated with the applicable discipline drawings.
.22 Work at Height Plan

.1 The Consultant shall provide a drawing(s) titled “Work At Height Plan”. The drawing(s) will depict the following:

.1 All falling risk zones.
.2 Location of rooftop equipment, including clearance envelope, deemed necessary to maintain equipment.
.3 Location of access points, roof hatches, fixed ladders, ladder guides, etc.

.4 Location of guard rails, travel restraint, and fall arrest anchors (if approved for use, see Volume 2)
.5 Locations of signage.

.2 The Work at Height Plan will be a coordinated effort of the Consulting team and representatives of the CoE Facility Maintenance Team.
.3 Work to be completed at height, at a minimum, will be governed by the current version of the Alberta Occupational Health and Safety Act and the associated OHS Code Explanation Guide.
.4 Operation and maintenance of equipment will be considered when determining the location of said equipment. Refer to Vol 2 - Design Loads for commonly used City Equipment.
.5 The result of this effort is the minimization of exposure to the risks of falling by:

.1 Eliminating risk by placing equipment at grade or within dedicated rooms.
.2 Placing equipment in locations not requiring guardrails, travel restraint, or fall arrest equipment.
.3 Understanding that the use of travel restraint and rooftop anchors will only be considered if all other methods of risk management have been determined to be impossible.

.2 Structural

.1 General notes with Project specific categories added, categories not pertaining to the Project are deleted.
.2 Final pile layout is set, complete with pile schedules and sections have been partially detailed.
.3 Type of pile caps identified and sections have been partially detailed.
.4 Grade beam schedule created and sections have been partially detailed.
.5 Slab on grade and structural slabs created and sections have been partially detailed.
.6 Base plate and anchor bolt schedules have been created and sections have been partially detailed.
.7 Column schedule created and elevations/sections have been identified and partially detailed.
.8 Framing plans are complete.
.9 Wall elevation plans are complete.
.10 Lateral bracing locations have been identified and partially detailed.
.11 Sections and details have been cut and partially detailed.
.12 Steel sections and connections that will be delegated to the Structural Steel Fabricator have been identified and loading provided.
.13 Snow load drifts identified and located on drawings.
.14 Draft revision of all relevant specification sections. Sections may still need to be edited, but all necessary sections have been provided.

.3 Mechanical

.1 Title page and list of mechanical drawings.
.2 Mechanical Legend.

.3 Site Plan: utility service connections and sizes, pertinent inverts, and natural gas schedule showing all loads.
.4 Roof Plan: locations of all roof top equipment, drains, plumbing vents, air intakes, and exhausts, etc.
.5 Plumbing Plan: fixtures, floor drains, cleanouts, plumbing and drainage mains with sizes. Also plumbing fixture tags.
.6 Heating / Cooling Plan: hydronic mains, branch lines, valves, and layout of any terminal units with sizes. Include terminal unit tags.
.7 Ventilation Plan: ductwork distribution mains and branches and layout of terminal units with sizes. Also diffuser and register locations and tags and dampers.
.8 Fire Protection Plan: fire mains, fire protection zone boundaries, and sprinkler tree location with sizes. Sprinkler head locations if needed.
.9 Developed mechanical system schematics (to be separate from the plan drawings).

.1 Heating
.2 Cooling
.3 Ventilation
.4 Plumbing
.5 Pool Systems
.6 Arena Refrigeration System
.7 Gas Detection

.10 Mechanical schematics shall indicate design parameters for inlet and outlet temperatures, pressure, and flow rates where feasible.
.11 Mechanical schematics to show all building automation devices including those that measure air and water flow, temperature, and pressure along with any control devices such as control valves or balancing dampers.
.12 Riser diagrams for piping and ventilation systems for any building with four or more levels (above or below ground).
.13 Mechanical room drawings shall show the following:

.1 Plan layouts shall have a minimum scale of 1:50 with equipment, piping, ductwork, and service access clearances (equipment maintenance and walking paths to access all equipment with dolly).
.2 Provide lower lever and upper level plans with a minimum of two (2) section views to clearly illustrate equipment heights, pipe and duct heights and clearances, vertical clearances etc.

.1 Layouts and elevations including duct shaft layouts and pipe routing. Include sufficient sections to show the elevations of all equipment, piping, ductwork, and structural supports.
.2 Equipment service space requirements are to be shown on the drawings and there shall be notes indicating that no other equipment or piping is allowed in these spaces.

.3 Where mechanical room drawings are modelled in three dimensions (3D), isometric views shall be shown on drawings.

.14 Gas detection plan drawing shall show locations for all sensors, controllers, strobes, horns, and signage.
.15 Proposed standard details for the Project.
.16 Complete and detailed control systems sequence of operations for all mechanical equipment to be included. Sequence to include which mechanical equipment is to be turned off in a fire alarm.
.17 Equipment Schedules including basic equipment design parameters to show type, configuration, and service of systems with sufficient detail for structural and electrical coordination. Equipment schedules shall be located on drawings and not embedded within specifications.
.18 Coordinate location and access requirements for maintenance of equipment mounted within or concealed above finished ceiling space with architectural Consultant.
.19 If access panels are required, recommend minimum size, quantity, and approximate location to ensure the equipment can be accessed as per the manufacturer's recommendations.
.20 Large units, such as fan coils, should be aligned with finished ceiling orientation to avoid clashes with regards to maintenance access and ceiling framework. Coordinate orientation with architectural Consultant as appropriate.
.21 Draft revision of all relevant Specification sections. Sections may still need to be edited, but all necessary sections have been provided.

.4 Electrical

.1 Electrical site plan indicating the location of power and low tension services, utility transformer, utility service boxes, site lighting, power, and parking pedestals.
.2 Lighting plan, including emergency and exit lighting. Indicate luminaire types, mounting height, and lighting control types & locations.
.3 Power and distribution plan, including

.1 All major equipment shown to scale, and
.2 Indicating clearances in front of/around equipment, and
.3 As applicable: installation path for redundant distribution system which shall be segregated (mission critical facilities only)

.4 Indicate all site generation and storage including as applicable:

.1 Emergency/standby power systems
.2 Cogeneration or tri generation units
.3 Renewable energy systems
.4 Energy storage system
.5 As applicable, provide details on planned transfer scheme as follows:

.1 3 pole non commuted neutral or 4 poles with commuted neutral,
.2 Dedicated ground electrodes or shared ground electrode,

.3 Open or closed transfer scheme and related synch check relay scheme

.6 Distributed energy resources installation (DER) consultant shall be responsible for all interconnection studies and microgen applications with local utility providers

.5 Low tension system plan(s), including fire alarm, structured wiring, sound. If necessary to increase clarity, separate low tension systems on different drawings.

.6 Provide elevations for equipment installed in

.1 Electrical Room(s)
.2 NARs,
.3 Details to include backboards and free-standing racks. Show all major equipment, equipment mounted to backboards, main ground bus bars, and receptacles (data and power).

.7 Security and Card Access system drawings indicating location of all devices, raceways, panel(s) and zoning.

.8 Video Surveillance system drawings indicating location of all devices, raceways, head-end equipment and view angles.

.9 Single-line diagram. Include:

.1 rating of all protection devices
.2 bus bracing rating of all distribution centers
.3 as/if applicable: information on advanced protective scheme such as Zone Interlocking Scheme (ZIS), differential protection,

.10 Grounding and bonding:

.1 Provide a dedicated grounding and bonding single line diagram identifying ground electrode, neutral grounding resistor (if any), Clearly identify neutral connection to transformers (both 3 phase and single/split phase), to inverters, and alternators (generators) as applicable,
.2 Clearly identify dedicated grounding and bonding systems as applicable:

- DC system for LRT.
- Isolated grounding system for specialty equipment,
- Interconnection with Lightning Protection System (LPS) electrodes,
- DC system for PV array bonding and grounding,
- Segregation between grounding electrodes (utility owned transformer VS service entrance ground electrode) according to applicable CEC C22.1 requirements. Note: Modifications of any bonding and grounding system located within the LRT Right Of Way (ROW) shall be designed in compliance with the LRT design guideline to demonstrate that the addition will NOT create multiple parallel DC stray current circulation path to the system's ground electrode.
- Where required:

- The design and installation of preventative measures against Galvanic Corrosion shall be coordinated with the structural discipline as required.
- The installation of LPS components shall also be coordinated with the architectural structural and building envelope disciplines to protect heritage buildings and prevent galvanic corrosion related issues as/if required.

.11 Service entrance and large distribution centers:

.1 **Low voltage (less than 1500Vac)**: Provide 3 line diagrams complete with current and potential transformers (CTs and PTs) test blocks, revenue metering, city metering, and any protective relays at the service entrance and any switchgears. Provide same deliverables for any MCC equipped with solid state motor starters, built in transformers or large branch circuit breakers rated 200A and above.

.2 **Medium voltage (5kVac and above)**: Provide 3 line diagrams complete with current and potential transformers (CTs and PTs) test blocks, revenue metering, city metering, and any protective relays for all distribution centers

.3 **Direct current system (all voltage):**

- **Photovoltaic systems:** Refer to the PV solar design guidelines
- **LRT traction power substations:** Refer to the LRT design guidelines for details
- **Uninterruptible Power Supply or Battery Energy Storage System (BESS)**: Clearly indicate anode and cathode wiring and grounding methodologies (cathode ground or anode ground or floating), and provide full wiring diagram to interconnect charger to batteries to inverters.

.12 Riser diagrams for all electrical systems, including fire alarm, audio visual system(s), security, low voltage/lighting controls, and structured wiring.

.13 Preliminary AV system design calculations. Provide network bandwidth and Power over Ethernet (PoE) power budget calculations.

.14 Electrical details, including utility transformer installation details, trenching/underground installations, equipment installation details, grounding/bonding details, and control diagrams.

.15 Preliminary panel schedules. Final circuiting is not required in this submission.

.16 Luminaire schedule.

.17 Preliminary low voltage panel schedules.

.18 Preliminary motor schedule, coordinated to the same progress level as the mechanical submission.

.19 Equipment schedule for all hard-wired electrical equipment and electrical equipment with a dedicated receptacle served by a branch circuit greater than 120V, 20A, 1ph.

.20 Working specification, edited to include only those products and methods applicable to the Project.
.21 Schedules may appear in either the drawings or specifications.

.5 Landscape / Civil / Site

.1 Site plan indicating; major grade elevations, land contours, material, and dimensioned locations of primary site features.
.2 Planting Plan.
.3 Site Materials Plan.
.4 Details of key site design elements.
.5 Site Demolition and Removals Plan.
.6 Site Grading and Storm Drainage Plan.
.7 Site Lighting and Site Electrical Plan (or coordinate with Electrical design).
.8 Site Irrigation Plan.
.9 Utility Connections Plan and Municipal Improvement Agreement (MIA) coordination (where required).

.6 Building Energy Modelling

.1 Refer to Section - Sustainable Design for Building Energy Modelling guidelines.

.7 This submission must include a Class 2 cost estimate. Refer to Appendix C: Construction Cost Estimates.

2.4.6. Working Documents – Pre-Bid Submission (Technical Review)

2.4.6.1. In this phase, the consultant prepares Drawings and Specifications intended to convey all information necessary to allow a contractor to bid and construct the Project. The information contained in the Pre-bid submission is to be complete with no further work intended and is submitted to allow the CoE a final chance to review if all requirements and comments from previous submission are addressed.

2.4.6.2. **(If applicable) Control Narrative:** The control narrative shall be finalised to define alll possible mode of operations for programmable systems:

.1 Normal Operations complete with a description of the initial conditions and the desired outcome.
.2 Alternate Operation complete with a description of the initial conditions, precursor mode of operation as applicable and the desired outcome.
.3 Mode of failure complete with a description of the initial conditions, precursor mode of operation as applicable and related safety features intended to prevent the apparition of dangerous conditions.
.4 Note: Complex BMS/BAS, PLC or Protective Relay scheme should be based either a flow chart mimicking a ladder type programming or a "boolean" logic diagram outlining all possible modes of operation and factoring different input and/or initial conditions.

2.4.6.3. **Specifications:** The specification document shall be finalised and define the performance of all equipment scheduled for procurement, provide clear instruction on acceptable installation practices, and outline any required equipment specific conditions for commissioning and for

O&M manual requirements. The consultants shall also include all required commissioning specifications prepared either by said consutlant or third party commissioning specialists selected by the City.

2.4.6.4. Project Construction Phasing & Temporary services:

.1 The drawing package shall clearly identify all construction and demolition phases as applicable including but not limited to:

.1 Temporary service / connection, if any required. Confirm if site utility supply is shared between different facilities and if operational constraint of one facility may negatively impact construction activities of other facilities. This includes but is not limited to shared utility connection, shared transformers, and shared cables.
.2 Rental equipment required to maintain an appropriate service level.
.3 Provisions to facilitate some commissioning activities, if required / practical.

.2 The construction phasing, if required, shall be site specific and discussed with site operators, city representatives, and possibly with the City's preferred third party commissioning agent to identify all project specific requirements which should be accommodated by design. This include but is not limited to:

.1 Multi-phase commissioning matching the construction phasing.
.2 Securing temporary service / equipment to facilitate said multi phased commissioning.

2.4.6.5. The pre-bid submission is to include the following:

.1 All requirements of the Progress Submission and;

.2 Architectural & Interior Design

.1 The updated Work at Height Plan is to be included in the pre-bid submissions for "information only"; the intention is for this plan to be included in the final operation and maintenance manuals turned over to the City.
.2 All furniture, equipment, and fixtures shall be coordinated to ensure appropriate backing and power supply. Consultant work shall clearly indicate which items are;

.1 owner supplied and installed (Not In Contract)
.2 owner supplied, contractor, installed.
.3 the contractor supplied and installed (In Contract).

.3 Structural

.1 All requirements of the Progress Submission, and;
.2 General notes are fully edited and are project specific. All extraneous and non-applicable notes have been removed.
.3 All schedules are 100% complete.
.4 All specifications are 100% complete.

.4 Mechanical

.1 All requirements of the Progress Submission, and;
.2 General notes are project specific.

.3 All drawings are fully complete with all sizes and technical information.
.4 Roof plan: All roof mounted piping and ductwork shown and sized.
.5 Plumbing plan: All plumbing pipes shown and sized.
.6 Heating / cooling plan: Include thermostats.
.7 Mechanical schematics to show the required manufacturer's recommended diameters of pipe both before and after any flow meter.
.8 Equipment, components, piping and ductwork shall be arranged to accurately reflect the physical (on-site) configuration including equipment connections, valves and dampers.
.9 Standard details edited and project specific. There shall be details for every piece of terminal equipment including VAV boxes, fan coils, radiant panels, etc. There shall be a detail for every major piece of equipment including boilers, chillers, air handling units, etc. There shall be a detail for all relevant control and balancing devices. Details to include piping and ductwork connections.
.10 Mechanical room drawings shall show the full coordination of mechanical details with architectural, civil, structural, and electrical design elements clearly identified.
.11 Equipment schedules included and fully complete.
.12 Schedule of control valves complete with Cv, install location, size, and service.
.13 Complete and detailed control systems sequence of operations for all mechanical equipment to be included. List of BAS Control points has been included, complete with input/output type.
.14 Complete, fully edited, set of specifications.

.5 Electrical

.1 All requirements of the Progress Submission and;
.2 Complete circuiting of all devices.
.3 Completed panel schedules indicating connected load, total connected load per phase, and total panel load.
.4 Completed motor schedule, 100% coordinated with final mechanical documents.
.5 Power and energy final calculations:

.1 Finalise the calculated installed load and the estimated min and max power demand for the site (in kW & kVA), based on the planned facility's operation and on seasonal changes, as/if required
.2 Finalize the min and max estimation for the energy requirements (in kw.h & kVA.h) based on the planned facility's operation and on seasonal changes, as/if required

.6 Provide complete Preliminary Arc Flash & Coordination Study as per Appendix E of Volume 2.

.6 Landscape / Civil / Site

.1 All requirements of the Progress Submission, and;
.2 Final documents for Municipal Improvement Agreement (MIA) utility connections or roadway work, submitted for City approval (if required).

.7 Environmental

.1 All requirements of the Progress Submission, and;
.2 Final "Design Environmental Permit Approval Checklist", incorporating all outstanding items from the design development submission. This checklist is for the City's records and is not required to be included in the bid documentation. Refer to section – Environmental Management (Enviso) for more information.

.8 Building Energy Modelling

.1 Refer to Section - Sustainable Design for building energy modelling guidelines.

2.4.6.6. The Pre-Bid submission should include a Class 1 cost estimate. Refer to Appendix C: Construction Cost Estimates.

2.4.7. Bid and Construction Documents

2.4.7.1. The Bid documents consist of a complete set of Drawings, Specifications, and control narrative intended to convey all information necessary to allow a contractor to bid and construct, and program the systems forming an integral part of the project. These documents shall incorporate all review comments from the Pre-Bid submission review, and use the title "Issued for Tender"

2.4.7.2. When modifying existing equipment or adding onto an existing building system, provide all necessary details on the existing equipment required for the bidders to accurately assess the cost. Include model name, number, vendor information, etc as appropriate.

2.4.7.3. The Consultant must;

.1 Coordinate with the Project Manager to include provisions for alternate pricing where conditions affecting scope remain unknown. Alternate pricing will not be allowed in situations where an inspection of the existing building, as-built drawings, or review of operation and maintenance manuals would clarify any unknowns.
.2 Describe products and processes, using terms that are standard in the industry, and are consistent between the Drawings and Specifications.
.3 Advise the City of any adjustments to previous estimates of Construction Cost and schedule due to changes in requirements or general market conditions.
.4 obtain contract document sign-off by the City prior to the Construction Contract Documents being issued for bids.
.5 Manage the authentication & validation of "Issued for Tender" and "Issued for Construction" drawings and specifications in accordance with the AAA/APEGA practice standards and their Interface Management plan.
.6 Provide the City with an electronic copy of the Specifications and Drawings in PDF format for bidding purposes. The City will electronically distribute the Bid documents via posting on SAP Ariba or via a Call-up using either the General Contractor or Construction manager process.

2.4.7.4. "Issued for Construction" documents are required when Consequential Changes occur to the bid documents that impact the integrity of the design and/or require input and approval from the authenticating professional are made by addendum during the bidding process. "Issued

for Construction" documents are to incorporate all addenda and revision items up to the date, and be authenticated in accordance with the AAA/APEGA practice standards.

2.5. Drawing and Document Standards

2.5.1. References

2.5.1.1. *Responsibilities for Engineering Services for Building Projects, V1.2,* APEGA, March 2009. This document can be downloaded from the APEGA Website.

2.5.1.2. National Research Council Canada. *Canadian National Master Construction Specification (NMS)*. Canadian National Master Construction Specification, accessed April 12, 2022.

2.5.2. General

2.5.2.1. Follow a consistent format throughout entire Drawing and document submissions. This includes header, footer, title block, font, type size, and section numbering.

2.5.2.2. All Drawing submissions under 50 pages shall be in one combined PDF, all other submissions shall be split into discipline or combined volumes.

2.5.2.3. All written reports shall be in one combined PDF, or in combined volumes.

2.5.2.4. Use of Colour in Printed Deliverables:

.1 Consideration for colour vision deficiency or colour blindness shall be made for drawing and document deliverables;

.1 Colour alone should not be used to convey information, instead use both colour and symbols.

.2 Use different textures, as opposed to multiple colours. If multiple colours are used, the information should also be conveyed in another format (text or textures).

.3 Drawings should generally be produced in monochrome format, with legible line types, so that the information can be legible when reproduced by a black and white printer/plotter.

.4 While photos are generally discouraged, if they are used in a drawing any photos should be high quality grayscale or colour and must print out clearly in both black and white and colour.

.5 If drawings are produced in colour, a disclaimer shall be added to every page in the title block noting that the drawing was produced in color format and is intended to be read in colour.

2.5.2.5. Wording in documents that provide direction to the contractor, e.g. Specifications, Drawings, site instructions, are to be directed to the general contractor, and not distinguish between subcontractors. It is the responsibility of the general contractor to manage his own forces as necessary.

2.6. Standard Document Guidelines

2.6.1. Reports and Studies

2.6.1.1. Architectural and Engineering reports and studies are to comply with the guidelines set out in Appendix A –Report Guidelines. Examples of reports where these requirements apply are feasibility studies, condition assessments, incident investigations, energy assessments, etc.

2.6.2. Specifications:

2.6.2.1. Specifications shall describe the material, quality and workmanship, requirements and the criteria and methods to be used to validate acceptance of the work upon completion in written form;

2.6.2.2. Specifications may include schedules in tabular form to communicate detailed information about systems and elements, such as: building code compliance; door and frame design, dimensions and materiality; floor, wall and ceiling finishes; electrical panel configuration; or air handling unit capacity and configuration details;

2.6.2.3. Specifications shall not be located on the Drawings.

2.6.2.4. Format:

.1 Numbering and naming of specification sections shall follow the latest adopted edition of MasterFormat™.
.2 Sections are to be formatted in three-part format in accordance with SectionFormat™/PageFormat™.
.3 Use the same formatting as the City provided Specification.
.4 The construction Specification is to contain all Divisions in one PDF document, with individual sections bookmarked, text to be fully searchable. If Specification is over 25mb, combined volumes are preferred.
.5 Written material shall employ correct syntax, grammar and spelling and use of appropriate terminology and phrasing, consistent across all documents. Editorial defects such as those noted above may impact the interpretation of documents by various users and contribute to misunderstandings, disagreements or disputes.

2.6.2.5. The City will provide one (1) copy of the City's Division 00 and Division 01 specification in electronic format for coordination.

.1 Ensure duplicate or conflicting information is eliminated. Specific attention should be given to coordinating Allowances, Separate & Alternate Pricing, Submittals (shop drawings, samples, mock-ups, O&M manuals, as-built drawings, etc.), Training, Testing, and Commissioning requirements.

2.6.2.6. The Consultant will prepare all specifications required for LEED administration/certification.

2.6.2.7. The Consultant will prepare all specifications required for static and performance testing of equipment and systems including; provisions for witnessing and validation. If required, incorporate any commissioning specifications, commissioning plan and general commissioning process requirements provided by the third party commissioning provider when engaged by the CoE. Refer to PSA for Consultant Service expectations.

.1 The equipment performance validation shall be equipment specific and identified as follows:

.1 **Factory Acceptance Testing (FAT):** FAT testing shall be done prior to shipping. The FAT test shall be either witnessed on site by the consultant and an authorised CoE representative, or the FAT reports shall be reviewed AND approved by the consultant and an authorised city representative PRIOR to shipment.
.2 **Shipping & Receiving Condition Assessment:** Visual inspection shall be carried out upon delivery on site to identify if any shipping damages has resulted in unacceptable conditions. The inspection shall be the responsibility of the consultant and applicable trade, and in the case of damages, said damages shall also be inspected by a city representative to determine if the goods shall be accepted, repaired on site, or shipped back to the manufacturer.
.3 **Individual testing:** Upon successful installation, the equipment shall be individually tested to verify proper operation and to satisfy any and all applicable conditions such as manufacturer's required testing for warranty purposes,
.4 **Integrated testing**: The final step of the commissioning shall include a comprehensive series of tests to confirm the proper integration of the equipment within the site. Tests shall be coordinated based on the equipment characteristics, its intended use, and shall be devised to test all possible modes of operation and mode of failure and demonstrate safe operation irrelevant of the condition. For details, refer to the Facility Commissioning Consultant Manual,

.2 The Consultant shall not delegate any additional services to the Contactor through the Specification, to which they have already agreed to provide by their own forces, refer to the PSA. I.e. CAD record drawing preparation from as-built markups, roof inspection, witnessing of fire alarm verification etc. unless directed to by the Project Manager.
.3 Maintenance Materials: Coordinate with the City for requirements for maintenance materials, spare parts, and special tools. Generally if items are difficult to source, limited edition or have long lead times the City will require spare material. If locally sourced/easy to obtain no spare materials are required. Ensure final selections are within the O&M manual.
.4 Specifications shall describe a system performance, architecture, topology, functionality, build, and provide clarification regardings acceptable installation practices and commissioning requirements.
.5 Product or Brand Names and Equivalents:

.1 Generally, specifications may only specify a product or brand name where use of the specific product is a legitimate operational requirement.
.2 By specifying a product or brand name, the City would not be meeting its obligations under the trade agreements, and may not meet the requirements to run a fair procurement process.

.1 If for operational reasons, a business area has determined that only one specific product can meet the City's needs, there will still be a requirement to consider equivalent products.
.2 A good example is where a piece of equipment is subject to a manufacturer's warranty and the use of non-OEM parts will invalidate that warranty. As part of the test for equivalence, the City could require that bidders provide

documentation from the manufacturer indicating that the use of the bidder's proposed alternate part will not invalidate the warranty. If the bidder is not able to provide the documentation, the proposed alternate part will not be equivalent.

.3 If the only *sufficiently precise or intelligible way* of describing a component is to use the brand name, the brand name may be used, but the specification must still include "or equivalent".

.4 Consultants shall avoid Basis-of Design specifications, or drafting a specification to match a specific product (even if the product name is excluded), as this effectively the same as asking for the specific product, and as a result, the City could still be found to have breached its trade agreement obligations.

.5 Consultants shall avoid specifying from a list of specific products unless there is a justification for why only certain products are acceptable, i.e.:

.1 legitimate operational requirements: If a list of specific products is used, then the phrase "or equivalent" is to be included in the specification.

.2 Expansion of a system: If a system comprising brand specific/proprietary/copyrighted technologies is present at a site, single sourcing the components required to expand said system is permissible if:

.3 The original manufacturer is still in business; and

- No other equivalent / alternate / compatible system can be sourced from other brands / manufacturers; and/or
- The required new components are based on proprietary technologies (e.g.: control system, communication system) which are either brand specific or not available with other manufacturers

.6 It is important when requiring a specific product to be clear about how the Project team will determine if a proposed alternate is equivalent. This may differ from product to product or contract to contract, but in all cases, bidders need to understand what the equivalency test entails and how the City will determine what passes.

.7 Consultants shall coordinate language around equivalents, acceptable materials and substitutions with the City's Sourcing Event front end for substitutions during tender and City's "01 25 00 Substitution Procedures" during construction.

2.6.3. Addenda

2.6.3.1. All Requests For Information (RFI) that may result in issuing of addendum must be issued by the consultant in 48 working hours or a timeline agreed upon with the CoE Project Manager.

2.6.3.2. Prior to issuing an addendum, the Prime Consultant is to obtain the current addendum number from the Project Manager. All addendum documents are to include this number.

2.6.3.3. Each addendum item must make reference to a specific drawing detail, drawing note, or specification article in the contract documents.

2.6.3.4. Each addendum item must indicate whether the item referenced is to be added, deleted, or revised, with further clarification(s) as required.

2.6.3.5. Include sketches with addenda, where necessary. Sketches issued with addenda are to be incorporated into the construction drawing set.

2.6.3.6. Use the City's addendum format for all addenda. A copy of the City's addendum format in Word may be requested from the Project Manager. An example of an Addendum using the City's format is included in the appendices.

2.6.3.7. Addenda that do not follow these requirements will be returned for resubmittal.

2.6.4. Submittals Registry

2.6.4.1. Prepare a submittals registry prior to construction start-up, to be handed over to the Prime Contractor. The Consultant shall distribute the Submittals Registry at the Construction Start-up Meeting, and review and update the status of all submittals in the registry at all regular construction meetings.

2.6.4.2. This registry is to include a list of all submittals (bid submittals, shop drawings, samples, mock-ups, O&M manuals, spare parts and maintenance materials, etc) to be submitted by the Contractor. Include reference to the specification section where the item is defined.

2.6.5. Site Instructions, Contemplated Change Orders, Change Orders and Change Directives

2.6.5.1. The use of electronic contract administration programs to monitor and issue SIs, CCOs, CO's and CD's is permitted, providing the requirements of this section are adhered to. Prior to implementation, get approval from the Project Manager.

2.6.5.2. Sketches or drawings accompanying Site Instructions and Change Orders, if these constitute a change to previously authenticated drawings; or are additions/changes to the contract documents, they shall be authenticated in accordance with AAA/APEGA practice standards.

2.6.6. Meeting Minutes

2.6.6.1. Record the minutes for project (design and construction) meetings.

2.6.6.2. Include a list of attendees with contact information, location and time of the meeting.

2.6.6.3. Meeting minutes are to include all outstanding items carried forward from previous meetings and any updates discussed in subsequent meetings. All unresolved items noted in the minutes are to be assigned to a responsible party.

2.6.6.4. Distribute meeting minutes within three (3) Working Days after each meeting. Transmit to meeting participants, affected parties, not in attendance, and the City. The City will distribute the design and construction start-up meeting minutes.

2.6.6.5. Construction meeting agendas and the subsequent minutes shall include the following attachments. Any outstanding items shall include review/commentary from the consultant:

.1 2 week look/ ahead (supplied by contractor)

.2 6 week look ahead (supplied by contractor)
.3 Safety and Environmental stats (supplied by contractor)
.4 Submittals registry
.5 Shop drawing log
.6 Site Instruction log
.7 RFI log
.8 Contemplated Change Order, Change Order, and Change Directive log
.9 Commissioning Issues and resolution log (if required)
.10 Progress claim status

2.6.7. Field Reviews

2.6.7.1. General Field Reviews Reports

.1 Include date, time, weather conditions, the person(s) performing inspection, date of the previous review.
.2 Indicate system(s) being reviewed.
.3 Note the reason for review (progress, mock-up, rough-in, substantial completion, occupancy, warranty, etc).
.4 Give a description of construction progress, as it relates to the system(s) being reviewed. Indicate progress since the previous review.
.5 Note specific deficiencies and action items. Include a description of item, relevant background information, and party(s) responsible for next steps.
.6 Record details of any discussions held on site between consultant and contractor, CoE, etc.
.7 Field review Reports are not a substitute for a Site Instruction or Contemplated Change Order. Issues identified during inspections are to be followed up with SIs or CCOs as required.
.8 The frequency of field reviews should occur at regular intervals and at specific milestones as defined in the PSA.
.9 Field review reports are to be distributed within 3 business days of the date of site review. Time-sensitive review items are to be addressed verbally to the Project Manager at the time of field review.

2.6.7.2. Construction Contract - Substantial Performance Review & Report

.1 include all information from a general field review report, and,

.1 When the Contractor considers that Substantial Performance of the Contract, has been achieved, and prior to issuing a Substantial Performance Certificate, the City and the Contractor will conduct a joint review of the Work.
.2 The City and Consultant will conduct a preliminary review after receipt of Contract Deficiency list from the Contractor (Refer to Division 01 77 00 Closeout Procedures) to verify contents. City and Consultant will revise or add additional Contract Deficiency items observed during preliminary review.
.3 City and Consultant will submit to Contractor modifications to the Contract Deficiency list to complete a comprehensive list of all Contract deficiencies and outstanding Work to be completed or corrected.

.4 Include the following information at the top of each page:

- Project name
- Date
- City's project number
- Name of Consultant
- Name of [Contractor] [Construction Manager]
- Page number

.5 Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
.6 Organize items applying to each area by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
.7 Include an accurate value for each item on the list.
.8 Include blank space for verification notes, and any additional notes of Contract Deficiencies that may be added during subsequent reviews.
.9 Prepare list on letterhead. A suggested format follows:

Item Number	Room Number	Location / Area	Description	Value	Date to be Corrected by	Consultant's Verification
1	201	Lobby	(Description of incomplete work)	(Value to complete item)		

.10 Descriptions shall avoid the use of general or all encompassing references and shall focus on specific items remaining to be completed within each room or area reviewed. The Consultants shall avoid general corrective actions such as "paint touch ups throughtout". The Consultants descriptions should be specific, such as "paint touch-up required on north wall or Room 103, as identified with green painters tape in 6 locations."
.11 shall combine the reviews or reports from all sub-consultants into a single, uniformly formatted and comprehensive submission. Separate or independent review submissions or reports by sub-consultants will not be accepted by the City.
.12 recommend compliance with Substantial Completion of the Construction Contract.

2.6.7.3. Construction Completion Review & Report

.1 include all information from a general field review report, and

.1 The Consultant shall recommend to the City an issuance of the Construction Completion Certificate (CCC), at the point in time when the construction meets the requirements contained in the Construction Documents, except those arising out of the warranty period.
.2 The Consultant shall recommend to the City, the withholding of payment to the Construction Contractor for faulty or incomplete Work.

2.6.7.4. Final Acceptance Review

.1 include all information from a general field review report, and

.1 a detailed report to the City on all deficiencies, providing recommendations for City's action.

.2 The review and report submission shall occur within 30 days prior to the end of the warranty period, and will result in the City issuing a Final Acceptance Certificate (FAC).

2.6.8. Drawing Quality Guidelines

2.6.8.1. Drawings are to comply with APEGA guideline "Responsibilities of Engineering Services for Building Projects".

2.6.8.2. Submissions will be reviewed to ensure they meet the project requirements and clearly convey the entire scope of work to bidders. Submissions not meeting these criteria will be returned for resubmittal.

2.6.8.3. The following are suggestions to help minimize errors and increase the clarity of drawings:

.1 Utilize the same floor/room names, numbers, gridlines, etc on the entire drawing set, including sub-disciplines.

.1 CoE Facility Inventory Management (CAFM) group shall be contacted to secure approved floor naming and room numbering scheme; email "fim@edmonton.ca" or "cafm@edmonton.ca".

.2 To minimize errors where a change is made on one drawing but not on the others, do not duplicate specific information on multiple sheets or details. For example, while the electrical service feeder will be drawn physically on the electrical site plan and schematically on the single line diagram, the specific cable and conduit size should be written on only one of those details with a keynote on the other detail(s) referring the reader where to find the information.

.3 Include a key plan for drawings containing a partial floor plan.

.4 Notes and Legends:

.1 Place notes, legends, and frequently referenced details on the right side of the drawing, or opposite the side on which the drawing set will be bound.

.2 Place general notes and legends on the first drawing sheet for each discipline, or on each drawing in the set. If general notes and legends are placed on each drawing, include only those notes and symbols that apply to that drawing.

.3 Use general notes for information that applies to the entire drawing or group of drawings.

.4 Text notes should be preferentially used for plans and details. When the amount of description or number of notes suggests the use of callouts and keynotes for clarity, the list of keynotes shall be sheet or detail specific and complete. That list shall include all callouts, and only those callouts, relevant to that sheet or detail. Each keynote must be referenced by a consistent callout symbol and numbering system

specific to that sheet or detail. Skipped numbers, “note not used”, and unreferenced or unmatched callouts-keynotes links are unacceptable.

.5 When using standard details or drawing templates, delete all notes that do not apply to the specific project.

.6 Keep notes on drawings concise and specific. Do not include notes when the same information is explained graphically in a plan or detail.

.5 Separate densely packed information into multiple drawings to improve readability. For example, separate different building systems onto different drawings or reduce the number of details placed on each sheet.

.6 For projects involving demolition, clearly indicate equipment to be demolished, relocated, or refurbished, as well as all information needed to convey the scope of the demolition to the bidders. Include a demolition plan for each discipline, clearly identifying all equipment and materials to be demolished, relocated or refurbished. Provide separate plans for demolition and new construction.

.7 Drawings based on Existing On Site Conditions:

.1 Any drawings, if developed from an existing record document package supplied by the city shall be updated to accurately reflect all actual conditions PRIOR to the implementation of any changes

.2 Existing record drawings available only in formats other than the latest version of AutoCAD (e.g. PDF, other drafting format, hard copies) shall be converted in AutoCAD and shall follow the latest city’s CAD standard,

.3 For sites devoid of any record documentation, the consultant shall prepare a document package capturing the “as-found” conditions.The package shall be sufficient to clearly identify the existing state of the site and the condition of its system.

2.6.9. CAD Drawing Standards

2.6.9.1. Drawings shall generally be prepared for A1 (841 x 594 mm) sheet size. The following alternate drawing sizes may be used, with the approval of the Project Manager:

.1 A0: (1189 x 841 mm)

.2 ANSI B (Ledger/Tabloid): (432 x 279 mm aka 11” x 17”)

2.6.9.2. Drawing units:

.1 All drawings are to be created using metric units using the millimetre as the standard unit of measurement (1 unit = 1 mm). Draw all objects in model space 1 to 1 scale.

.2 All dimensions and measurements are to be in metric units. Do not round numbers on drawings when converting imperial measurements to metric.

2.6.9.3. Title Blocks:

.1 Use an approved CoE CAD template for all drawings. A copy of the CAD template and prototype CTB files are located here;

.1 Technical Template

.2 Visual Template

.3 AutoCAD CTB File plot style template

.2 If there are any questions or difficulties contact the Project Manager for assistance or referral.

.3 Version control shall follow the Issue and Revision scheme defined in the referenced CoE CAD Template.

.4 Include the Consultant Logo(s) on all title blocks.

.5 Consultants' CTB files must be adjusted so that they are congruent with the intended lineweights on the CoE title block template. While consultants are free to use their own CTB file, the CoE title block must render/plot in the same manner as in the supplied template.

2.6.9.4. Layers:

.1 Overall CAD structure should follow the American Institute of Architects (AIA) standards.

.2 A layering scheme acceptable to the City is included as a reference in Appendix D Sample CAD Layering Standard. This scheme is compatible with the COE.ctb plot style table. It is not a requirement to use this standard when consultants have their own; however, layers should be descriptively named, well organized, and adequate in number for the complexity of the design.

2.6.9.5. Plans, details, and related text are to be created in Model space. Paper space is to be used for laying out the drawing sheet and defining views. Title blocks, general notes, schedules, charts, and other non-graphic information may be placed in Paper space. All viewports in paper space should be locked.

2.6.9.6. Use only standard AutoCAD font styles. Do not use third party fonts. Text height should be between 2.0 and 3.0 mm for the final plot. Use a consistent text height throughout submission.

2.6.10. Drawing Submission Requirements

2.6.10.1. Drawings not complying with the following requirements will be returned for resubmission.

2.6.10.2. All CAD drawing submissions are to be provided in the latest Adobe PDF format.

.1 All drawings and elements thereof must *exactly* match the native CAD design documents in page format, size, line weight, etc.

.2 All drawing PDFs must be of the vector type format, bitmap or scanned drawings are unacceptable.

.3 Submissions prior to Record Drawings shall generally be in the form of a single PDF file bookmarked by discipline. In cases where aggregate PDF file size may be an issue, separating into one file per discipline is acceptable.

2.6.10.3. Drawings in AutoCAD format may be requested, prior to the Record Drawing stage, for use by the CoE. If so, these DWG files shall be provided as per the Record Drawing section requirements below.

2.6.10.4. Record Drawings

.1 The CoE requires Record Drawings to be submitted as per PDF requirements above, and as one PDF file per drawing sheet. The matching CAD source files must also be submitted in AutoCAD DWG format, one file per drawing sheet.

.1 Any individual drawing file names are to comply with the drawing naming convention. Refer to Appendix B – Drawing Naming Convention.

.2 If drawings were converted from other CAD software or exported from BIM software, the consultant is responsible for ensuring the accuracy of the final AutoCAD files.

.3 Submitted AutoCAD files are to have only one drawing sheet in paper space per DWG file and should be self-contained, and independently viewable without a supporting x-ref file structure.

.1 Bind all xrefs in all DWG files submitted to the City using the “Bind” option (not “Insert”) . Purge all unused blocks, dimstyles, layers, styles, linetypes, and shapes.
.2 When simple monochrome bitmap images, such as logos, are used in drawings, they are to be inserted as OLE objects to ensure they are attached to the drawing file.
.3 While detailed bitmap images, such as digital photos or underlays, are generally discouraged, these type of supporting files may be provided as x-refs provided they are relative pathed to the same directory as the DWG file and clearly named with the same file name + suffix(es) “XREF[1,2,etc.]”.
.4 DWG files that require MEP, AEC or similar extensions to load or view correctly are unacceptable.

.4 Submitted AutoCAD files are to include the corresponding CTB file used to plot/print. One CTB file per drawing set is preferable, but at most one CTB file per discipline subset will be acceptable.

.5 Consultants are required to submit a metadata table in spreadsheet format for drawing classification in the CoE Electronic Document Management System. Contact the Project Manager to secure the latest version and referral for assistance.

.6 If Building Information Modelling (BIM) software was used, provide a digital copy of the building model in its native format, as well as a format readable with the City’s latest viewer.

.1 In particular, the City expects accurate parametric equipment data export tables congruent with CoBIE standards. Currently, any model(s) must also be supplied in IFC (Industry Foundation Class) format. Note that this is in addition to the CAD & PDF 2D sheets.

.7 Submit all files on an optical disc, memory stick, portable drive, or via file sharing system for CoE download to edms@edmonton.ca.

.8 Confirm with the Project Manager if any supplementary hard copies are required.

2.7. Edmonton Design Committee

2.7.1. General

2.7.1.1. The Edmonton Design Committee (EDC) reviews presentations from both Civic Departments and the public in regards to major developmental applications, direct control rezoning applications, and public projects with a predetermined downtown and surrounding neighbourhood geographical area.

2.7.1.2. The consultant will be required to give a pre-consultation and formal presentation to the EDC for all new buildings.

2.7.1.3. For addition and renovation projects, the consultant may be required to participate in a pre-consultation and formal presentation to the EDC, as directed by the Project Manager on a case-by-case basis. In general, interior renovation projects are not required to be presented to EDC, while renovations that affect the site, the exterior of the building, and require a development permit are required to be presented to the committee.

2.7.1.4. All information regarding the Edmonton Design Committee can be accessed from the CoE webpage.

2.7.1.5. The deliverables required for presentations to the EDC are available on the CoE website (Link to the EDC web site: https://www.edmonton.ca/city_government/city_organization/edmonton-design-committee), with their timing within the design process outlined in the section - Consultant Deliverables of this Manual.

2.7.2. Process

2.7.2.1. Between the midpoint and end of schematic design, the Consultant will prepare a presentation for a Pre-Consultation with the Edmonton Design Committee (EDC). This meeting is not public. Refer to CoE Edmonton Design Committee Bylaw 14054. The work includes:

.1 A printed 11x17 color booklet to be submitted two weeks prior to the EDC presentation date explaining how the Project meets the committee's 'Principles of Urban Design' and including drawings and renderings to illustrate the design. Submission requirements can be found on www.edmonton.ca under Edmonton Design Committee. The content of the Pre-consultation presentation is a draft version of the same information that will be submitted at the Formal Consultation.

.2 A Powerpoint presentation is to be submitted the Friday before the presentation including the content of the printed booklet (if different than the printed booklet).

.3 A 15 minute presentation to EDC by the design team, followed by 25 minutes of questions and comments from the committee.

.4 All of the above is to be prepared in advance of each deadline so that the drafts can be reviewed with the CoE Architects prior to submission.

.5 Feedback from the committee at the pre-consultation stage is verbal. It is the Consultant's responsibility to record the questions and comments from this discussion and determine how to address them in the next stage of work.

2.7.2.2. Between the midpoint and end of design development, the Consultant will prepare presentations for Informal and Formal Consultations with the Edmonton Design Committee (EDC) as per the requirements listed on the EDC website. This stage of the process is tied to

the issuance of the Development Permit for the Project. The requirements are the same as for the Pre-Consultation, with the following exceptions:

.1 The development permit application is to be submitted to the Development Services, Urban Planning and Economy Department at least one week prior to the formal consultation with EDC.
.2 The presentation content shall show how the comments from the pre-consultation were addressed.
.3 The meeting is public.
.4 The committee will ask questions and may make comments on some areas for design improvement.

2.7.2.3. Formal response from the committee is given within 48 hours of the presentation in the form of a letter. The response will be either support, support without conditions, or non-support. In the case of Non-Support or Support with Conditions, the EDC comments and conditions become part of the development permit response and will need to be addressed with the development officers of the Development Services, Urban Planning and Economy Department.

3. Design Guidelines & Reference Standards

3.1. Sustainable Design

3.1.1. Introduction

C627 Climate Resilient Policy aligns with the strategic goals of Climate Resilience in ConnectedEdmonton, the Big City Move of Greener as we Grow in City Plan, and the City leadership actions that are set out in the Revised Energy Transition Strategy.
The Procedures include requirements for Emission Neutral Buildings for all new construction at the City, development of an Emissions Neutral Building Framework for our existing building portfolio, requirements for programs and projects that support the continued improvement of the climate resilience of City buildings through operation and maintenance, clarity on roles and responsibilities and expectations for all Procedures but most specifically with regards to the way we purchase and lease buildings.

The goal of transforming Edmonton's building stock to be emissions neutral is stated in the policy as follows:

> *The City of Edmonton will ensure proactive leadership in climate solutions by taking a lead role in promoting and supporting Edmonton's climate resilience efforts and leading by example in its own civic operations*. For Buildings, this means, *immediately adopting sustainable and resilient building practices for the buildings it owns, leases and funds, over the course of their entire lifecycle through: 1) the design and construction of Emission Neutral, climate ready buildings; 2) monitoring, benchmarking, operating, and*

maintaining City buildings, and 3) proactively retrofitting existing City buildings to reduce their carbon emissions and to prepare for a changing climate.

The implementation of this policy will be realized through a collaborative and holistic planning approach to the development of a project's scope, program, and its current condition (if rehab project).

The City of Edmonton website provides the latest adopted edition of the City of Edmonton Policy C627 Climate Resilience Policy and Administrative Procedures:

- *Climate Resilient Design and Construction of City Buildings*
- *Climate Resilient Existing City Buildings*
- *Climate Resilient Acquisition of City Buildings*
- *Climate Resilient Building Leasing - City as Landlord*
- *Climate Resilient Building Leasing - City as Tenant*
- *Climate Resilient City-Funded, Non-City Owned Buildings.*

3.1.2. References

3.1.2.1. Latest adopted edition of the Canadian Green Building Council, *LEED Canada NC (New Construction) Green Building Rating System.*
3.1.2.2. Climate Resilient Edmonton Adaptation Strategy and action plan, 2018
3.1.2.3. Community Energy Transition Strategy Implementation progress report, April 2021
3.1.2.4. CoE, Technical Memorandum PIEVC Lite Assessment - Facilities Risk Assessment, March 2021.
3.1.2.5. Latest adopted Infrastructure Asset Management Policy C598 which can be found on the CoE Website.

3.1.3. Emissions Neutral Building Requirements

3.1.3.1. This section outlines the recommended procedure for demonstrating that a building is emissions neutral:

.1 Utilizing the building energy model, determine the amount of annual greenhouse gases (in tonnes CO2) produced by the building from electricity end uses. This value is determined by taking the annual electricity consumption of the building and multiplying it by the estimated electricity grid emissions factor provided by the CoE for the year the project is expected to become operational. Refer to the energy modelling guidelines section of the Facility Design and Construction Consultant Manual Volume 2.
.2 Utilizing the building energy model, determine the amount of annual greenhouse gases (in tonnes CO2) produced by the building from fossil fuel end uses (if applicable). This value is determined by taking the annual natural gas consumption of the building and multiplying it by the natural gas emissions factor found in the energy modelling guidelines section of the Facility Design and Construction Consultant Manual Volume 2.
.3 Combine the values from step 1 and step 2 above, to determine the total annual greenhouse gas emissions generated by the building.

.4 Determine the amount of greenhouse gas emissions that can be offset by on site renewable energy systems (eg. photovoltaics). This value is determined by taking the annual electricity generated by on-site renewable energy system(s) and multiplying by the current electricity grid emissions factor found in the energy modelling guidelines section of the Facility Design and Construction Consultant Manual Volume 2.

.5 Subtract the amount of annual greenhouse gases offset by the renewable energy system from the total annual greenhouse gas emissions generated from the building. The result must be less than or equal to 0 to meet the emissions neutral requirement.

3.1.3.2. If there is not enough on-site renewable energy to offset the annual emissions generated from the building, confirm with the City that the utilities provided to the building are 100% renewable.

3.1.3.3. Do not include emergency or backup systems in greenhouse gas emissions calculations.

3.1.3.4. Verify the design is emissions neutral at the design development stage before construction documents begin.

3.1.3.5. Verify the design is emissions neutral at the final construction documents progress review.

3.1.4. Energy Modelling

3.1.4.1. Concept Design

.1 Assess the impact of up to three massing options presented by the Architect and provide feedback on the following metrics:

.1 Relative energy use, broken down by end-uses heating, cooling, lighting, and ventilation.
.2 Renewable energy potential, as applicable from the project's RFP.
.3 Alignment of City goals as defined in the RFP (NECB energy and GHG savings, Annual Heating Demand, etc.)

.2 To reduce the number of variables that differentiate between each iteration of the model, plug loads, ventilation rates, and schedules (occupancy, lighting, plug, fans, thermostatic setpoints) are to be kept constant between options and are to be appropriate for the building based on occupancy.

.3 If mechanical systems are known at this stage, they shall be modeled directly. However, the absence of mechanical information shall not hold up this phase. In lieu of actual HVAC design parameters at conceptual design, mechanical systems are to be modeled as heating, cooling, and ventilation delivered directly to the zones (i.e. 100% OA with terminal heating and cooling).The intent of this phase is to comment only on the impact of architecture on indicative building performance metrics.

.4 Based on the findings from the analysis conducted above, the Building Energy Consultant will work with the Architect to recommend strategies around massing, location, and amount of glazing, and shading to improve the outcome based on the metrics identified above. Allow for an additional round of energy modeling to assess the impact of resulting recommendations for only one of the massing options.

.5 The Building Energy Consultant shall prepare a report that clearly identifies the energy modeling strategy employed, a summary of key inputs used, a summary of results based on the above metrics, and any recommendations. Units shall be reported in kWh for electricity and GJ for natural gas, as well as an ekWh and ekWh/m2 for total energy and GHG emissions in kg/m2 as well as the annual heating demand in kWh/m2. Current utility costs and GHG emissions factors shall be provided by the City. Please include a detailed account of the calculation for annual heating demand specifically identifying all heat sources used in the calculation and how these were extracted from the energy modelling software.

3.1.4.2. Schematic Design

.1 The Building Energy Consultant shall create an energy model as per the description provided in Concept Design above. Or, as applicable, update the model and the report prepared during the concept design phase with any additional information that has become available since that time. The updated report completed during the schematic design phase shall also include:
- .1 Relative peak heating and cooling loads for the building and for the worst performing zones (on a W/m2 or Btu/h/sq ft basis)
- .2 Daylight potential and excessive illuminance levels (i.e. glare) in zones of interest, as determined by the City and/or Architect
- .3 The model shall also take into account the daylighting potential of the building by directly modeling the impact of daylight sensors in applicable zones.
- .4 Energy use, broken down by end uses (at minimum heating, cooling, lighting, plug loads, fans, and pumps)
- .5 Energy Cost, broken down by end uses and Utility (including utility rates used)
- .6 Peak delivered heating and cooling for the building and for the worst performing zones
- .7 City compliance metrics and targets (NECB savings, LEED, Energy Usage Intensity (EUI), GHG emissions)
- .8 Window performance, based on Solar Heat Gain Coefficient, Visible Transmittance, and overall U-value (including framing)
- .9 Roof performance
- .10 Lighting power density ranges, as appropriate, but not less than 3 levels
- .11 Up to 2 mechanical system types (i.e. Air-based heating and cooling with recirculation versus 100% OA with Radiant Heating)
- .12 List of equipment efficiencies for mechanical equipment.
- .13 Impact of potential renewable energy options, as applicable in the RFP
- .14 Building-type specific innovative measures (i.e. Chiller heat recovery for data centre spaces or specialized refrigeration such as ice rinks or innovative dehumidification and reheat strategies in swimming pools, etc.)

3.1.4.3. Design Development

.1 The building energy model and report shall be updated with all subsequent changes made since schematic design, including details to address potential thermal bridging as required by NECB 2017.

3.1.4.4. Working Documents - Progress Reviews

.1 Building Energy Consultant to review drawings and specifications and update model and associated energy report with any subsequent changes.

3.1.5. Life-Cycle Cost Analysis (LCC)

3.1.5.1. Refer to your PSA for Project specific scope of services related to Life-Cycle Cost Analysis.

3.1.5.2. LCC includes an assessment of key building elements, features, or energy savings measures above code on a 30-year lifecycle. This assessment will:

.1 involve a comparison of the features or energy saving measures (minimum 2 envelope options, 2 mechanical system options, and 2 lighting options);

.1 apply:

- net present value methodology; and
- a City-approved discount rate and Utility pricing; and

.2 include:

- initial capital cost (including any required spares inventory);
- annual energy costs and annual maintenance costs (including any consumables);
- element replacement costs over the 30-year lifespan

.3 Some maintenance costs (FMS) and some predicted element lifespans (LCM) may be provided by the City.

3.1.6. Greenhouse Gas (GHG) Energy and Cost Tracking - Existing Buildings

3.1.6.1. Rehabilitation is intended to provide replacement or upgrades to various systems and components that are at the end of their lifecycle or in critical condition. Within the scope of work that is identified for the Project, the Consultant shall support the City in identifying scopes of work that have greater potential to impact energy consumption (i.e., more than 2.5%+/- against existing equipment), and reporting this within the Pre-design (if applicable), Schematic Design and Design Development milestone reports.

3.1.6.2. Options are to be developed that balance the requirements for lifecycle replacement, energy efficiency and cost. The City is interested in understanding the incremental impact to emissions and costs to achieve the defined, facility specific, reduction in GHG output.

3.1.6.3. The GHG Energy and Cost Tracking Report shall include the following information:

.1 Calibrated Energy Model:

.1 The emissions factors used;
.2 The utility rates used;
.3 Carbon Tax Assumptions used;
.4 Model calibration information and where it was gathered from;
.5 Graphs of the calibrated model's consumption vs. the last three years of utility data.

.2 Comparison Analysis:

.1 Two options should be bundled for consideration:
.2 The first option is a base case scenario. This scenario will include the identified scope of work which will include some ECMs for the project as part of the project scope.
.3 The second option is a high performance option that looks to maximize energy savings to achieve the target GHG reduction for the proposed project. Identify which scope items may be replaced or augmented by proposed alternatives that may have a higher efficiency outcome compared to the base replacement option.
.4 Provide a summary list of Energy Conservation Measures (ECMs) bundles for each of the options analyzed.
.5 Provide information on the assumptions around each ECM.
.6 Comment on any important interdependencies between measures
.7 A lifecycle costing analysis must be completed for each option, applying a net present value methodology, include initial capital cost (including any required spares inventory), include annual energy costs and annual maintenance costs (including any consumables), include element replacement costs over the 30-year lifespan, and apply a City-approved discount rate. The NPV resulting from this analysis should be entered into the summary table identified below.

.3 Cost Tracking:

.1 The Consultant shall work in partnership with their cost Subconsultant, GHG Subconsultant and the construction manager(if applicable) to develop the cost assessment.
.2 Provide separate Construction Cost estimate tracking for scope items that have a material change in their energy consumption at the milestone deliverable. The energy Cost Estimates shall be inclusive of materials, labour, demolition, and installation. The cost analysis must include the total cost of any interdependent system upgrades that are triggered by the ECM.
.3 Construction Cost estimates shall align with the formatting and accuracy levels published in Consultant Manual Vol 1 - Design Process and Guidelines, Appendix C - Construction Cost Estimates.
.4 Provide detailed information on the costing assumptions made for each scope item.

.4 Summary Table:

.1 The following table provides an example of how the City would like the information presented. Further breakout of detailed options can be provided as applicable.

	Annual Natural Gas (GJ)	Annual Electrical (kWh)	Estimated Year One GHG (tonnes of CO2e) savings	Total Capital Cost Option ($)	Total Annual Utility Savings of Option ($)	Net Present Value Calculation ($)
Calibrated Model				N/A	N/A	
Rehabilitation Scope						
Growth Scope (if applicable)						
Additional Energy Retrofit scope required to meet GHG reduction target (*Add Other Energy Conservation Measures (ECM) Bundles if applicable)						

3.1.7. Embodied Carbon Analysis (ECA)

3.1.7.1. Refer to your PSA for Project specific scope of services related to ECA's.

3.1.7.2. Embodied Carbon Analysis (ECA) - Embodied carbon analysis should analyze the initial embodied carbon of the building for new construction projects and renewals, and use Environmental Product Declaration (EPD) life cycle "product stage (A)" (EN 15978 modules A1 through A5).

.1 The analysis shall include all envelope and structural elements (including parking structure), including footings and foundations, and complete structural wall assemblies (from cladding to interior finishes, including basement), structural floors and ceilings (not including finishes), roof assemblies, and stairs construction, but exclude excavation and other site development, partitions, building services (electrical, mechanical, fire detection, alarm systems, elevators, etc.), and parking lots.

.2 Study to utilize valid Type III EPD sheets for products where available and provide each EPD used in digital, machine-readable, format if available.

.3 All New Construction must consider using the material with the lowest embodied carbon for an otherwise equivalent material. This review and consideration must be documented alongside the Embodied Carbon analysis.

3.1.8. Measurement and Verification Plan

3.1.8.1. The City will provide Project specific measurement and verification plans for the renewal project, if applicable. Inquire with your Project Manager if one has not been provided.

3.1.8.2. Refer to your *Professional Service Agreement* for detailed information regarding services and format of deliverables related to implementing, and reporting deviations on the Project's Measurement and Verification Plan.

3.1.9. References:

3.1.9.1. '*City of Edmonton, Technical Memorandum PIEVC Lite Assessment - Facilities Risk Assessment, March 2021*
3.1.9.2. *CSA A123.26:21* Performance requirements for climate resilience of low slope membrane roofing systems
3.1.9.3. *CSA S37-18* Antennas, towers, and antenna-supporting structures
3.1.9.4. CSA Z800, *Guideline on basement flood protection and risk reduction*. (Part 9 buildings)
3.1.9.5. *CSA Z240.10.1:19* Site preparation, foundation, and installation of buildings
3.1.9.6. *Thermally comfortable playgrounds*: A review of literature and survey of experts, standards council of Canada, 2020.
3.1.9.7. National Research Council "Guide for design of flood-Resistant buildings"

3.1.10. Climate Risk and Vulnerability Assessments

3.1.10.1. The purpose of this assessment is to provide an understanding of what a facility project could face due to climate change. Identifying the key climate-based risks, and vulnerability to those risks will assist the City in making decisions regarding infrastructure planning and design.

3.1.10.2. Using the Engineers Canada's PIEVC (Public Infrastructure Engineering Vulnerability Committee) protocol is seen as an asset.

3.1.10.3. Methodology

.1 The high-level assessment process is shown below;

.1 Define Infrastructure/elements
.2 Identify Climate Risks
.3 Conduct Risk and Vulnerability Assessment
.4 Risk Evaluation and Recommendations

3.1.10.4. New Construction

.1 Climate Risk Assessment

.1 This scope of work is to complement the work required for Specific LEED Credit IPpc98 Assessment and Planning for Resilience and must be substantially complete in pre-design.

- Review the City's provided Hazard Assessment '*City of Edmonton, Technical Memorandum PIEVC Lite Assessment - Facilities Risk Assessment, March 2021"* to understand the types of climate change risks the project may face.

  .1 Using the City's PIEVC Lite Assessment as a starting point, provide written response to the City's report as it relates to the Project specific climate risk assessment for its specific site features, building materials, and systems.
  .2 Response shall identify the low, medium and high climate risk ratings for 2050 and 2080.

.2 Obtain the climate projection and Climate Risk data from the CoE.
.3 Obtain a flood map from the Project Manager via EPCOR to evaluate site specific risk of flooding. Identify flood risks specific for the building including identification of low grading, natural topography.
.4 Identify wildfire risk, by obtaining Wildfire Risk Assessment rating from CoE Project Manager.
.5 Provide any other reference sources of climate data used in the analysis

.2 Climate Vulnerability Assessment

.1 "Vulnerability refers to the susceptibility of assets and services to be impacted by climate change; it is the function of the nature and magnitude of the impact the asset or service is exposed to, the sensitivity to that exposure, and the adaptive capacity of the asset or service" (Climate Resilient Edmonton Adaptation Strategy and action plan)
.2 Conduct a charette to solicit input from the City to identify the degree, likelihood, and consequences should the built infrastructure and/or system be unable to cope with climate change impacts, variability, and extremes over time. Consequences shall consider project goals, program, and intended service for the life of the building and be quantified across different categories and consider:

- Built Infrastructure Assets
- Human Wellbeing
- Health and Safety
- Economy
- Social Wellbeing
- Natural Environment

.3 The vulnerability assessment should address any climate-related impacts the Project may face throughout its lifespan (Construction Phase and Operation).

3.1.10.5. Risk Evaluation and Recommendations Report

.1 Provide site specific options for how the facility could be designed, constructed or operated to resist, with minimal damage, reasonably expected climate risks.
.2 This scope of work is to complement the work required for Specific LEED Credit IPpc 99 Designing for Enhanced Resilience.

.3 The Consultant should provide a written report with a 1-2 page executive summary of the climate risk vulnerability findings and Project specific resiliency recommendations to be executed within the next phases.

3.1.10.6. Renewal/Rehabilitation Projects

.1 Renewal projects will provide a high level screening guide (HLSG) assessment also referred to as, Climate Risk & Vulnerability Assessment Lite.
.2 The Consultant shall prepare a brief commentary on Climate Risk & Vulnerability, describing how the Consultant is considering the risks associated with climate change to building components and incorporate recommendations for design and construction into the rehab project. Recommendations can also include back-up power priorities among other adaptation actions. The climate risk assessment should cover all climate hazards applicable to Edmonton and the analysis would be site-specific to the location.
.3 Review the City's provided Hazard Assessment 'City of Edmonton, Technical Memorandum PIEVC Lite Assessment - Facilities Risk Assessment, March 2021" to understand the types of climate change risks the project may be applicable.
.4 Provide site specific options for how the facility could be designed, constructed or operated to resist, with minimal damage, reasonably expected climate risks.

3.1.11. Future Proofing

3.1.11.1. Section 3.6 of the Climate Resilient Design and Construction of City Buildings Administrative Procedure states:

> *"New City Owned, Occupied Buildings will be designed and constructed in a manner that provides flexibility to plan for and incorporate reasonably foreseeable emerging technology installations. For example solar-ready Buildings to suit installations that meet the City of Edmonton Solar Photovoltaic Program Design Guideline, provisions for future geothermal, energy storage, low or Carbon Neutral energy, district energy nodes and connectivity where appropriate and as identified in the City of Edmonton's Facility Design and Construction Manuals."*

The intent of this checklist is to help design teams identify "*reasonably foreseeable emerging technology installations"* that should be considered. As identified in the below checklist, if a design requirement is triggered, but is not being considered in the design, the team must clearly justify the reason. Similarly, there may be options for the extent of infrastructure needed to facilitate future technology and those options should likewise, be presented for consideration.

3.1.11.2. The report deliverable must include strategic considerations and lifecycle cost benefit justification if appropriate. Future proofing considerations must be included in the sustainability section of the Schematic Design Report and updated accordingly in the Design Development Report. At these key milestones and in the case where a design requirement is triggered, but is not being considered in the design, justification must be made to the Climate Resilient Building Team (CRBT). If there is a disagreement between the design team and the CRBT regarding application the team must follow the procedure exception process.

3.1.11.3. Future Proofing Table:

Potential Future System	Triggers	Requirement
Community-Generation Potential on Solar-ready Buildings	• Is there roof area available to support the installation of additional solar panels, (over and above emissions neutral)? • Is there a potential for an additional onsite or community generation project to be installed? *Note 1: Assume that buildings are already designed to be an emissions neutral building. Note 2: Assume that the existing solar installation meets the maximum capacity allowed by the micro-generation regulation set out by the Provincial Government.*	• Installations shall meet the *CoE Solar Photovoltaic Program Design Guideline* • What is the added future benefit? (cost of additional capacity + cost of related building infrastructure, vs added value to community (GHG reductions or energy $ credits?) • What are the implications to the current design to realize this added benefit?
Provisions For Future Geoexchange	• Is there an available site area that is appropriate for deep or shallow geothermal fields • Is there an intent for a future scenario to allow a switch from a gas heating system to a geothermal heating system? • Is there an intent to accommodate a future building expansion? *Note: Assume that buildings are already designed to be an emissions neutral building.*	• The existing heating systems (assume gas fuel source) utilizes a heating system (such as hydronic) that can be transitioned to geothermal
Energy Storage	• Is there on-site energy generation? (example: solar, geothermal/alternative heat exchange system, RNG, or other,?) • Is there an emergency back-up power system required?	• Evaluate potential energy storage solutions to meet emergency heating and power requirements, and evaluate potential off-sets for peak power draw. • Identify what additional space requirements may be required and determine potential space availability for storage. • Identify other infrastructure requirements needed that may be difficult to update after initial construction.
Low or Carbon Neutral energy	• Is the building planned to utilize a higher emissions energy source (e.g. Natural Gas, grid electricity, diesel)?	• Plan space and infrastructure for new equipment or fuel source to replace carbon emitting /using equipment.

District Energy Nodes And Connectivity Etc.	• Is the facility planned to be within one of the potential district energy nodes? • Is DE a feasible option for this building?	• Ensure space for DE system connections is planned for and potential phase out of existing equipment is possible. • Confirm if the district energy system is compatible with what is planned for this facility? Or, is there a transition strategy?
Electric Vehicle Charging	All facilities	Recommend growth strategy for future integration of electric vehicle charging stations level 2 and 3. Review site's service entrance energy delivery capacity (per 24 hr period) and compare to both site's energy demand (including seasonal changes) and EV charging schedule. Determine if addition of grid connected energy storage system acting as peak shaving unit could be desirable or if service entrance upgrade may be required. Review issues related to the operation of large intermittent non linear load and determine if resultign power quality issues may require the installation of harmonic filters.

3.1.12. Specific Leadership in Energy and Environmental Design (LEED) Credit Requirements

3.1.12.1. On projects designed to achieve LEED certification, the following credits shall be implemented and must achieve the minimum credit level indicated. Provide written explanation to the City if any of these credits cannot be pursued:

.1 Integrative Process
.2 Sensitive Land Protection
.3 Bicycle Facilities (pursued on facility side even if bike network not available)
.4 Site Assessment
.5 Open Space
.6 Heat Island Reduction (pursued on roof even if non-roof measures cannot be implemented to fulfill credit)
.7 Outdoor Water Use Reduction

.8 Indoor Water Use Reduction
.9 Cooling Tower Water Use / ID Pilot: No cooling tower
.10 Water Metering
.11 Enhanced Commissioning, including monitoring-based commissioning
.12 Optimize Energy Performance (meet C627 energy performance minimums)
.13 Advanced Energy Metering (M&V)
.14 Renewable Energy Production (meet C627 requirements)
.15 Enhanced Refrigerant Management
.16 Construction & Demolition Waste Management
.17 Enhanced Indoor Air Quality Strategies
.18 Low-Emitting Materials
.19 Construction Indoor Air Quality Management Plan
.20 Indoor Air Quality Assessment
.21 Thermal Comfort
.22 Interior Lighting
.23 Acoustic Performance
.24 ID: Green Building Education
.25 IP: LEED Pilot credits relating to Climate Resilience:

- Assessment and Planning for Resilience (Prerequisite)
- Designing for Enhanced Resilience

3.1.12.2. On projects designed to achieve LEED certification, the following shall be considered as priority credits where project conditions and budget allow. Provide written explanation to the City if any of these credits, or point thresholds within these credits, will not be pursued:

.1 Reduced Parking Footprint
.2 Green Vehicles
.3 Light Pollution Reduction
.4 Indoor Water Use Reduction
.5 Enhanced Commissioning (Envelope Commissioning)
.6 Demand Response
.7 Renewable Energy Production
.8 Enhanced Indoor Air Quality Strategies
.9 Daylight
.10 Quality Views
.11 IN: Community Outreach & Involvement
.12 IN Pilot: Ergonomics Approach
.13 Passive Survivability and Back-up Power During Disruptions
.14 Whole-Building Life-Cycle Assessment

3.1.12.3. On projects designed to achieve LEED certification, these credits are potentially attainable based on site location:

.1 High Priority Site
.2 Surrounding Density & Diverse Uses
.3 Access to Quality Transit

.4 Green Power

3.1.13. LEED Responsibilities

3.1.13.1. Should the project be required to be LEED certified, the Consultant shall assign a LEED AP to provide the following services:

.1 Review the design for LEED certification feasibility
.2 Identify the appropriate LEED rating system
.3 Identify prerequisites and credits that the project will be achieving and clarify what needs to be done where non-compliant.
.4 Identify what needs to be done for additional credits.
.5 Identify Innovation in Design Credits
.6 Create a task matrix that identifies key players and their responsibilities as relates to LEED design and certification.
.7 Prepare all Division 01 sections in reference to LEED.
.8 Provide support and assistance in understanding LEED credit requirements
.9 Undertake any additional energy modeling in excess of any code required energy modeling if required for particular credits
.10 Application and management of the LEED online process.
.11 Provide support to key team members in preparing letter templates.
.12 Guide and manage the Project team, including the contractor throughout the entire LEED certification process.
.13 Review letter templates and submittals during construction.
.14 Assist the team in responding to comments during the LEED review process.
.15 Ensure CoE (coeleedrep@edmonton.ca) is a co-registrant in the certification process.
.16 Continue correspondence with Green Building Council during design, construction and post construction to provide necessary documentation for achieving LEED certification.
.17 Coordination for the installation of LEED-provided interior and exterior certification plaques.
.18 Provide an updated photo of the completed project to the CaGBC, for publication on their website.

3.2. Accessibility

3.2.1. Universal Accessibility

3.2.1.1. General

.1 All new buildings and additions are to be inclusive and universally accessible (barrier-free, gender inclusive, age-friendly.) All new construction shall comply with the latest version of the City of Edmonton, Access Design Guide.
.2 All renovations and upgrades shall strive to achieve the highest level of universal accessibility feasible for that project.

3.2.1.2. References

.1 Required References:

- National Building Code, latest Alberta Edition.
- City of Edmonton Policy C602: Accessibility for People with Disabilities
- Administrative Procedure: Accessibility for People with Disabilities
- City of Edmonton Access Design Guide

.2 Recommended References:

- "Barrier-free Design Guide", Barrier-free Design Advisory Committee of the Safety Codes Council and with the assistance of Alberta Municipal Affairs.
- CAN/CSA-B651-18, Accessible design for the built environment.

3.3. Corporate Space Guidelines

3.3.1. General

3.3.1.1. The CoE's Administrative Directive A1407B: Provision of Office and Special Purpose Accommodation for Civic Staff has guidelines establishing office space requirements for typical office staff and positions. Obtain the most current copy of the Corporate Space Guidelines from the Project Manager prior to beginning design on a project with office space.

3.3.1.2. The Consultant shall work with City Workplace Accommodations to understand office space requirements.

3.4. Percent for Art Process

3.4.1. General

3.4.1.1. The latest adopted version of the Percent for Art City Policy C458d is available on the CoE Website. The CoE will provide separate public art project funding to qualifying eligible projects. (Money will no longer be allocated from project construction budget).

3.4.1.2. The Public Art procurement process is managed by the Edmonton Arts Council (EAC). The process for commissioning an artwork varies depending on the capital project scope and available art budget.

3.4.1.3. The Project Manager will arrange an introductory meeting between the consultant and the Edmonton Arts Council at the beginning of the Schematic design to discuss the public art approach in the context of the capital project scope and timeline. Another meeting should be arranged with the consulting team at the end of Schematic Design to discuss the budget for art on the project and the process that will be used to select the artist and/or artwork.

3.4.1.4. Typically, the consultant, EAC, Project Manager, and CoE Project Architect will work together to develop site location alternatives for public art pieces (typically three locations). The consultant shall produce a narrative and drawings showing these locations for the purpose of the consultative meetings with EAC

3.4.1.5. The Consultant shall provide general information on the project, including project description and suggested art locations, to the EAC for the Call to Artists. This information may also

include restrictive criteria for the artworks as the consultant sees fit, such as maximum size and weight. The consultant may be required to answer questions during the proposal call. The consultant shall participate in either one or two juries to select the artist and/or final artwork. A typical jury session is a half day commitment.

3.4.1.6. Once the artist and/or artwork is selected, the Consultant shall coordinate as necessary with the artist and may be asked to make minor provisions for the art piece, such as providing power in a specific location or considering structural elements related to the public art, e.g. foundations, or coordinating the art installation with the overall project delivery schedule. The Edmonton Arts Council will continue to be the primary contact for the artist through the project duration.

3.5. City Department Design Standards

3.5.1. General

3.5.1.1. Some departments within the CoE have supplementary design standards that must be incorporated into new building projects, request current versions from the City Project Manager.

3.6. Historic Resources

3.6.1. References

3.6.1.1. Designation and Rehabilitation of Municipal Historic Resources in Edmonton, Policy Number C450B, City of Edmonton, October 2008.

3.6.1.2. Standards and Guidelines for the Conservation of Historic Places in Canada, Second Edition, 2010.

3.6.2. General

3.6.2.1. This policy provides guidelines for the identification, management, protection and promotion of historic resources.

3.6.2.2. Prior to commencing design work, consult with the Project Manager to determine if the building is a Provincial Historic resource and/or a Municipal Historic Resource, so they can track the project and ensure that legislation is being followed and the legal requirements of the respective heritage designations are being adhered to.

3.6.3. Definitions

3.6.3.1. Historic Building Record: detailed documentation of the building in its current state in order to create archival-level, complete, present-day drawing, photographic, and/or 3D rendering documentation. Historic Building Records typically guide future conservation work and reuse decision-making. The specific level of building recording will be defined in advance, on a project by project basis. Typical documentation entails the preparation of building elevations, floor plans, cross-sections and photographic documentation. Depending on the specific

building and nature of the rehabilitation scope of work, additional documentation, such as 3D rendering or other methods may be required.

3.6.3.2. Historic Building Condition Assessment: An assessment of the current physical condition of a building, specifically related to the historic nature of the structure and its character-defining elements. The assessment will identify required conservation, life expectancy, and prioritization of rehabilitation of the building components and character-defining elements, including structural, mechanical, and electrical. These assessments are typically prepared in conjunction with a standard Building Condition Assessment.

3.6.3.3. Conservation Plan: Using the documentation from the Historic Building Record and Historic Building Condition Assessment as a guide, a Conservation Plan outlines the required rehabilitation work to the historic resource based on appropriate standards and guidelines, such as those from the *Standards and Guidelines for the Conservation of Historic Places in Canada*, to the significant character-defining elements of the structure. It further outlines circumstances where new materials may be introduced to assist in the proper conservation of the structure, in accordance with the Standards and Guidelines

3.7. Building Life Expectancy

3.7.1. References

3.7.1.1. Refer to the latest adopted Infrastructure Asset Management Policy C598 which can be found on the CoE Website.

3.7.2. General

3.7.2.1. Consider the life expectancy and operational needs (ability to shutdown) of the building when designing the building envelope, making material choices, and designing building systems.

3.7.2.2. Take a comprehensive approach to asset management that looks at the complete lifecycle of the asset, including planning, design, construction/development, operation, maintenance, rehabilitation, replacement, and disposal. Refer to Lifecycle Costing Analysis.

3.7.2.3. Interior Finishes shall be chosen to be durable and last their expected life/aesthetic life expectancy ie) porcelain floor tile in high traffic areas should be specified porcelain tile with integral colour and not just surface glazed.

3.7.2.4. All building materials shall be durable and specified appropriately for their intended use.

.1 ie) Waterproof grout such as Epoxy grout, shall be specified where it is expected to be in contact with water or staining is expected to occur.

3.8. Crime Prevention through Environmental Design (CPTED)

3.8.1. References

3.8.1.1. Business Safety Matters Guide - CoE
3.8.1.2. Crime Prevention Through Environmental Design Guide - CoE
3.8.1.3. Safer Business Spaces - CoE
3.8.1.4. Crime Prevention through Environmental Design - Edmonton Police Service

3.8.2. General

3.8.2.1. CPTED is a proactive design philosophy built around a core set of principles that is based on the belief that *the proper design and effective use of the built environment can lead to a reduction in the fear and incidence of crime as well as an improvement in the quality of life.* CPTED is part of a community approach to crime prevention that complements community-based policing.

3.8.2.2. CPTED goes beyond conventional approaches of target hardening and active systems (camera's, locks, onsite security personal, etc.) to safeguarding the environment by exploiting; natural forms of surveillance, access control, and territorial reinforcement in a deliberate attempt to present a psychological deterrent for the purpose of positively influencing human behaviour as people interact with the environment.

3.8.2.3. Consultants should request documentation of any previous CPTED audits of the existing facility or CPTED audits of similar facility types to help inform their design.

3.8.2.4. Consultants shall engage and comment on all three CPTED design principles within their designs.

.1 Natural Forms of Surveillance
.2 Access Control
.3 Territorial Reinforcement

3.8.2.5. Where indicated in the project professional service agreement, CPTED audits shall be performed by an agent with an CPTED Enhanced Training Certificate provided by Edmonton Police Service or a pre-approved equivalent. Confirm requirements with the CoE Project Manager.

3.9. North Saskatchewan River Valley Area Redevelopment Plan

3.9.1. References

3.9.1.1. North Saskatchewan River Valley Area Redevelopment Plan, Bylaw 7188, CoE, February 1985 (Office Consolidation June 2010). This document can be found by searching the document name on the CoE website.

3.9.1.2. A Guide to Environmental Review Requirements (In the North Saskatchewan River Valley and Ravine System), CoE, December 2000. This document can be found on the CoE website.

3.9.2. General

3.9.2.1. The bylaw is in place to protect the North Saskatchewan River Valley and Ravine System and establish principles for future development in those areas.

3.9.2.2. Refer to these documents when the project takes place in the North Saskatchewan River Valley system, as defined in Bylaw 7188.

3.10. Environmental Management (Enviso)

3.10.1. References

3.10.1.1. CoE Enviso Website: www.edmonton.ca/enviso

3.10.1.2. Contractor Environmental Responsibilities Package for: Construction, Operation, Maintenance & Service Activities, Hired Equipment and Consultants, version October 2018.

3.10.2. General

3.10.2.1. Enviso is the name of the City's environmental management system.

3.10.2.2. The Consultant is to identify and understand the potential environmental implications of the project. Environmental considerations include, but are not limited to, spills and releases, contamination discovery, noise, erosion and sedimentation control, water conservation & efficiency, drainage of wastewater & stormwater, energy conservation & efficiency, tree protection, natural area protection, waste management, and material & resource conservation.

3.10.2.3. The Consultant may be required to sign an Environmental Acknowledgement Form prior to commencing work on the project. This form is included as an appendix in the Consultant's Environmental Responsibilities Package: Engineering Design & Architectural Services document. When required, this will be identified in the *Professional Services Agreement (PSA)*.

3.10.3. Environmental Permits/Approvals Checklist

3.10.3.1. The Consultant is required to complete the "Design Environmental Permits/Approvals Checklist" during design for all projects involving construction of new buildings, building demolitions with site disturbance, or hazardous material remediation affecting the site. This form is to ensure environmental permits, approvals and restrictions are identified and in place before construction.

3.10.3.2. The City requires up-to-date copies of this checklist to be submitted with the Design Development submission and Pre-Bid Submission, however it is the Consultant's responsibility to ensure the process of identifying requirements and seeking approvals happens as early as necessary in design to ensure the project schedule is not impacted. The Checklist User Guide indicates typical approval timelines.

3.10.3.3. Obtain a copy of the most recent version of the Checklist and the Checklist User Guide from the Project Manager at the start of every project.

3.10.4. Tree Management Policy

3.10.4.1. References

.1 Corporate Tree Management Policy - C456C
.2 Corporate Tree Management and Tree Reserve Procedure - October 5, 2020
.3 Refer to the Edmonton Zoning Bylaw 12800 for Landscaping requirements, including incentives for preserving Existing Trees and Shrubs.

3.11. Erosion and Sedimentation Control Guidelines

3.11.1. References

3.11.1.1. Erosion and Sedimentation Control Guidelines, CoE, Jan 2005. This document can be found on the CoE website.

3.11.1.2. Erosion and Sedimentation Control Field Manual, CoE, Jan 2005. This document can be found on the CoE website.

3.11.2. General

3.11.2.1. The Erosion and Sedimentation Control Guidelines and Field Manual were developed to assist City of Edmonton departments and staff, owners and developers, consultants, and contractors to understand the City's ESC requirements to achieve effective stewardship of environmental resources and continual improvement.

3.11.2.2. If the project has potential erosion and sedimentation impacts on the environment, the City's Erosion and Sedimentation Guidelines are available to assist the Consultant in complying with all regulatory requirements.

3.12. Commissioning Guidelines

3.12.1. References

3.12.1.1. Commissioning Consultant Manual Volume 1 - Whole Building Commissioning Process and Guidelines, CoE, latest revision including associated appendices and references. This document can be obtained through the Project Manager.

3.12.1.2. Commissioning Consultant Manual Volume 2 - Building Envelope Commissioning Process and Guidelines, CoE latest revision including associated appendices and references.

3.12.2. General

3.12.2.1. The Commissioning Consultant Manuals were developed as a reference for consultants providing or coordinating with third party commissioning services for new building projects and renovations to existing facilities owned or operated by the CoE.

3.13. City Design & Construction Guidelines

3.13.1. General

3.13.1.1. The standards are organized into eight volumes by discipline. Each volume contains a design section, specifications and drawings as required, plus any other guidelines or manuals appropriate to that discipline.

3.13.1.2. City Design and Construction Guidelines are available on the City website. These include but are not limited to:

.1 General
.2 Complete Streets Design and Construction (Roadways)
.3 Drainage
.4 Water
.5 Landscaping
.6 Street Lighting Standards
.7 Power
.8 Pavement Marking

3.14. Visual Identity Standards

3.14.1. References

3.14.1.1. All deliverables which are intended for the public or Council shall adhere to the CoE Visual Identity Standards. Anyone producing materials for the CoE should refer to the Foundational Elements standard. Standards are available on the CoE website.

3.14.1.2. Additional access standards, communication templates, project stage visual identifier logo, CoE Logo, vector files, and other resources to guide consistent OneCity approach to the City's visual identity are available through the Project Manager.

3.15. Gender Based Analysis + (GBA+)

3.15.1. References

3.15.1.1. CoE. (2018, April, 12) *Gender-Based Analysis +: What is it and Why* [video] YouTube.

3.15.1.2. CoE. (2019) *The Art of Inclusion; Our Diversity & Inclusion Framework.*

3.15.1.3. Social Vulnerability Map, Alberta Capital Region (2018, June)

3.15.1.4. Government of Canada. Gender-based Analysis Plus course [online course]

3.15.1.5. CoE. *The Process of Inclusion: GBA+ tool*

3.15.1.6. GBA+ reporting Template - Sample

3.15.1.7. Canadian Human Rights Act - Bill C-16 (Prohibit discrimation - Gender Identity or Gender Expression

3.15.2. General

3.15.2.1. The City's goal is to create an environment in which all individuals feel like they belong, and everyone has equal access to opportunities and resources. Inclusion is fundamental to the way we work. We are diverse and embrace differences with empathy and curiosity.

3.15.2.2. Gender-Based Analysis Plus (GBA+) is a tool to identify and address how people from diverse backgrounds experience policies, programs, and initiatives. The goal of GBA+ is to reduce or eliminate inequality and discrimination and ensure equality of outcomes for all Edmontonians.

3.15.2.3. Consultants are not expected to be experts on equity and diversity but can contribute to developing ways to improve outcomes for all community members through the use of GBA+. Consultants shall endeavour to research and address three fundamental GBA+ questions within their designs.

.1 Who is excluded or differentially impacted?
.2 What contributes to this exclusion or impact?
.3 What will we do about it?

3.15.2.4. Consultants shall endeavour to review their designs from multiple perspectives.

.1 Race, Colour, place of origin, ethnicity
.2 immigration status
.3 language
.4 religious beliefs
.5 gender, gender identity, and gender expression
.6 appearance
.7 physical and mental disability
.8 political viewpoint
.9 marital and family status
.10 occupation, source of income, employment status
.11 sexual orientation
.12 age
.13 poverty
.14 homelessness

3.15.2.5. Consultants should request documentation of any previous GBA+ analysis of similar facility types to help inform their design. These are encouraged to be reminders so that consultants can keep the principles of GBA+ and inclusivity in general at the top of mind when doing their work.

3.15.2.6. Advanced GBA+: Where indicated in the Project's Professional Service Agreement, an advanced GBA+ analysis shall be performed by an agent with GBA+ training and experience with various intersectionalities.

.1 Advanced GBA+ analysis' shall

- use the City's *The Process of Inclusion: GBA+ tool* to form a basis of the analysis;
- use the GBA+ reporting Template - Sample, and
- engage with internal CoE stakeholders as required to ensure diverse voices and needs are identified.
- where noted in the Consultants PSA, engage with external public.

APPENDIX A - REPORT GUIDELINES

1. General

.1 The purpose of this guideline is to establish a standardized format for architectural and engineering reports and studies not defined in Section – Consultant Deliverables.

2. Contents

.1 In general, each report and study will contain the following:

.1 Executive Summary
.2 Introduction
.3 Findings, Analysis, and Conclusions (collated for each major concept in the report)
.4 Recommendations and Cost Estimates (collated for each major concept in the report)
.5 Appendix

3. Structure

.1 The head of each page shall list the name of the facility under study, the title of the study, the report section, the City of Edmonton project number, and the section page number.

.2 Each report will begin with a cover page displaying the project title, project number, list of consultants, and date of submission of the final report.

.3 Provide a detailed table of contents, including a listing of all appendices.

.4 Depending on the length and complexity of the report, cover pages for each individual report section may be provided.

4. Introduction

.1 Provide a general description of the building or building system under review:

.1 Address
.2 Date of construction
.3 Occupancy classification
.4 Building area

.2 The introduction shall contain a clear statement of the purpose of the report. This statement will address:

.1 Why the work is being done; and
.2 What is to be accomplished by doing the work,i.e., the end result.

.3 Provide a brief outline of the scope of work, how the work is to be done, and when the work will be completed.

5. Executive Summary

.1 The executive summary shall be a synopsis of the report purpose, conclusions, and recommendations, complete with a total estimated cost figure for the recommendation.
.2 The executive summary shall not be longer than one page, except for exceptionally comprehensive reports.

.3 Minimum items to be addressed shall be;

.1 Description of issue
.2 Outline options;

- Do nothing
- Briefly outline action items, in order of effort and cost
- Recommended course of action

6. Findings, Analysis, and Conclusions

.1 Findings:

.1 Describe existing site conditions, and give source of information (examination of construction documents, site inspections, interviews with knowledgeable personnel, or examination of previously prepared reports).
.2 Describe existing building or system modes of operation.

.2 Analysis:

.1 Present an analysis of the findings, and examination of methods of solving the problem under review.
.2 Include the results of calculations which may be required to evaluate conditions or solutions.

.3 Conclusions:

.1 Include a brief description of all remedial action considered, advantages and disadvantages of each (this is to include actions which are considered but may be rejected). Provide evaluation matrix as appropriate.
.2 Determine optimum solution. Where alternatives are presented, such alternatives should be prioritized.

7. Recommendations and Cost Estimates

.1 Provide statement of recommended courses of action, complete with total estimated costs.

.2 Where more than one action is required, recommendations should be prioritized where possible (to suit budget constraints, time constraints, etc.). Prioritize on the basis of:

.1 Life hazard;
.2 Code violation;
.3 Environmental Contamination;
.4 Functional upgrade (high priority); and
.5 Functional upgrade (low priority).

.3 Where recommendations are made, sufficient detail shall be given to ensure that remedial work can in fact be carried out as envisaged. Provide sketch drawings as required.

.4 Where applicable, explain the effect of recommended construction on the operation of the building or building system in question (personnel relocation required, after hours work, service shut-down, etc.).

.5 Where applicable, identify opportunities for phasing of the work. This will be of value in project planning, where budget constraints may dictate a phased approach, occurring over several years.

.6 Where applicable, give preliminary estimates of time of construction, and highlight any items of long delivery which may affect the schedule. Specify that estimates are for time of construction only.

.7 Where applicable, give preliminary estimates for recommended measures with breakdown. Specify that costs do not include design or project management fees. Specify the limits of accuracy of the estimates.

8. Appendix

.1 The appendix shall contain:

- .1 Copies of all information referenced in the body of the report,e.g., Technical papers, product information, previous related information;
- .2 Detailed photographs illustrating existing conditions;
- .3 Detailed calculations of estimated costs;
- .4 Sketch drawings and schematics showing existing and recommended construction; and
- .5 Copies of calculations carried out to check existing system capacities or required to support analysis and recommendations, energy consumption, payback periods.

9. Report Presentation & Submission

.1 All reports must be electronic files submitted as vector PDFs with appropriate bookmark structure and fully text searchable. Bitmap or scanned submissions are unacceptable except as embedded photos or historical content. Any embedded bitmap text content shall be fully OCRd.

.2 Submit all files on optical disc, memory stick, portable drive, or via file sharing system for CoE download.

.3 Confirm with Project Manager if any supplementary hard copies are required.

APPENDIX B - DRAWING FILE NAMING CONVENTION

1. General

1. File names for all project drawings are to follow the convention described in this Appendix. Include the drawing file name under “File” at the bottom of the title block (this is automated in the CoE CAD Template).

Sample drawing file name:
[CP-123456]_[BLD123]_A000.{dwg/pdf}

CP-123456	Project Number as supplied by Project Manager
CEN101	The CoE Facility ID for the building or site as provided by Project Manager or CoE Facility Inventory Management (CAFM) group; email “fim@edmonton.ca” or “cafm@edmonton.ca”.
A000	Drawing numbers in a particular discipline's set. Usually assembled as [Discipline]+[Sheet number in that discipline’s set]. Common discipline codes are: C Civil (Site) L Landscape Architecture (may use Civil) A Architectural S Structural M Mechanical E Electrical F Fire Protection (may use Mechanical) P Pool
.dwg/pdf	AutoCAD or PDF file extension

APPENDIX C - CONSTRUCTION COST ESTIMATES

1. Construction Cost Estimates

1.1 The Consultant is required to provide the estimates stated below to the accuracies shown. All Construction Cost Estimates shall be presented in UNIFORMAT II elemental format and all quantities shall be reported and organized in accordance with the latest edition of ASTM International Standards E1557-09(2015) Standard Classification for Building Elements and related Site Work - UNIFORMAT II; E2516-11 Standard Classification for Cost Estimate Classification System and E2514-15 Standard Practice for Presentation Format of Elemental Cost Estimates, Summaries and Analysis. In the event of uncertainty over the category of any element, the Consultant shall obtain clarification from the City.:

Project Phase	Level of Accuracy
Programming	Class 5 (- 30% to +50%)
Pre-Design	Class 4 (- 20% to +30%)
Schematic Design	Class 3 (- 15% to +20%)
Design Development	Class 3 (- 15% to +20%)
Working Drawing (Progress Submission)	Class 2 (- 10% to +15%)
Working Drawing (Pre-Bid Submission)	Class 1 (- 5% to +10%)

References:

ASTM E 2516-11 TABLE X1.1 Illustrative Example of Typical Accuracy Ranges for General Building Construction Industries.

Definitions

APPENDIX D - SAMPLE CAD LAYERING STANDARD

1. General

1.1 This appendix contains a sample CAD layering standard that may be used on facility projects for the CoE where the consultant does not have their own system. This is not a mandatory requirement, however any layering standard used must comply with the requirements indicated in CAD Drawing Standards.

1.2 This standard has been designed to:

.1 Organize graphical information so that it can be effectively grouped and manipulated for display, editing, and plotting purposes.

.2 Ensure that all CAD based design drawings are structured and formatted consistently for archival and retrieval purposes.

.3 Organize drawing information in layers that can be used for both initial project development and ongoing facility management purposes.

1.3 Table D-1: CAD Layering Standard

X-YYYY-ZZZZ

X	Major Group		
		C	Civil Engineering and Site Work
		L	Landscape Architecture (optional)
		A	Architecture, Interiors and Facilities
		S	Structural
		M	Mechanical
		E	Electrical and Electrical Auxiliary Systems
		P	Pool Systems (optional)
		F	Fire Protection (optional)
YYYY	Minor Group		
	This group comprises up to 4 characters and is used to subdivide the major group on the basis of construction components or building contents. Refer to Table D-2.		
ZZZZ	Modifiers Group		
	This group comprises up to 4 characters and may be used to further differentiate minor groups. The use of a modifier is optional and is not required if the major and minor group designations for a layer are sufficient. Refer to Table D-3.		

Table D-2: Minor Group

.1 This table indicates common labels for the Minor Group (YYYY). Additional Minor Groups may be added as necessary.

.2 Except where indicated, layer color may be any of the AutoCAD colours 1 to 8. Select color to ensure the appropriate line-weight is plotted when using the COE.ctb plot style table. Different colours may be used for different layers within the Minor Group. For example, A-WALL-FULL may use a different colour than A-WALL-TEXT.

.3 Drawing Information Layers may be used with any discipline, as necessary.

DRAWING INFORMATION LAYERS (Minor Group)

Layer Name	Description	Colour
*-SCHD	Schedules	White
*-LEGN	Legend of Symbols	White

ARCHITECTURAL, INTERIORS AND FACILITIES

Layer Name	Description	Colour
A-WALL	Walls	1 to 8
A-DOOR	Doors	1 to 8
A-GLAZ	Windows, Glazing, Curtain Walls	1 to 8
A-FLR	Floor Information	1 to 8
A-FURN	Furniture	1 to 8
A-EQPM	Equipment	1 to 8
A-CLNG	Ceilings	1 to 8
A-ROOF	Roof	1 to 8
A-FENC	Fencing	1 to 8
A-PMFN	Materials & Finish Plan	1 to 8
A-FIRE	Fire Separations	1 to 8

STRUCTURAL

Layer Name	Description	Colour
S-GRID	Column Grid	1 to 8
S-FNDN	Foundation Piles, Piers & Reinforcing	1 to 8
S-SLAB	Concrete Slab	1 to 8
S-ABLT	Anchor Bolts	1 to 8
S-COL	Columns	1 to 8
S-WALLS	Structural Bearing and Shear Walls	1 to 8
S-METL	Miscellaneous Metal	1 to 8
S-FRAM	Framing (Beams, Joists)	1 to 8

MECHANICAL

Layer Name	Description	Colour
M-CONT	Controls & Instrumentation	1 to 8
M-DUST	Dust and Fume Collection Systems	1 to 8
M-ELHT	Electrical Heat Equipment	1 to 8
M-ENER	Energy Management Systems	1 to 8
M-EXHS	Exhaust Systems	1 to 8

M-FUEL	Fuel Systems (excluding natural gas)	1 to 8
M-HVAC	HVAC Systems	1 to 8
M-HOTW	Hot Water Heating System	1 to 8
M-CWTR	Chilled Water System	1 to 8
M-NGAS	Natural Gas System	1 to 8
M-PROC	Process System	1 to 8
M-REFG	Refrigeration System	1 to 8
M-STEM	Steam System	1 to 8
M-DOMW	Domestic Water System	1 to 8
M-SANR	Sanitary Drainage	1 to 8
M-STRM	Storm Drainage	1 to 8
M-EQPM	Misc. Plumbing Equipment	1 to 8
M-CO2S	CO2 System	1 to 8
M-SPRN	Fire Sprinkler System	1 to 8
M-STAN	Standpipe System	1 to 8

ELECTRICAL

Layer Name	Description	Colour
E-LTG	Lighting	1 to 8
E-PWR	Electrical Power	1 to 8
E-FIRE	Fire Protection System	1 to 8
E-CTRL	Electrical Control System	1 to 8
E-GRD	Ground System	1 to 8
E-CCTV	Closed Circuit Television System	1 to 8
E-VOC	Voice Communication Connections	1 to 8
E-DATA	Data Communication Connections	1 to 8
E-SEC	Security System	1 to 8
E-SND	Sound and Public Address System	1 to 8
E-EMRG	Emergency System	1 to 8

CIVIL

Layer Name	Description	Colour
C-PROP	Property Lines, Easements, Right of Way	1 to 8
C-TOPO	Contour Lines and Elevations	1 to 8
C-BLDG	Building Footprint	1 to 8
C-PKNG	Surface Parking Lots	1 to 8
C-ROAD	Roads including Lines & Curbs	1 to 8
C-STRM	Storm Drainage Site Services	1 to 8
C-ELTR	Electrical Site Services	1 to 8
C-COMM	Communications Site Services	1 to 8
C-WATR	Domestic Water Site Services	1 to 8
C-FIRE	Fire Protection Site Services	1 to 8
C-NGAS	Natural Gas Site Services	1 to 8
C-SSWR	Sanitary Sewer Site Services	1 to 8

LANDSCAPING AND SITE WORK

Layer Name	Description	Colour
C-PLNT	Plants and Landscaping	1 to 8
C-IRRG	Irrigation System	1 to 8
C-WALK	Walkways and Steps	1 to 8

C-SIGN	Site Signage	1 to 8
C-SITE	Site Improvements	1 to 8

1.4 Table D-3: Modifiers Group

.1 This table indicates common labels for the Modifiers Group (ZZZZ). Additional Modifiers may be used as necessary. Modifiers may be used with any Minor Groups, as needed.

BUILDING INFORMATION LAYERS

Layer Name	Description	Colour
*-****-IDEN	Identification Data	1 to 8
*-****-PATT	Cross-hatching Pattern	1 to 8
*-****-DEMO	Existing to be Demolished (Hidden Linetype)	1 to 8
*-****-NEW	New or Proposed Work	1 to 8

DRAWING INFORMATION LAYERS

Layer Name	Description	Colour
*-****-NOTE	Notes	1 to 8
*-****-TEXT	General Information and Specification	1 to 8
*-****-SYMB	Symbols, Bubbles, etc.	1 to 8
*-****-DIMS	Dimensions	1 to 8
*-****-PATT	Cross-hatching Pattern	1 to 8
*-****-DETL	Detail	1 to 8
*-****-ELEV	Elevation	1 to 8
*-****-EXTR	Exterior	1 to 8
*-****-NAME	Name (i.e. Room Name)	1 to 8
*-****-SECT	Section	1 to 8
*-****-EQPM	Equipment	1 to 8
*-****-PIPE	Piping	1 to 8
*-****-DUCT	Ductwork	1 to 8
*-****-FIXT	Fixtures	1 to 8
*-****-WALL	Wall Mounted Equipment	1 to 8
*-****-CEIL	Ceiling Mounted Equipment	1 to 8
*-****-CIRC	Circuit	1 to 8
*-****-UNDR	Underground	1 to 8
*-****-OVHD	Overhead	1 to 8
*-****-NPLT	Non-plot Information and Construction Lines (Defpoint layer)	1 to 8
*-****-PLOT	Plotting Targets and Windows (Defpoint layer)	1 to 8
*-****-RDME	Read-Me layer (Defpoint layer)	1 to 8

APPENDIX E - CONDITION RATING SCHEME TABLE

Condition Rating Scheme Table

CONDITION RATING	DESCRIPTION	REMAINING SERVICE LIFE (RSL)
Rating A (100 - 80) Excellent	No noticeable defects. Component meets all current requirements and will require only routine maintenance.	Time: 10 + Years
Rating B (79 - 60) Good	Minor deterioration or defects. Present condition has minor or no deficiencies, is performing well and will require only routine/average maintenance.	Time: 8 - 10 Years
Rating C (59 - 40) Fair	Some deterioration or defects. Function still adequate. Component is marginally acceptable for intended use but has deteriorating conditions that will need to be addressed.	Time: 5 + Years
Rating D (39 - 20) Poor	Serious deterioration. Function is inadequate. Component has generally extensive deficiencies that will have an impact on the operational functions and/or may lead to health and safety concerns.	Time: 1 Year
Rating F (19 - 0) Fail/Critical	Component represents an unacceptable, unhealthy or unsafe condition requiring immediate attention in order to ensure continued access, use and safety of staff and public.	Time: Immediate
F.I. Further Investigation Required	Refers to building conditions observed which require more detailed investigation, or possible testing using special equipment and techniques to determine the exact building component condition.	