DESIGN DELIVERABLES

Major Dalhousie construction and renovation projects are typically executed through five (5) standard design phases. Appendix 1, at the end of this document, outlines the default submittal requirements at each design phase. This list – and the quantity and timing of each design phase – shall be adjusted as needed for the demands and particulars of the project being executed.

Factors that may impact the quantity, timing, and duration of design phases – and the deliverable requirements for each – include:

1. Facility type (research/lab, classroom, library, office, housing, sports/recreation, etc.)
2. Location (main campus vs. off campus)
3. Project delivery method (CM, D/B, Design-Bid-Build)
4. Schedule requirements or constraints
5. Accuracy and completeness of the Facilities Program, OPR, and other pre-design information

SECTION 1 - DELIVERABLE REQUIREMENTS COMMON TO ALL DESIGN PHASES

A. BASIS OF DESIGN (BOD)

The BOD is essentially the design team's translation of the project’s goals and requirements – first into design concepts, then design documents, then construction documents. The BOD is drafted and maintained by the Consultant throughout design and construction, while the Owner’s Project Requirements (OPR) document is drafted by the Owner during programming and maintained throughout design and construction by the Commissioning Authority (CxA). The OPR describes the owner’s functional goals & requirements, while the BOD expresses how those requirements will be met.

The BOD records the concepts, assumptions, calculations, decisions, rationale(s), and product selections used to satisfy applicable regulations, standards, and guidelines and to otherwise meet the owner’s goals and requirements. It is a “living document” that must be updated throughout design and construction by the Consultant so that an “as-built” version of the document can accompany the record drawings, operation & maintenance manuals, and other documents provided during project closeout to substantiate what was designed and built, and why.

See Appendix 1 for a template list of specific components of the Basis of Design document.

B. SPACE SUMMARY & AREA CALCULATION

At the end of each phase of design, the Consultant shall calculate the area of the facility to be constructed or renovated using AutoCAD or BIM as outlined below. Space quantities shall be tabulated to allow for a comparison at each phase to the original Facilities Program and prior design submittals.
1. Gross Area: The sum of all areas on all floors of a building included within the outside faces of its exterior walls, including all vertical penetration areas, for circulation and shaft areas that connect one floor to another. (In addition to all the internal floored spaces Gross Area should include the following: excavated basement areas; interstitial space (i.e., mechanical floor or walkways), mezzanines, penthouses, attics, garages, covered porches—whether walled or not, inner or outer balconies to the extent of a drip line from a roof or balcony immediately above. The footprints of stairways, elevator shafts, and vertical duct shafts are to be counted as gross area on each floor through which they pass.

2. Net Assignable Area: Determine the sum of room areas excluding non-assignable areas. Room area is defined as the net area of the room in square feet, measured between the inside surfaces of walls and partitions. Non-assignable areas include interior circulation space (including stairs), custodial areas, mechanical and electrical rooms, structural areas, public rest rooms, exterior circulation space (including stairs), elevators, elevator machine rooms, elevator shafts, and telecommunications & security equipment areas.

3. Non-Assignable Area: Determine the net room area of all non-assignable spaces as defined in Item #2 above.

4. Structural Area: The sum of all areas on all floors of a building that cannot be occupied or put to use because of structural building features. (Exterior walls, fire walls, permanent partitions, unusable areas in attics or basements, or comparable portions of a building with ceiling height restrictions.)

4. Roof Areas: Determine the gross area of each surface receiving horizontal waterproof membranes.

**Gross Area = Net Assignable + Non-Assignable + Structural areas.**

**C. QUALITY CONTROL**

The Consultant shall thoroughly review, check, and coordinate all elements of each submittal, including those of consultants, to eliminate errors, omissions, and conflicts. These checks shall be made by persons other than those preparing the material. The name of the reviewer shall be indicated on all drawings, computations, and other submittals. If design reviews indicate a lack of such quality assurance & control, such materials may be rejected and returned for revision.

Each design submittal shall include a statement confirming that the design:

1. meets the requirements of the facilities program, the Owner’s Project Requirements (OPR), the Basis of Design (BOD), or approved updated versions of the same
2. has been coordinated between disciplines for consistency, quality, and constructability
3. complies with the Dalhousie University Design Guidelines. NOTE: Compliance checklists are included with each Guideline. Consultant to indicate if each section is compliant or non-compliant or not applicable. Proposed non-compliances shall be submitted in writing by the
Consultant, with justification and other background information as necessary to explain the variance and gain approval.

D. SURVEY INFORMATION

The Consultant is responsible to site the proposed design feature (i.e. building) with the proper coordinate referencing system based on land survey information provided from Owner. North American Datum of 1983 (NAD83 CSRS) will be the horizontal reference system for all documents. The vertical reference system used for illustrating elevations will be based on the Canadian Geodetic Vertical Datum of 2013 (CGVD2013).

All units will be Imperial for University purposes. Should the Authority Having Jurisdiction require metric units, the Consultant will convert, as required.

Record documentation of new infrastructure provided shall also conform to these standards. This includes:

- All underground services/structures both under a building or outside the footprint (tunnels, watermains, ductbanks, sanitary and storm lines, sump pits within buildings, conduit, gas lines, etc)
- All building scans (internal and external point cloud surveys, models, etc.) to be referenced for horizontal and vertical reference.
- All legal and site surveys

E. RENDERINGS, MODELS, and ANIMATIONS

Particularly during the early stages of design, the Consultant shall utilize interior and exterior renderings, sketches, perspectives, models, and other means as needed to illustrate design options, concepts, and solutions. The means for providing these deliverables – including, but not limited to AutoCAD, Revit, and Sketchup – are considered standard design tools and are inherently to be included as a Basic Service.

The Consultant shall provide electronic copies of such deliverables – both in their native format(s) and in a readily-usable form (JPG, PDF, etc.) – to the University for its official use.

SECTION 2 - DELIVERABLES BY PHASE

See Appendix 1 for a template list of requirements at each phase. This list shall be adjusted as needed for the demands of each project.

A. PROGRAM VERIFICATION
Prior to selection of the Consultant the University will fully or partially develop a project-specific Facilities Program (or “Program”) to explain, outline, and justify the project. The Program conveys general and specific pre-design information such as:

1. background on both the project/facility and the users/occupants
2. anticipated project delivery method (Construction Management, Design/Build, or Design-Bid-Build)
3. design goals
4. quantification of space in terms of type, net and gross SF, adjacency, and finishes
5. relationship of the project & site to the adopted Campus Master Plan
6. site and utilities infrastructure information
7. applicable codes
8. overall project schedule
9. funding source(s) and budget data
10. a draft form of the Owner’s Project Requirements (OPR) document NOTE: The OPR is updated as needed and maintained by the University until selection of the Commissioning (Cx) consultant, at which point the OPR becomes a “living document” that is updated throughout design and construction by the CxA.

As the initial step in translating such goals and pre-design assumptions into design and construction documents, the design team shall meet with the user group, and other University officials to review and confirm or adjust the assumptions outlined in the Program and OPR. The primary objectives of this effort include:

1. Development of a clear understanding of the needs of the facility, its occupants/users, and their academic & operational mission(s)
2. Verification that all spaces essential to the function, operation, and support of the facility are accounted for and properly sized
3. Identification of the relationship of spaces to and with each other and the general character, finish, and furnishing of each space
4. Review and confirmation of site development strategies and constraints, utility infrastructure assumptions, and the project-specific Campus Master Plan checklist
5. Discussion of primary building systems – mechanical, electrical, plumbing & fire protection, telecommunications, audio/visual, and security
6. Discussion of energy efficiency, sustainability, and LEED certification goals
7. Review of Operation & Maintenance considerations and goals
8. Review of applicable codes, standards, and guidelines
9. Review of special considerations where applicable such as historic preservation, vibration or acoustic sensitivities, hazardous materials, etc.
10. Finalization of the detailed design schedule, including key milestones and meetings
11. Review of the construction budget and programmatic estimating assumptions

Typically, the Program Verification effort leads to the Design Professional’s production of an initial Basis of Design (BOD) document, which is to be provided as part of the Concept Design submittal. See above and Appendix 1 for specific BOD requirements.
In cases where the Program was only partially developed by the University, the BOD – coupled with information or data that was incomplete or absent in the original Program – may be required as a separate deliverable in advance of Concept Design.

During Program Verification, the Consultant shall call attention to the need for topographical, geotechnical, existing conditions, or other surveys that were not provided by the University or included in the consultant’s Basic Services.

B. CONCEPT DESIGN

This deliverable shall convey the Consultant’s understanding of the confirmed program and OPR with both narratives and illustrations. Typically, computer-generated exterior and interior 3D perspectives and mass models are used to fully present the concept(s). Such illustrations are considered basic design tools and are inherently part of basic services.

The Concept Design deliverable shall illustrate and/or describe fundamental design parameters such as functional organization; building footprint; site development; massing, scale, and context of the building; basic exterior and interior finish materials; and major building systems.

Interactive design workshops (or “charrettes”) may be employed during this phase to allow the User Group and other University entities to participate in the design process. At the conclusion of the conceptual design charrette(s), the Consultant shall make a presentation to explain the design and the influences that led to the proposed solution(s). Upon consideration by those in attendance, if a consensus can be reached, a concept will be selected for further development in the Schematic Design phase. Otherwise, multiple solutions may be developed further Schematic Design.

C. SCHEMATIC DESIGN (SD)

The SD submittal shall fully convey the design intent by explaining and/or illustrating these fundamental concepts or systems:

1. site development, circulation, and contextual relationships with neighboring facilities
2. site infrastructure – particularly the routes, sizes, and impacts of distributed utilities
3. building exterior massing, scale, materials, appearance, and contextual relationship
4. building egress, ingress, and life safety provisions
5. functional organization of the interior spaces
6. interior finishes
7. building systems, including building envelope, structural, mechanical, plumbing & fire protection, electrical, telecommunications, audio/visual, security, and conveying systems

This phase usually represents the final opportunity to significantly alter the program, floor plan(s), major building systems, and the footprint and orientation of the building without impacting cost and/or schedule.
D. DESIGN DEVELOPMENT (DD)

All significant design decisions should be captured in the DD submittal, as these documents will provide the basis for the detailed Construction Documents. At the completion of this phase, all major design, technical, logistic, procurement, and cost challenges should be resolved to eliminate carryover of research or exploration of alternatives to the next phase. The Consultant shall present enough documentation to fully explain the quality level decisions and solutions that have been reached. This documentation shall consist of drawings, outline specifications, 2D elevations, 3D perspectives, models, material samples, and design documentation such as calculations, notes, and economic or engineering analysis. Cut sheets for lighting, plumbing, hardware, HVAC equipment, architectural specialties, special equipment, and other key elements are to be included, along with preliminary equipment schedules for mechanical, electrical, plumbing, and fire protection systems.

Immediately following the DD stage – or prior to DD if floor plans are mostly settled – the Consultant shall assign room numbers to spaces as outlined in the Room Numbering Guideline. Subsequent modifications to the floor plans shall be accompanied by confirmation from Space Planning that the revisions still meet the Room Numbering Guideline.

E. 60% CONSTRUCTION DOCUMENTS (60% CDs)

This submittal should include sufficient detail to construct the facility, including complete draft specifications, dimensioned architectural floor plans, reflected ceiling plans, finishes schedule, door/window schedules, refined mechanical/electrical/plumbing and fire protection equipment schedules, scaled layouts of major equipment in mechanical, electrical, plumbing, fire protection, and telecommunication rooms.

If the 60% CDs deliverable is to be the basis for competitive bidding, certain key systems or trades should be further developed to minimize the risk of changes and additional construction costs.

F. 100% CONSTRUCTION DOCUMENTS (100% CDs)

This submittal is typically the basis for competitive bids. As such, plans and specifications must be finalized, fully detailed, and coordinated with each other.

The Consultant shall recommend to the Owner’s Project Manager any alternatives as needed to ensure a complete and usable facility within the budget. Alternatives will be awarded as funds allow, but the base bid must be structured so that the facility will function as intended if the alternatives cannot be funded and awarded.

G. EARLY RELEASE PACKAGES

For certain Construction Management or Design/Build projects, certain scopes of work may be procured (bid) and executed in advance of the balance of work. Common examples include sitework, site utilities, demolition, and building foundations. In such cases, the Consultant shall develop a stand-alone,
biddable set of plans and specifications (including non-technical specifications) for the targeted “early release” scope of work.