UNIVERSITY OF TORONTO | Facilities & Services

Facilities & Services Deliverable Standard

Revision 02

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1 Introduction

1.1 Key parties involved

The key parties listed in this standard include:

- University of Toronto Project Manager
- University of Toronto Facilities & Services (“F&S”) Representative
- University of Toronto Client Representative
- Client refers to representative of University Planning, Design & Construction (“UPDC”) and Facilities & Services (“F&S”)
- Independent Commissioning Agent (“CxA”)
- Architect (Prime Consultant or Engineer)
- Contractor

1.2 Purpose

For the purposes of the F&S Deliverable Standard, main phases are:

i) Pre-design (PD) (if applicable)
ii) Schematic Design (SD)
iii) Design Development (DD)
iv) Construction Documents (CD)
v) Construction
vi) Close-out Documents
vii) Ready-for-Takeover Procedures
viii) Warranty Period

An electronic deliverable package will be submitted by the Architect at the end of each of the above-noted phases representing the milestone for that phase. Depending on the project size, there may be interim deliverable submissions determined within each phase of the project. However, the purpose of the Deliverable Standard is to set out the Client requirements for deliverables to be provided for their review and comment (see Appendix A). The deliverables required within this standard are in addition to the other requirements set out in the applicable procurement documents for the Architect.

The Client will review the deliverables for completeness and/or compliance with the University standards. However, this review in no way relieves the Architect of its contractual or legal obligations.

2 Deliverables by Phase

2.1 Pre-design Phase (if applicable)

The Pre-design Phase is the early stage of defining new project requirements from an end-user perspective. Depending on the complexity of the project, F&S will require a technical Building Systems

Investigation (BSI) that thoroughly evaluates the existing mechanical and electrical equipment, components, and systems to identify the efficacy of the existing infrastructure to support the new project. The BSI will be required for all Level 2 and 3 (as defined by the Capital Planning and Capital Project Policy) renovation and expansion projects. Level 1 projects may also require a BSI - to be evaluated on a case-by-case basis. For new projects, the investigation may be scaled back or not required.

2.2 Schematic Design (SD)

Refer to Appendices A and B for the required F&S deliverables to be provided by the Architect during the SD phase. The SD shall meet the University of Toronto Tri-Campus Energy Modelling and Utility Performance Standard https://www.fs.utoronto.ca/projects/design-standards-and-project-forms/. The Architect shall provide the preliminary energy model and any cutsheets for equipment used in the model. The Architect shall also provide a preliminary list of any permits, licenses, certificates, or approvals that may be required and could potentially impact the operations of the campus.

The Architect shall provide a status update on the following permits and approvals:

i. Emissions
ii. Sound and vibration
iii. Water quality
iv. Dewatering requirements

2.2.1 Preliminary Constructability Report

The Architect to shall review and provide recommendations on Contractor's Preliminary Constructability Report that defines at the minimum, including recommendations on the following:

i. Site conditions and construction boundary,
ii. Connections to existing buildings,
iii. Land and property access and use, such as easements or rights of way,
iv. Restrictions by neighbours, third party utilities, affiliated colleges, and authorities having jurisdiction, and
v. Crane location, staging area for material, equipment and trailers.

2.2.2 3-Dimensional model

If available, the Architect shall present a three-dimensional massing model including a depiction of the space needed to accommodate structural, mechanical, and electrical systems (including vertical shafts) for interference coordination.

2.3 Design Development (DD)

Refer to Appendices A and B for the required F&S deliverables to be provided by the Architect during the DD phase. During the DD phase, the Architect shall present any deviations from University's Design

Standards for Client review. The Architect shall provide a summary of energy model changes from the previous submission comparing current model performance to the established energy and GHG performance indices. The Architect shall demonstrate, in a presentation, that the design is compliant with the Sustainability Project Charter requirements.

2.4 Construction Documents (CD)

Refer to Appendices A and B for the required F&S deliverables to be provided by the Architect during the CD phase. During the CD phase, the Architect shall present any deviations from University's Design Standards for Client review. The Architect shall provide a summary of energy model changes from the previous submission comparing current model performance to the established energy and GHG performance indices. During CD, the Architect shall submit a metering and verification strategy that outlines which loads are to be metered, types of meters to be specified, and calibration certificates. The Architect shall demonstrate, in a presentation, that the design is compliant with the Sustainability Project Charter requirements. If multiple milestone submissions during the CD phase are specified in the Architect's contract, then the Architect will resubmit the deliverables package at each milestone (e.g. 80% CD). At the completion of the CD phase, design standards conformance form (refer to the Appendix C) shall be completed, signed by the Architect, and submitted as part of the 100% CD phase submission package.

2.5 Construction Phase

2.5.1 Shop drawings & Submittals

When the shop drawings and submittals noted in the Appendix E received by the Architect, the Architect shall immediately issue the shop drawing or submittal to Client review. The Client will endeavour to review the shop drawings and issue comments in parallel with the Architect review. The Architect will incorporate Client's comments into their response to the Contractor.

2.5.2 Proposed alternates and deviations

In addition to following the process in their Contract, any proposed alternates or deviations from the University of Toronto Design Standards by the Contractor must be reviewed and submitted with comments and recommendations by the Architect to the Client on the form in Appendix D (Building Design Standard Variance Request form). The comments and recommendations shall include an explanation why the standard cannot be met, the specific differences, any impact on the designed performance of the equipment and system and lifecycle analysis that includes future maintenance and operating costs. Variances from the University of Toronto Design Standards shall only proceed after acceptance by the Client.

2.6 Close-out documents

The close-out documents should be provided as defined in the contractor's contract.

2.7 Ready-for-Takeover

The project will be considered Ready-for-Takeover as defined in the contractor's contract. Prior to the Ready-for-Takeover, all the Ready-for-Takeover necessary documents must be provided to the Client for review; training must be provided to the Client; any remaining deficiencies must be identified and provided for Client's review and comment.

2.7.1 Systems Manual

The Architect will support the CxA with the gathering of building and systems information to complete a Systems Manual. The Systems Manual will be delivered by the CxA prior to Ready-for-Takeover. The following shall be included in the Systems Manual:

Section 1—Executive summary

Section 2—Facility design and construction

2.1 The Owner's Project Requirement document (as per ASHRAE definition)

2.2 The Basis of Design document

2.3 Building/Project Design and Record Drawings

2.4 Updated BIM model to Record Drawings condition

2.5 Substantial Performance Certificate issued by Architect

2.6 Architect and/or engineers' letters for City Building Inspector and contractor to facilitate the closeout of all permits

2.7 Certificates from ESA, TSSA, and other authorities having jurisdiction

Section 3—Building, systems, and assemblies information for commissioned systems and assemblies

3.1 Copy of building and equipment specifications

3.2 Copy of approved submittals including final controls sequences of operation

3.3 Copy of manufacturer's operation and maintenance (O&M) data

3.4 Copy of warranties

3.5 Contractor and supplier list and contact information

3.6 Elevator documents (drawings, logbook, test records, operating licence)

3.7 Fire alarm system test report and certification

Section 4—Facility operations

4.1 Facility Guide including: operating plan; building and equipment operating schedules, setpoints, ranges and limitations; commissioned systems control sequences of operation; and emergency procedures.

Section 5—Training

5.1 Copy of training plan and materials

5.2 Training records

Section 6—Final Commissioning Report

6.1 Copy of final Cx process plan(s)

6.2 Copy of commissioning design and submittal review reports

6.3 Copy of testing and start-up reports, evaluation checklists, and testing checklists completed for commissioned systems and assemblies

6.4 Copy of All Cx Progress Reports

6.5 Copy of deficiencies and resolution logs

6.6 Item resolution plan for open items

6.7 EMRS integration final report

2.7.2 Energy model and utility performance for new construction projects

When the building is commissioned and being used for its intended purpose, the Client will complete a post-occupancy energy performance evaluation. In parallel, the Architect will update the energy model with any changes during commissioning and the revised model will be the adjusted baseline.

Refer to University of Toronto Tri-Campus Energy Modelling and Utility Performance Standard Documentation Submission Requirements by Project Milestone for required deliverables.

Each documentation item, the expectations, and responsible parties is outlined in the University of Toronto Tri-Campus Energy Modelling and Utility Performance Standard.

2.7.3 Energy model and utility performance for renovation projects

For renovation projects, the following documents shall be delivered to the Client at occupancy. Each documentation item, the expectations and responsible parties are outlined in the University of Toronto Tri-Campus Energy Modelling and Utility Performance Standard.

Refer to University of Toronto Tri-Campus Energy Modelling and Utility Performance Standard Renovation Documentation Submission Requirements by Project Stage for required deliverables.

2.8 **Warranty Period**

2.8.1 Warranty review

The Architect, Contractor, and CxA to conduct a warranty inspection and review with the Client at approximately the 10th month after the Ready-for-Takeover date. The Client shall coordinate with the

parties to review all warranty items. The Architect will prepare the warranty review reports and issue to the Contractor to rectify any identified warranty items, copying all other parties.

2.8.2 Energy model and utility performance

If the actual energy performance after 12 months of continuous operation exceeds the predicted performance by more than 15%, then the Client will conduct an in-house investigation to identify the cause of the exceedance. If it is determined that the performance issue is design-related, the Architect and, if applicable, its other relevant consultants will be required to comment and assist the Client in determining the possible reasons for the variation.

3 Appendices

Appendix A – Design deliverable check sheets

The check sheets for drawings and the Basis of Design (BOD) shall be utilized as a consistent design quality control tool. The intent of this checklist is to capture the minimum level of detail for each milestone. Additional items can be added to the checklist as required. The check sheets need to be completed and verified by the Architect, submitted to the Client to meet the requirements of each design milestone and to proceed to the next phase. The CD check sheets and the design standards conformance form shall be submitted at the 100% CD phase submission package.

Refer to the Design Deliverable Check Sheets that is required to be completed and included in every milestone package.

Appendix B – Basis of design report template and checklist

A Basis of Design (BOD) report or design brief is a “living document” that is updated at each phase of design to the appropriate level of detail required for that phase. It is the document that conveys the understanding of the project and how the design solution will address the Client’s requirements. It is also a record of the assumptions and decision-making process driving the design.

The BOD serves as a communication tool between the Client and the Architect. It is used as the foundation for the System Narrative prepared by the Cx agent and included in the Systems Manual (refer to University of Toronto’s Building Commissioning Standard for details). The items outlined in the BOD should evolve from proposed or estimated components to actual components.

For renovation projects (building or systems) include an interpretation or an analysis of the existing conditions that includes supporting documents such as, existing drawings, existing controls, existing sequence of operations, load on the electrical panels, air balancing reports, assumptions, items to be confirmed, etc. In addition, an impact analysis shall be included to determine the adequacy of the existing infrastructure to support the new systems. It should also include an updated inventory list to understand what equipment has been removed, replaced, or added.

Refer to the Basis of Design report template and checklist that is required to be completed.

Appendix C – Design standards conformance form

The design standards conformance form shall be completed, signed by the Architect, and submitted to the Project Manager as part of the 100% CD phase submission package.
Refer to the design standards conformance form that is required to be completed.

Appendix D – Building design standard variance request

Information on any proposed alternates or deviations (deletion, addition, revision) of University of Toronto Design Standards must be submitted on the form with comments and recommendations from the Architect prior to the Client acceptance. The comments and recommendations shall include the significant differences, any impact on the designed performance of the equipment and system and lifecycle analysis that includes future maintenance and operating costs.

Refer to the building design standard variance request form that is required to be completed.

Appendix E – Shop drawing and submittals

This section outlines the minimum required shop drawings and technical submittals to support construction.

Mechanical	Electrical
Building automation system	High voltage switchgear
BTU metering	All protection relays and systems
Elevators	High voltage cables
Fire safety systems	High voltage transformers
High pressure steam and condensate components (above 690 KPa)	High voltage circuit protection devices
High temperature heating water components (above 150 °C)	High voltage metering
Air handling units	Low voltage switchgear
Chillers (175 KW (50 Tons) or greater)	Ductbanks and cable chambers
Boilers	Packaged generator assemblies
Pumps (7.45 KW (10 HP) or greater)	Battery equipment
Air valves	Lighting control system
Snow melting systems	Electricity and energy metering
Access platforms	Power system studies
Heat pumps (175 KW (50 Tons) or greater)	Voltage or power quality mitigation equipment
	Substation communication architecture
	Inverters