

## 5. PHASE 2 – DESIGN PHASE

### 5.1 DESIGN PERIOD PROCEDURES

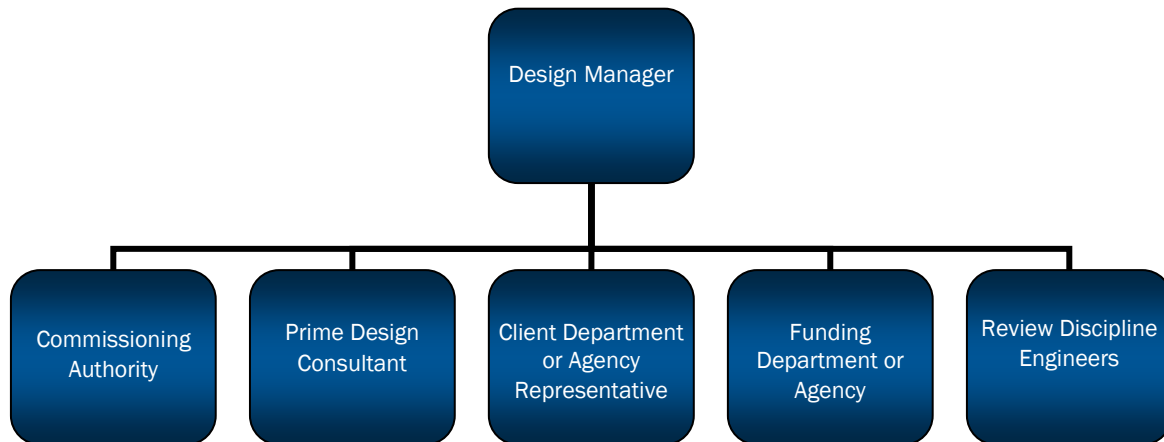
#### 5.1.1 GENERAL

1. The Consultant project team, accompanied by TW professionals shall visit the site as soon as possible after receiving a project briefing from the Design Manager. The site visit is intended for the Consultant to appraise site characteristics and any external factors affecting the design.
2. A design briefing meeting is to be convened following the completion of the site visit and the Consultant's review of the client's functional program study. The purpose of this meeting is to and to introduce all parties involved in the project and facilitate group discussion of the program to ensure that all requirements in it are fully understood.
3. The redevelopment of an existing building will necessitate completion of a detailed Facility Condition Assessment.
4. The basic service fee for Consultant Services incorporates four design stages:
  - a. Concept Design
  - b. Design Development
  - c. Detailed Design
  - d. Contract Documents

#### 5.1.2 DESIGN PHASE COMMUNICATIONS

1. Maintaining effective communication with the client department or agency is an essential part of the responsibilities of both the Design and Construction Managers. This includes regular reports, correspondence and meetings to provide information related to a project's financial and physical status and the identification of any areas of concern. It is crucial that a high level of client satisfaction is achieved.
2. Approval from the client requested by the Design Manager and shall be obtained in writing on any capital or maintenance projects affecting floor layouts, work disruptions, scheduling, or other relevant matters prior to start of work.

3. All communications during the design phase shall be routed through the Design Manager. For example, the Consultant should not contact the Client Department directly. This will alleviate the sometimes misdirection and erroneous decisions by those not managing the project.



### 5.1.3 SCHEDULE

1. The Design Manager is to establish a project schedule in consultation with the Consultant following the design briefing meeting. The schedule shall establish the elapsed time from start of the design process to the award of the construction contract(s) and incorporate client design reviews. This schedule shall also detail the expected deliverables for the project.
2. Schedule should be developed using Microsoft Project. The schedule should contain the following information:
  - a. Task definitions (technical, meetings, review periods, etc.)
  - b. Task start date, finish date and duration
  - c. Task resources
  - d. Linked tasks
  - e. Identification of Critical Path

### 5.1.4 COST CONTROL

1. The Consultant is responsible for monitoring construction costs during preparation of contract documents and advising the Design Manager of any significant deviation as a result of client or TW requested design changes. Ensure that the probable cost increases do not

exceed the design contingency allowance provided for in the cost plan. The pre-tender estimates are to be provided in accordance with this manual.

2. Estimates are to be provided with each submission and provide detailed costs of systems included for each discipline.
3. Where alternative technologies are proposed or evaluated, estimates shall be provided for each alternative comparing initial capital and life cycle costs

### 5.1.5 DESIGN ERRORS AND OMISSIONS

1. An error is an item in the drawings and specifications that results in extra costs or delay due to the correction of a design or other deficiency (e.g. co-ordination).
2. An omission is an item missing from the drawings and specifications which must be added outside the competitive bidding process.
3. Design errors and omissions can be minimized through the implementation of a design quality assurance plan by the Consultant team and complying with the design procedures and guidelines contained in this manual. The Consultant is to exercise the skill, care and diligence that may reasonably be expected of other professionals of ordinary competence.
4. The Consultant shall complete all internal design checks and inter-discipline reviews prior to submitting to TW's project team for review. Shall it become evident that this review has not been completed by the Consultant; the document package will be returned without comment and the expectation that the Consultant will complete the work prior to further submission. Delays in the project will not be accepted, it is expected that the Consultant will assign appropriate resources to maintain the schedule as agreed.
5. Correction of errors and omissions shall be completed in a reasonable time frame so that the overall project schedule is not affected. During construction phase this time shall be 10 days or less for non-critical items and three (3) days or less for those deemed critical.
6. The cost of design errors on the part of the Project Consultant team is the responsibility of the Consultant. The Consultant shall undertake immediately to correct the error, in consultation with the Construction Manager. The correction may include, but not necessarily be limited to, provision of design drawings and specifications, preparation of a change order for the Contractor, coordination of on-site inspections, and payment to the Owner (credit

change order to the contract). Under no circumstance shall the Consultant be reimbursed for efforts expended to overcome the errors or omissions.

7. The construction cost of design omissions on the part of the Project Consultant team may be paid, in part or in full, by TW provided:
  - a. the cost of such omissions does not entail removing material or equipment already installed
  - b. the costs of such omissions are within the construction contingency allowance provided for in the cost plan

## 5.1.6 APPROVAL REQUIREMENTS

### 5.1.6.1 General

1. The Design Manager is responsible for ensuring that the Consultant obtains all necessary approvals. This includes the approval of client partners and the approval of any regulatory agencies. The major regulatory agencies are noted in the following sections; however the specifics of the project may necessitate several other regulatory approvals. In some limited cases, the Design Manager will facilitate the receipt of approvals.

### 5.1.6.2 Fire Commissioner's Office

1. Submissions for review should be made by the Consultant for any contracts related to the construction or alterations of buildings as defined in National Building Code of Canada (latest revision). This would generally include contracts involving changes to the layout of buildings or the installation of fire protection systems, but would not include maintenance related projects such as roof repairs.

### 5.1.6.3 Municipal Building Permits

1. Plans are to be submitted for approval and the Contractor will be required to obtain and pay for a municipal building permit where applicable, in accordance with TW policy, for new buildings and extensions to existing buildings. Discussions will be held during the preliminary design stage with municipal authorities to identify and resolve any concerns and

maintain compliance with any applicable municipal regulations. This is intended to ensure that the Contractor will not experience undue delay in obtaining a building permit.

2. Building alteration projects involving an occupancy classification change will be submitted to the municipality for agreement in principal to ensure any municipal zoning regulations, bylaws, and ordinances are incorporated into the design.

#### **5.1.6.4 Building Accessibility Regulations**

1. Plans and specifications shall be submitted by the Consultant to Service NL in accordance with the design registration procedures established under the “Building Accessibility Act and Regulations”.
2. The Contractor shall be obliged to obtain and pay for any inspection permit fees levied by Service NL.

## 5.2 PHASE 2, STEP 1 - CONCEPT DESIGN

### 5.2.1 GENERAL

1. The Concept Design process documents and reports on the building systems proposed (or alternatives under evaluation), taking into consideration the client's program needs, economy, durability, capital cost, and requirements of relevant codes and authorities.
2. The Concept Design documentation shall be assembled in such a way to facilitate its updating and expansion to incorporate:
  - a. the requirements of the project design report at the conclusion of the design development stage
  - b. the systems description and operating principles required in the preparation of system operation manuals
  - c. LEED® requirements or recommendations in order to achieve the certification level required for the project. Projects will require the LEED® certification striving for LEED® Silver unless otherwise notified. The LEED® score card shall be included in submittals
  - d. Format of the document shall be in follow the table of contents as outlined in [http://www.tw.gov.nl.ca/works/ddr\\_model\\_index.pdf](http://www.tw.gov.nl.ca/works/ddr_model_index.pdf)
3. Review comments made by TW team and client partners will be assembled and consolidated by the Design Manager and forwarded to the Consultant, for incorporation into the facility Concept Design report.
4. The Design Manager will arrange design review meetings or other communications as may be required to conclude this stage of the design process.
5. The Design Manager will confirm that the project is within the approved budget prior to proceeding with the design development stage.
6. At each submission, inter-disciplinary review by the Consultant team must be evident. This indicates to TW that there is constant communication between the design team members, and will avoid major coordination issues at the final stages of design.

## 5.2.2 PRIME CONSULTANT

1. The Consultant shall:
  - a. Identify information required from TW, client and other design disciplines before setting a design schedule
  - b. Review the building performance criteria with the client
  - c. Review applicable codes, regulations, restrictions, insurance requirements, and other factors affecting the design and review with authority having jurisdiction, as necessary. Identify codes and standards to which the design will follow.
  - d. Meet with the Project Team to compile information concerning
  - e. Determine mechanical and electrical requirements other than specified standards
  - f. Equipment and furnishings, including built-ins, for each space and the associated services required by the equipment and Owner supplied items
  - g. Review the Department's project budget
  - h. Prepare a project cost plan including TW's project services costs
  - i. Develop a schedule for the preparation, and client and regulatory approvals of the project design
2. Advise the Design Manager of:
  - a. additional professional service activities to be included beyond basic services
  - b. delegation and authority respecting project design and quality assurance

## 5.2.3 SITE SURVEYS

### 5.2.3.1 General

1. Carry out existing conditions survey for proposed construction of installations and structures, and provide drawings depicting existing conditions for design and construction purposes.
2. Preliminary layouts and concept planning under development by the Prime Consultant. Work shall be coordinated with other disciplines and sub-Consultants, in particular the Geotechnical Consultant.

3. The Consultant will be supplied with or can obtain access to all existing relevant drawings for areas to be surveyed; however, completeness and accuracy of this information are to be verified.
4. Before the Consultant enters the site, clearance shall be obtained from the Design Manager or Owner.
5. Obtain maps, record drawings or other available information which may show location of utilities, benchmarks, ground contours and other existing site facilities such as buildings, access roads, parking areas, drainage features, etc.
6. All data supplied to the Consultant is to be returned on completion of the project. A copy of all field notes, control data and all data obtained or compiled by the Consultant (level, and field data books, sketches) shall be turned over to the Design Manager.

#### 5.2.3.2 Guidelines

1. Information provided shall be verified, except that a GSC monument providing benchmark information and exact latitude and longitude will be accepted as valid, and needs no verification. Information shown shall be sufficiently detailed to permit any point on any survey line to be accurately located in the field.
2. Building sites will be mapped at a scale of not less than 1:500. Corridors for access roads and utilities outside property limits are to be mapped at a scale of 1:500. Mapping for corridors to be 60 m wide unless otherwise noted.
3. Place permanent monuments on the site as required, enabling the work to be sited and built as designed.
4. If aerial photography is utilized for mapping purposes, sufficient temporary monuments shall be placed and targeted to enable adequate horizontal and vertical control.
5. A minimum of two (2) benchmarks and two (2) monuments are to be established at the project site as indicated by the Design Manager.

#### 5.2.3.3 Accuracies

##### 5.2.3.3.1 *Vertical*

1. Benchmarks will be accurate to 5mm.



2. Building floor elevations and inverts, if any, will be accurate to within 25 mm. Spot elevation on roadways and similar surfaces will be accurate to 25 mm.
3. Contours on 1:500 mapping will be identified at 1m intervals, with intermediate contours of 0.5 m also indicated.

#### 5.2.3.3.2 *Horizontal*

1. Control traverses shall be such as to ensure a closure accuracy of 1 to 5000 or better. Plotting accuracy of identifiable features to be within 250 mm.

### 5.2.3.4 Survey Requirements

1. Determine surface elevations on 5.0 m grid patterns or by photogrammetry over the property and adjacent areas to tolerances compatible with usage of information for design and construction purposes. Grids may be smaller, as may be dictated by surface irregularities to give an accurate representation. Flag perimeter boundaries of the survey area.
2. Take surface elevations of lakes and water courses and observe on high-low level marks. Also measure depth of fresh water lakes and streams which impact the project site. Determine direction of flow for all watercourses.
3. Determine elevations and cross sections of existing drainage channels where such will be used for drainage of new work.
4. Take invert and top elevations as well as pipe sizes of existing culverts and drainage structures in areas affected by new work.
5. Take invert and top elevations of existing sanitary and stormwater manholes which may service the site. Obtain pipe size, and determine grade of sanitary/storm sewers.
6. Obtain information on water distribution mains, appurtenances, and fire hydrants available to service the site from field survey data and review of project record drawings.
7. Obtain information on and locate all overhead power utilities and underground power supply/distribution from field work and review of construction records.
8. Obtain road centerline, shoulder, and ditch elevations on existing public roads for a distance to be determined by the Design or Construction Manager on either side of proposed site access location(s).

9. Determine outline of rock outcrop and distinct terrain features. Outline wet or swampy areas. Record depths to firm bottom. Outline tree clusters as may be required by the Project Consultant for preservation during construction. Do not cut survey lines through tree cluster without prior authorization from the Design Manager.
10. Locate and indicate results of any test pits/borings.

### 5.2.3.5 Drawing Requirements

1. Show all pipe sizes in mm.
2. Identify the exact longitude and latitude of each control monument to the nearest second.
3. Show all existing buildings, utilities, services and topographical details to accurately illustrate existing conditions on the site.
4. Drawings will be related to known survey benchmark which will be described.
5. Show the location and elevation of all soil test borings. Show and number test pits or probe holes in accordance with that shown in soils report.
6. Place a North arrow in the upper right hand corner of the Site Plan. Draw the Site Plan so as to be viewed either in an East to West, or a South to North direction.
7. Provide stamped drawings with the seal of the respective professional engineer or licensed land surveyor supervising the survey work, and the permit to practice of the Consultant firm.

### 5.2.4 GEOTECHNICAL

1. During the conceptual planning of a project, a preliminary geotechnical investigation is to be carried out. The geotechnical sub-Consultant is to attend periodic meetings with the Design Manager and the Consultant team to obtain the instructions regarding project requirements. In the preliminary investigation stage, provide air photo interpretation, literature search, site reconnaissance, and preliminary investigation report.

#### 5.2.4.1 Air Photo Interpretation

1. Where air photographs are available, map the site and surrounding area terrain to indicate some or all of the following:
  - a. general drainage patterns
  - b. general slopes and ranges or gradient

- c. bedrock outcrops, where present
- d. general surficial soil types
- e. poorly drained or bog areas (peat or muskeg)
- f. erosion features
- g. old or potential slope failure areas

#### 5.2.4.2 Literature Search

1. Review the geology of the area from known data, either to supplement the air photo interpretation, or to replace it where air photos are not available.
2. Search all available physiographical data and previous site investigation data, along with any available well water records.

#### 5.2.4.3 Site Reconnaissance

1. Following air photo interpretation and/or literature search carry out a preliminary site reconnaissance to physically examine land forms, drainage, erosion features, etc. In addition, hand auger holes or rod soundings may be put down, or shallow test pits excavated to confirm the general surficial soil, bedrock and groundwater conditions.
2. Present the findings of the work in the preliminary investigation report. Present the data in a form that enables the client to assess the economic effect which the soil, bedrock and groundwater may have on the viability of the project.

#### 5.2.5 **STRUCTURAL**

1. Provide TW with the overall structural engineering design intent for the proposed facility.
2. Review applicable code, regulations, restrictions, insurance requirements, and other factors affecting the design and review with authority having jurisdiction, as necessary. Identify codes and standards to which the design will follow.
3. Establish the structural design criteria for the primary structural system based on the latest NBCC edition and TW.
4. Develop the structural scheme for the primary structural system detailing each significant component and material, and providing alternates where applicable.
5. Conduct field reviews and review existing drawings as appropriate.

6. In consultation with the site design Consultant, describe and oversee the program to be performed by the geotechnical Consultant as required.
7. The report shall include:
  - a. Brief description of the chosen structural system using sketches, including comparison of up to three (3) alternative structural systems.
  - b. Development of structural framing plan for architectural concept being examined, to establish the viability of the structural system.
  - c. Evaluation of loads including determination of type, magnitude, and possible combination of design loads including their locations, and directions of application on the main components of the structure. Design loads shall include dead, live, environmental, liquid/earth pressures, differential ground displacements, etc.
  - d. Identify the various load combinations.
  - e. Determination of quality, strength and specification of materials used in design.
  - f. Relevant design/construction parameters/constraints from the geotechnical report that are used in the design.
  - g. Method of design and analyses.
  - h. Method of transfer of lateral loads in both orthogonal directions to transfer loads from roof to foundations using sketches and narratives.
  - i. Detail of any computer software used in the analysis and design.
  - j. Description of provision to accommodate movements in the structural components due to thermal variations between different types of structures. Coordinate with architectural. Account for creep and moisture movements, foundations movements and dynamic movements.
  - k. Prescribed construction procedures and sequence of work, if this is critical to the functioning of the finished structure and integrity of the structure during construction.
8. Prepare a conceptual cost estimate for structural components/systems or assist in the completion of the project estimate.

### 5.2.6 ARCHITECTURAL

1. Review the spatial and functional program, and other information given by TW or the Client.
2. Study the characteristics of the site, record the data including information on existing structures, and carry out the following:
  - a. produce measured drawings (as-found) for structures that will be affected by the construction program
  - b. provide advice on cost factors or risks in proceeding with the site as selected at this stage
3. Provide advice on potential environmental concerns affecting the project. TW shall select an appropriate environmental Consultant to carry out environmental assessments, with emphasis on existing hazardous materials, and co-ordinate execution of the environmental review program with the consulting team
4. Prepare Concept Design documents to describe:
  - a. the general architectural design intent of the building
  - b. the massing, fenestration, and materials selected for the exterior
  - c. a description of the envelope system, illustrating the approach to meet energy performance requirements
  - d. the spatial plan and the functional relationships including:
    - i. major program areas and spatial plans showing the functional relationships inside these areas
    - ii. summary of deviations from the program areas, identifying the differences in net and gross building area
    - iii. complete system performance outline with environmental requirements, equipment, furnishings and special considerations
    - iv. provision of adequate space for layout and servicing of mechanical installations
    - v. enlarged concept layouts for circulation areas
    - vi. proposed materials for interior finishes
    - vii. a list of all regulatory authorities
5. Interior Design discussion including:
  - a. general presentation of the color scheme and furnishings

- b. brief description of the objective of the color scheme and how they can be achieved
  - c. a color board showing the general color scheme and the schemes of any special area are required
  - d. sample of draperies
  - e. catalogue cuts of special furnishings
6. Estimates of materials in the overall cost plan.

### 5.2.7 CIVIL

1. Provide TW with the overall civil design intent for the proposed facility.
2. Describe each of the civil components of the project such as:
  - a. site grading and layout
  - b. domestic water supply
  - c. sanitary sewers and existing capacity
  - d. storm sewer and existing capacity
  - e. traffic control
  - f. paving
  - g. landscaping
3. Review applicable codes, regulations, restrictions, insurance requirements, and other factors affecting the design and review with authority having jurisdiction, as necessary. Identify codes and standards to which the design will follow.
4. Where appropriate, provide comparative information to be used in the selection of various systems for the project.
5. Provide or co-operate in the completion of preliminary costs estimate for the civil work for the project.
6. Identify design criteria proposed for site utilities – storm water, sanitary sewer and water distribution
7. Identify parking and vehicular circulation requirements to accommodate facility users
8. Describe proposal for site development incorporating grading, surface runoff channeling and embankment erosion control

9. Describe features of existing vegetation and topsoil, and the preservation and reuse of these in the development of the site.
10. Outline proposals for soft landscaping – trees, shrubs, flowers and grassed areas.
11. Describe operational and maintenance aspects of site design and landscaping with particular attention to snow removal and storage, ease of maintenance of landscaped areas, and durability characteristics of proposed materials and products.
12. Identify environmental issues in connection with the construction and operation of the site.
13. Show planned parking areas, along with allotted parking spaces and roadways.
14. Show planned routing of site utilities, water, sanitary sewer and storm sewer.
15. Identify on site plans proposed measures for storm water management, which minimized the negative impacts upon the local hydrology.
16. Prepare concept site plans to depict existing conditions and proposed site design. Develop site sections necessary to illustrate extent of excavation, backfill and grading.
17. Identify location for site furnishing and structures.
18. Provide initial cost estimate of site work and services.

### 5.2.8 MECHANICAL

1. Provide TW with the overall mechanical engineering design intent for the proposed facility. Support with occupancy profiles, single line system schematics, overall heating and cooling loads, and total outdoor air and supply air flow figures for the facility.
2. Review applicable codes, regulations, restrictions, insurance requirements, and other factors affecting the design and review with authority having jurisdiction, as necessary. Identify codes and standards to which the design will follow.
3. Describe each of the proposed mechanical systems to be utilized in the facility including heating:
  - a. HVAC and controls
  - b. plumbing
  - c. fire protection
  - d. other required specialized mechanical systems
4. Describe viable alternative mechanical system concepts (for the preceding systems) being considered. Criteria to be considered are:

- a. energy conservation
  - b. efficiency
  - c. maintainability
  - d. reliable performance (local parts and service availability)
  - e. capital cost
5. Analyze the energy consumption of three alternative heating systems on a monthly and hourly basis for one year using total life cycle cost method.
  6. Describe function of each mechanical system as it would operate in the proposed facility and its effect on the gross size of the building.
  7. Identify the location of the service connections to the building for all mechanical services. Comment on the availability of these services and describe how these services will be provided.
  8. Identify recommended locations for mechanical rooms in the building and their approximate size (area and height).
  9. Provide an initial cost estimate for the mechanical systems.

### 5.2.9 ELECTRICAL

1. Provide TW with the overall electrical engineering design intent for the proposed facility.
2. Describe viable alternative electrical system concepts being considered. Criteria to be considered are:
  - a. energy conservation
  - b. efficiency
  - c. maintainability
  - d. reliable performance, (local parts and service availability)
  - e. capital cost
3. Identify codes and standards to which the design will follow.
4. Describe function of each electrical system as it would operate in the proposed facility and its effect on the gross size of the building. Include analysis of the client's functional requirements and describe how these systems meet those requirements.
5. Submit sketches illustrating the concept.



6. The location of the service connections to the building for all electrical services. Comment on the availability of these services and describe how these services will be provided.
7. Identify recommended locations for electrical and data rooms in the building and their approximate size (area and height).
8. Distribution single line diagram showing metering arrangement, transformers, and power supply feeders to distribution centers. Indicate the anticipated size of service entrance.
9. Lighting layouts and levels for typical spaces and a description of the proposed lighting strategy.
10. List of anticipated building systems and concept riser diagrams to be incorporated into the design documents. Coordinate systems requirements with the Prime Consultant for approval by the Design Manager.
11. Indicate proposed voltage level and number of phases for the power distribution system in the facility.
12. Indicate anticipated amperage of electrical service entrance.
13. Provide information to the mechanical Consultant and allow the mechanical Consultant to evaluate the best suited heating system for the building.
14. Provide an initial cost estimate for the electrical systems.

#### 5.2.10 LEED®

1. Provide TW with a preliminary LEED® scorecard identifying points to be targeted, points which will not be pursued and those points which need to be explored further.
2. Describe each of the proposed systems to be utilized in the facility.
3. Describe viable alternative electrical system concepts being considered. Criteria to be considered are: energy conservation, efficiency, maintainability, reliable performance, (local parts and service availability), and capital cost.
4. At this stage, a decision will be made by TW to continue or discontinue the efforts towards LEED® certification.
5. The Consultant shall provide updates to TW on a regular basis, which shall include at a minimum:
  - a. status of credits/points achieved
  - b. factors limiting the achievement of any points planned for the project

- c. issues with documentation submittal from all parties

### 5.2.11 COMMISSIONING

1. The Commissioning spec sections of the NL Master Specification Guide for Public Funded Buildings and the TW Commissioning Guidelines cover project aspects in detail. This section is an overview of the general process of Facility Commissioning.
2. The process of commissioning starts at the design phase and continues during construction phase. The following are commissioning activities carried out during the Concept Design stage of the project:
  - a. identification of Commissioning Authority
  - b. identify building systems to be commissioned
  - c. identify the documentation requirements
  - d. review and sign off on design concept for identified building systems
  - e. identification of responsibilities of all parties involved with commissioning
  - f. present design concept for identification of building systems

## 5.3 PHASE 2, STEP 2 – DESIGN DEVELOPMENT

### 5.3.1 GENERAL

1. The Design Manager will confirm that the project is within the approved budget prior to proceeding with the design development stage.
2. The design development process is crucial to the long term success of the project. It is this stage that final design solutions become thoroughly defined and documented for acceptance by the client in achieving program requirements, and by TW in relation to capital costs, long term maintenance and compliance with departmental design criteria.
3. The Design Manager is responsible for overall direction and co-ordination of the Consultant and ensuring client and departmental requirements are met prior to proceeding in earnest. Elements of the work which have been accepted may be released for the next stage of the design process, the contract document stage.
4. On minor capital and maintenance projects, Concept Design and Design Development often converge as a single activity, and culminate in the presentation of a brief technical design report. Design sketches are provided to clearly show the design intent. The report contents shall be analytical in its assessment of the problem, the options examined, and the reasons for the design solution selected.
5. The Design Development documentation shall be assembled in such a way to facilitate its updating and expansion to incorporate:
  - a. the requirements of the project detailed design
  - b. the systems description and operating principles required in the preparation of system operation manuals and commissioning manuals
  - c. LEED® requirements or recommendations in order to achieve the certification level required for the project. Note, projects will require LEED® Silver unless otherwise notified.
  - d. LEED® score card shall be included in submittals
  - e. Format of the document shall be in conformance with the table of contents as outlined in [http://www.tw.gov.nl.ca/works/ddr\\_model\\_index.pdf](http://www.tw.gov.nl.ca/works/ddr_model_index.pdf)

- f. During this stage of the design process, the Consultant is required to submit a tabular deliverables list (including specifications and drawings), indicating percentage complete. This schedule is to accompany all progress payment requests.
6. A final Design Report is to be prepared by the Consultant at the conclusion of this stage.
7. The Final Design Report may be considered as an extension of the Concept Design Report, and reuse of sections of the Concept Report is encouraged. However, revisions and updating is anticipated to reflect the final design solutions selected for the project.
8. In addition, the submission shall incorporate:
  - a. a full listing of anticipated drawings
  - b. a listing of applicable discipline technical specifications and new spec sections to be developed specifically for the project
  - c. a listing of furnishings, furniture and client dedicated equipment to be procured under the capital cost of the project
  - d. separate binders providing product/equipment literature for client and departmental acceptance, organized and referenced by NMS divisional and sectional specification sections
  - e. LEED® Scorecard revision and comments with respect to achievement of credits
9. Review comments by the Project Team partners will be assembled and consolidated by the Design Manager. The Divisional Director will resolve any conflicts on technical matters. The Consultant shall revise and resubmit the Final Design Report as required to obtain the final approval of the Project Team.
10. The Design Manager will arrange design review meetings or other communications as may be required to conclude this stage of the design process.
11. On major projects, a final perspective should be prepared on the project. At this stage only a sketch perspective is normally provided.
12. At each submission, inter-disciplinary review by the Consultant team must be evident. This indicates to TW that there is constant communication between the design team members, and will avoid major coordination issues at the final stages of design.

### 5.3.2 GEOTECHNICAL

1. Upon completion of the preliminary investigation, the geo-technical sub-Consultant is to meet with the Design Manager and the Consultant team to review other relevant planning Concept Design information. The detailed geotechnical investigation shall include work as described in the following sections.

#### 5.3.2.1 Field Exploration

1. The pattern of borehole drilling and/or test pit excavation should be agreed between the geotechnical Consultant and the Consultant's design engineers. The nature of the project to be designed and the known subsurface conditions of the area usually dictate the location, spacing and depth of the test holes.
2. The drilling of boreholes is to be carried out by an experienced drill crew using the type of equipment best suited for the terrain and anticipated soil conditions. Boreholes may be advanced by wash boring, with or without driven casing, solid stem augers or hollow stem augers. Test pits may be hand or mechanically excavated.

#### 5.3.2.2 Field Sampling

1. Carry out exploration and field sampling work in accordance with recognized practice, such as recommended in the latest edition of the Canadian Foundation Engineering Manual, and by ASTM.
2. The frequency and type of sampling may be varied by the requirements of the project, but should be under the control of the geotechnical Consultant. Normally, standard sampling is carried out at 0.75 m intervals initially, with a spacing often increased to 1.5 m intervals below the 4.5 m or 6.0 m depth if conditions warrant such increase. Types of samples normally used include split spoons and thin wall Shelby tubes. Other types of samplers which may be required in certain types of soil are piston and Oesterberg samplers and foil samplers.
3. In test pit excavations, representative bulk samples may be recovered from the different stratigraphy units as necessary.

### 5.3.2.3 Field Testing

1. Carry out field testing in accordance with recognized practice such as recommended in the latest edition of the Canadian Foundation Engineering Manual, and by ASTM or in accordance with special instructions set out by the equipment manufacturers. Types of tests normally include in-situ vane, standard penetration, dynamic cone penetration, pressure meter and pumping tests. Other tests depending on soil conditions may include static cone penetrometer, flat dilatometer, plate load tests, etc.

### 5.3.2.4 Groundwater Records

1. Fluctuations in the elevation of the groundwater occur over a period of time. The existing groundwater level shall be monitored by piezometers or other methods as a routine part of any investigation. The installation of such equipment shall be in accordance with recognized standards. Such installations usually require additional visits to the site to make field observations until conditions have reached equilibrium.
2. Record all observations of the encountering of seepage water or initial water percolation into test pits. Record the rate of inflow and rise of water levels at the time of the initial observations in order to assess correctly the apparent influence which the water condition may have on the design project as well as on construction procedures.

### 5.3.2.5 Laboratory Testing of Samples

1. Test representative samples from the detailed site investigation in the laboratory for the determination of soil properties essential to the preparation of the geotechnical report. Determine natural moisture content of samples at the time of the investigation. Base the report and recommendations on the laboratory results obtained.

### 5.3.2.6 Classification Tests

1. Classification testing of samples is frequently carried out to identify soil type. Such classification tests include grain size analysis, Atterberg limits, moisture content determinations and is to be carried out in accordance with recognized practice such as recommended by ASTM.

### 5.3.2.7 Strength Tests

1. Strength and consolidation tests should be carried out on undisturbed samples if conditions warrant such testing. Such tests may be carried out in a variety of ways, depending upon the parameters required and the soil type being examined, but all such tests are to be carried out in accordance with recognized practice, such as recommended in relevant CSA Standards, the National Building Code of Canada, and by ASTM.

### 5.3.2.8 Geotechnical Report

1. The Geotechnical Report shall outline the terms of reference of the investigation, summarize the findings of the field investigation and the supplementary laboratory testing, and then present the conclusions and recommendations based on these findings.

#### 5.3.2.8.1 *Factual Data*

1. The factual data comprises the terms of reference, the details of the field investigation procedures, the results of the field investigation, the results of the field testing, records of groundwater observations, laboratory test results, site plan and inferred soil stratigraphy, etc.

#### 5.3.2.8.2 *Report Recommendations*

1. Recommendations may cover a variety of activities, such as alternative founding depths/elevations with recommended design bearing values, pile design considerations, estimates of potential settlements, recommended safe slopes of banks or excavation walls, earth pressures for shoring design, dewatering requirements, soil stabilization, etc.
2. Make the recommendations with due consideration to the construction proposed by the user, in order to provide the most economic viable alternatives available for consideration.
3. The report is a necessary tool for the, designer and for those Contractors who specialize in dewatering, excavation and foundations. Incorporate the part of the report containing factual information in the contract documents.

### 5.3.3 STRUCTURAL

1. Describe the structural design program with respect to comments provided as a result of TW and the Client's review of the Concept report.
2. Identify desired standards of quality and the effect of such standards on serviceability requirements such as:
  - a. Deflection of slabs and beams and the effect of deflection on non-structural items such as curtain walls and glazing
  - b. Control or advise of potential vibration induced by footfall or machinery
  - c. Lateral drift of the structure
  - d. Crack control in concrete and masonry structure elements
  - e. Foundation settlement
  - f. Soil-structure interaction
  - g. Seismic deformation and movements
3. Prepare the preliminary structural analysis and design calculations.
4. Prepare preliminary foundation drawings based on recommendations from the geotechnical Consultant.
5. Prepare preliminary framing design showing layout of typical areas.
6. Coordinate structural design with deflection and lateral movement criteria to meet the requirement of the other design disciplines.
7. Provide product catalogue cuts of specialized materials appended to the design development submission.
8. Identify coating systems for structural elements with particular emphasis on corrosion protection where necessary.
9. Provide an elemental cost plan for the work appropriate for the level of information known at each submission stage.
10. Provide specification index.
11. Provide drawing deliverable list.

### 5.3.4 ARCHITECTURAL

1. Finalize review of codes and standards applicable to the project, with regulatory authorities.
2. Prepare drawings and other documents from the approved Concept Design showing:



- a. fire separations and fire compartments and ratings
  - b. occupant load and exit path (route) calculations
  - c. architectural, mechanical, electrical and structural systems
  - d. environmental and energy performance criteria
  - e. rendering of the exterior of the project showing the materials and the colors selected
3. Provide a design building area analysis comparing the designed area to the programmed area.
  4. Provide furniture layouts for typical interior spaces.
  5. Provide an ergonomic review of casework and mill work.
  6. Provide drawings to show:
    - a. building floor to floor heights, identifying mechanical and other horizontal service space requirements
    - b. exterior wall performance criteria, and components including typical details of major interfaces such as: wall/roof, wall/foundation, wall/intermediate floors, wall/window
    - c. roof assembly, drainage provisions and waterproofing roof penetrations
  7. Provide color schemes for discussion with the client, including colors for special finishes.
  8. Update description of color scheme, provide updated color board
  9. Identify if any color selected for a particular element of the project will affect the delivery date and project schedule
  10. Provide information on areas that require special treatments
  11. Catalogue cuts for furnishings, samples of draperies and other finishes
  12. Provide an elemental cost plan for the work appropriate for the level of information known at each submission stage.
  13. Provide specification index.
  14. Provide drawing deliverable list.

### 5.3.5 CIVIL

1. Provide detail on the selected systems to allow the start of the final design and construction documents.

2. Review the reports from specialty Consultants and tests completed such as geotechnical, fire protection, flow rates, storm and sanitary capacity, etc.
3. Provide preliminary design drawings.
4. Provide product catalogue cuts of proposed materials, equipment and furnishings, appended to the Concept Design development submission.
5. Provide further developed site plans, site section and typical details of appurtenances and structures to fully explain final design for site grading, services and planting including:
  - a. Location, orientation and finish floor elevation of the building, access from interior to exterior space and impacts on existing environment
  - b. Water piping network with fire hydrant location and maximum fire flow rates
  - c. Sanitary sewer network with pipe sizes and slopes, calculated pipe capacity and design peak flow, location of manholes
  - d. Storm sewer network with pipe sized and slopes, calculate pipe capacity, design storm flows, location of manholes, catch basins inlet and outlet structures
  - e. Routing and geometry of open drainage courses
  - f. Proposed finished and existing site grades, geometry of cut and fill embankments, limits of landscaping
  - g. Layout and proposed grades or roadways and parking areas, number of parking stalls, locations for snow storage, walkways and curbs, pedestrian and vehicle access points to the building
  - h. Areas designated for trees, shrubs, planters, and site furniture
  - i. Location of vehicle and pedestrian signage, fencing and flag posts
6. Provide an elemental cost plan for the work appropriate for the level of information known at each submission stage.
7. Provide specification index.
8. Provide drawing deliverable list.

### 5.3.6 MECHANICAL

1. Update design synopsis describing the mechanical work with respect to the comments and discussion from the Concept Design Submission.

2. Update information on description of operation of mechanical systems, including flow diagrams, and system schematics.
3. Submit Design Development drawings showing:
  - a. mechanical service connections indicating sizes and inverts
  - b. location of major mechanical equipment
  - c. ventilation distribution with preliminary sizing
  - d. cooling and heating systems
  - e. controls schematics and sequence of operations for all systems
  - f. fire protection system, showing major components
  - g. plumbing layout, showing routing and sizing of major lines and location of pumping and other equipment as required
4. Provide catalogue cuts of proposed equipment.
5. Provide an elemental cost plan for the work appropriate for the level of information known at each submission stage.
6. Provide specification index.
7. Provide drawing deliverable list.

### 5.3.7 ELECTRICAL

1. Update design synopsis describing the electrical work with respect to the comments and discussion from the Concept Design Submission.
2. Update information on description of operation of electrical systems, and system schematics.
3. Submit Design Development drawings showing:
  - a. legends and lighting/heating fixture schedules with manufactures catalogue numbers, lamps and remarks
  - b. service equipment, and connections indicating sizes
  - c. location of major electrical equipment
  - d. distribution with preliminary sizing
  - e. control equipment
  - f. conduit and conductor layouts and sizes
  - g. MCC & PF controls

- h. grounding
  - i. proposed special loads
  - j. lighting layouts, include list of maintained lighting levels to be designed for throughout all spaces
  - k. indicate size of service entrance complete with connected and demand loads indicated on a single line riser diagram
  - l. drawings of typical lighting, power, heating and communication layouts and riser diagrams
4. Drawings of exterior electrical services showing:
- a. supply locations and size
  - b. sub-station size and locations
  - c. service routing
  - d. street and area lighting layouts
  - e. building and entrance locations
  - f. cable types, sizes and electrical ratings
  - g. characteristics of all electrical equipment and devices
  - h. fire alarm system, showing major components
5. All proposed L.V systems including:
- a. telephone
  - b. CCTV
  - c. clock and program
  - d. data
  - e. public address
  - f. fire alarm
  - g. security
  - h. nurse call
6. Provide catalogue cuts of proposed equipment.
7. Provide an elemental cost plan for the work appropriate for the level of information known at each submission stage.
8. Provide drawing deliverable list.
9. Provide specification list.

### 5.3.8 LEED®

1. Provide TW with an updated LEED® scorecard identifying points to be targeted, points which will not be pursued and those points which need to be explored further.
2. Describe in detail, each of the proposed systems to be utilized in the facility.
3. Any points which are not attainable at this stage, and were intended to be sought shall be accompanied with an explanation why the intent will not be met.
4. Update plan for document control and list of deliverables required from each discipline Consultant and Contractor in order to achieve the credits planned for.
5. At this stage a decision will be made within TW to continue or discontinue the efforts towards LEED® certification.

### 5.3.9 COMMISSIONING

1. Incorporate into the Final Design Report, a complete description of the design and system operation.
2. Include documentation on:
  - a. building occupancy
  - b. required physical areas for systems(s) and equipment
  - c. air quality requirements
  - d. energy performance
3. Preliminary Commissioning Manual shall be prepared by the Commissioning Authority at this time and shall be reviewed by the Consultant for comments.
4. Identify specific requirements and contractual responsibilities of:
  - a. The Consultant
  - b. The Contractor
  - c. Transportation and Works
  - d. The Client department
5. The Consultant shall identify building systems to be commissioned and submit updated systems descriptions to the Commissioning Authority for incorporation into the Commissioning Documents which will be “Issued for Tender” with all other tender documents.

## 5.4 PHASE 2, STEP 3 - DETAILED DESIGN

### 5.4.1 GENERAL

1. Submissions of working drawings and specifications shall be made at the 33%, 66% and 99% (Pre-Tender) stages of detailed design development. Various levels of review will be performed by TW at each stage. Comments will be returned to the Consultant for incorporation into the design.
2. For LEED® projects each submission shall include an updated LEED® scorecard accompanied by a justification of changes from the previous submittal.

3. At each submission, inter-disciplinary review by the Consultant team must be evident. This indicates to TW that there is constant communication between the design team members, and will avoid major coordination issues at the final stages of design.
4. Provide a pre-tender cost estimate for the work (all disciplines).
5. 99% design submission should represent complete working documents, all design is complete, interdisciplinary reviews completed, coordination of all systems, interference checks completed.

#### 5.4.2 STRUCTURAL

1. Structural notes on drawings to indicate:
  - a. Design criteria indicating all superimposed vertical and horizontal loads used in the design including live, snow, earthquake, wind, and dead loads, not shown on the structural drawings. These loads should be designed as unfactored.
  - b. Reference to the geotechnical report on which the foundation design is based
  - c. Brief material specification of structural elements
  - d. Absolute or relative deflection criteria for structural members
  - e. Where forces are shown, the forces should be clearly identified as factored or un-factored.
  - f. Design standards
  - g. Reference to drawings and specifications prepared by other disciplines
2. Foundation Plans:
  - a. Allowable soil bearing capacity, pile capacities and lateral earth pressures for retaining structure
  - b. Size, location, dimension and details of all foundations
  - c. Assumed bearing strata or elevations
  - d. Estimated pile lengths, or source for this information
  - e. Location of known existing underground services and or structures
  - f. If underpinning or temporary shoring is specified to be designed by others, indication on the drawings of the areas designated to be shored or

underpinned. If underpinning is designed by the structural Consultant, indication of all details and construction sequences.

3. Prepare floor and roof framing plans and details which show:
  - a. General gridline dimension and overall building dimensions
  - b. Sizes, location, dimension and details of structural elements
  - c. Elevations, including slopes and depressions
  - d. Lateral load resisting system
  - e. Wind uplift system
  - f. Governing forces, moments, shears or torsion required for the preparation of shop drawings and detail drawings
  - g. Reinforcing bar sizes and details with fabrication and placing criteria
  - h. Location and detail of control, construction, contraction and expansion joints
  - i. Locations, sizes and details of all openings requiring reinforcement
  - j. Provision for future extensions
  - k. Location and magnitude of any additional superimposed loads, which are not part of the normal dead and/or live load
4. Prepare schedule and details for columns, beams and walls, indicating:
  - a. Element size
  - b. Elevation of bottom of columns
  - c. Reinforcing steel and splice details for concrete columns
  - d. Details of structural masonry or reinforced concrete walls including lintels and reinforcing or significant openings
  - e. Stiffeners, lateral bracing and local reinforcement
  - f. Type and location of splices for structural steel columns
  - g. Show on structural drawings the location, sizes, reinforcing and connections of the structural elements in sufficient scale and detail to enable fabrication, installation and connection of the members in a reasonable sequence.
5. Connections:
  - a. Design all connections or specify which connections are to be designed by others
  - b. For structural steel projects wherein CSA W47.1 certified fabricators are specified, clearly state who is responsible to do connection design



- c. Where connections are specified to be designed by others, indicate on the contract drawings all required information and governing forces. In such cases, the designing Engineer shall seal, sign and date the fabrication and erection drawings
  - d. Show all dimensions and comprehensive connection details requiring no further engineering input
  - e. Show general arrangement and details at intersections of different structural materials
6. Sequence of construction, if this is critical to the functioning of the finished structure.

### 5.4.3 ARCHITECTURAL

1. Prepare contract drawings and specification from the approved Design Development Report showing:
  - a. floor plans
  - b. elevations
  - c. cross sections
  - d. wall construction details
  - e. window details
  - f. roofing details
  - g. component details
  - h. case work and mill work details
  - i. fire separations and fire compartments and ratings
  - j. occupant load and exit path (route) calculations / way finding
  - k. accessibility requirements
  - l. rendering of the exterior of the project showing the materials and the colors selected
  - m. Reflected ceiling plans
  - n. building floor to floor heights, identifying mechanical and other horizontal service space requirements

- o. exterior wall performance criteria, and components including typical details of major interfaces such as: wall/roof, wall/foundation, wall/intermediate floors, wall/window
  - p. roof assembly, drainage provisions and waterproofing roof penetrations
- 2. Provide color schemes
- 3. Provide information on areas that require special treatments
- 4. Catalogue cuts for furnishings, samples of draperies and other finishes

#### 5.4.4 CIVIL

- 1. Provide product catalogue cuts of proposed materials, equipment and furnishings.
- 2. Provide site plans, site section and typical details of appurtenances and structures to fully explain final design for site grading, services and planting including:
  - a. Location, orientation and finish floor elevation of the building, access from interior to exterior space and impacts on existing environment
  - b. Water piping network with fire hydrant location and maximum fire flow rates
  - c. Sanitary sewer network with pipe sizes and slopes, calculated pipe capacity and design peak flow, location of manholes
  - d. Storm sewer network with pipe sized and slopes, calculate pipe capacity, design storm flows, location of manholes, catch basins inlet and outlet structures
  - e. Routing and geometry of open drainage courses
  - f. Proposed finished and existing site grades, geometry of cut and fill embankments, limits of landscaping
  - g. Layout and proposed grades or roadways and parking areas, number of parking stalls, locations for snow storage, walkways and curbs, pedestrian and vehicle access points to the building
  - h. Areas designated for trees, shrubs, planters, and site furniture
  - i. Location of vehicle and pedestrian signage, fencing and flag posts

### 5.4.5 MECHANICAL

1. Prepare contract drawings. In the case of buildings, these drawings should be made, where possible, to the same scale as that of the building layout drawings and should define the work.
2. Where scale of drawings or complexity of work make drawing difficult to be read and interpreted, separate drawings should be provided for such areas of the work as:
  - a. plumbing drainage
  - b. heating, ventilating and air conditioning
  - c. fire protection
  - d. process piping and equipment
  - e. other special systems as necessary
3. Provide schematics and diagrams as required for all major systems with notes to describe the function of control, flow and operation
4. Include plot plans and/or site plans showing water supply, gas supply, sanitary and drainage arrangements and connections to public utility services as required, complete with invert elevations
5. Include symbol lists and typical details should be included, where required, for all equipment, accessories, piping and duct systems
6. Provide floor plan layouts for all piping and duct systems. Show complete duct and pipe sizing on these documents. Show sizes, types, locations and capacities of all supply and exhaust air terminals together with type and location of valves.
7. To avoid conflicts, provide supplementary details for boiler, equipment and fan rooms and congested areas.
8. Piping and duct work can be shown in single line, except where necessary to show arrangements and clearance for piping or duct work in ceiling spaces, shafts, header trenches, pipe chases and for tight or close-coupled equipment. Show piping and duct work in double-line detail with appropriate valves, fittings and accessories
9. Include schedules to provide capacities and details of performance of fans, air-handling units, pumps, etc.
10. All drawings as well as details, elevations and sections are to be properly cross-referenced.

### 5.4.6 ELECTRICAL

1. Plot plan showing incoming power and communication services
2. Floor plans showing:
  - a. detailed system layout of all electrical systems, showing sizes, locations, and quantities
  - b. Room identification
  - c. Legend of all symbols
  - d. Circuit number at outlet and motors
  - e. All conduit and wire sizes
  - f. For each panel, a panel schedule with loadings
  - g. all equipment locations
  - h. relevant details and sections
  - i. schedules
  - j. detailed control schematics including sequence of operation
3. Single line diagrams of the power circuits with their metering and protection including:
  - a. Complete rating of equipment
  - b. STs and PTs
  - c. Maximum short circuit levels on which design is based
  - d. Identification and size of services
  - e. Connected load and estimated maximum demand on each load center
4. Provide riser diagrams for power, communications (data, telephone), fire alarm and other systems. Riser diagrams are to be complete showing all devices, locations by room number, conduit risers and sizes, wire type and size.
5. Provide motor control diagrams for each system.
6. Provide equipment schedule for motor and controls.
7. Provide electrical heating layout and schedule.
8. Provide control drawing details of electric heating.
9. Provide complete lighting layout and fixture schedule clearly indicating circuiting, switching, fixture types and mounting methods.
10. Submit a computer analysis of the lighting for typical spaces showing point-by-point lighting level values.

11. Provide the following design data:
  - a. Total connected load
  - b. Maximum demand and diversity factors
  - c. Sizing of standby power load if applicable
12. Short-circuit requirements and calculations showing the required ratings of equipment used. Verify that breakers and fuses are correct types and ratings to handle anticipated fault currents and will facilitate protective co-ordination of the whole system. This item will be considered a requirement for the electrical distribution equipment supplier and would normally be stated in the contract specification.
13. Provide edited Master Specification with track changes on at pre-tender submission. Make changes required by TW and accept changes for tender documents.
14. Provide detailed equipment list with the following information:
  - a. identification number
  - b. location
  - c. type, proposed manufacturer, make, model
  - d. operating parameter (max, normal, min)
  - e. electrical requirements
  - f. control comments
  - g. other pertinent information

#### 5.4.7 LEED®

1. Provide TW with an updated LEED® scorecard identifying points to be targeted, points which will not be pursued and those points which need to be explored further. The score card will be issued with the Tender Package and will form part of the contract.
2. Describe in detail, each of the proposed systems to be utilized in the facility.
3. Any points which are not attainable at this stage, and were intended to be sought shall be accompanied with an explanation why the intent will not be met.
4. Update plan for document control and list of deliverables required from each discipline Consultant and Contractor in order to achieve the credits planned for.
5. At this stage a decision will be made within TW to continue or discontinue the efforts towards LEED® certification.

#### 5.4.8 COMMISSIONING

1. The Consultant shall identify building systems to be commissioned and submit updated systems descriptions to the Commissioning Authority for incorporation into the Commissioning Documents.
2. The commissioning specifications as posted on TW's website shall be included in the tender specification, the intent is that these specifications should not be modified, however the Consultant should review and discuss with the CxA any requirements specific to a project.

## 5.5 PHASE 2, STEP 4 - CONTRACT DOCUMENTS

### 5.5.1 GENERAL

1. During this stage of the design process, the Consultant is required to submit a tabular drawing and specification list, indicating percentage complete achieved to date with respect to each working drawing. This schedule is to accompany any progress payment request.
2. Commonly accepted progress submissions occur at 33%, 66%, and 99% completion.
3. On minor capital and maintenance projects, it is common to have only a single submission of the contract documents for review purposes at completion and prior to tendering. Review input by the inspection group is standard practice for all regional projects.
4. Working drawings are to be prepared and in accordance with this manual.
5. Technical specifications are to be prepared using the latest editions of the “NL Master Specification Guide for Public Funded Buildings” where applicable. If a required section does not exist, the Consultant is responsible for creating that section in a format consistent with the Department of Transportation & Works specifications. Request specification number from TW.
6. The submissions are subject to review by the TW Project Team and Regional Inspection group. The Design Manager shall ensure the necessary approvals are in place prior to calling tenders, and the tender documents accurately reflect the revisions and changes arising from the review/approval process.
7. The Consultant is responsible for design quality assurance to ensure accurate, coordinated and complete contract documents are prepared for construction purposes. TW requires a formalized interference design check, and a constructability review performed by Consultant’s staff who:
  - a. was not directly involved in design preparation
  - b. have at least ten (10) years design experience
  - c. have similar experience in administering and managing construction change orders
8. Under certain authorized project delivery schedules, there is no alternative but to conduct the design checks and constructability review during the tendering period. The Design

Manager, in consultation with the Construction Manager, will direct the Consultant on how the conflict between the project schedule and quality control will be addressed. Addenda are not an avenue for completion of design tasks. The use of addenda to complete the design process will be reflected poorly in the Consultant review process.

9. Contract drawings and specifications will be provided by the Consultant for calling tenders in accordance with this manual.
10. Where requested by the Design Manager, the Consultant will arrange for the preparation and submittal of a final, colored rendering of the project.
11. The contract documents are to fully address commissioning requirements appropriate for the project and departmental requirements. Edit the NL Master Specification Guide for Public Funded Buildings on Commissioning to suit the project.
12. The contract documents are to fully address LEED® requirements appropriate for the project and TW requirements.
13. Pretender estimates are to be prepared and submitted with the 99% progress submission. The Consultant is responsible for monitoring construction costs during the preparation of contract documents and advising the Design Manager of any significant deviation as a result of client or TW requested design changes. The Design Manager is to ensure that the probable cost increases do not exceed the design contingency allowance provided for in the cost plan.
14. The Design Manager may require that design calculations be submitted by the Consultant for review by departmental professional staff. The Consultant shall be responsible that design calculations are maintained and presentable in a clear and organized manner.
15. The Design Manager shall ensure that the Final Design Report, accepted subsequent to the design development stage, be updated by the Consultant to reflect material changes and revisions in the facility systems design, which occurred during the production of contract documents.

### 5.5.2 STANDARD FRONT END DOCUMENTS

1. Standard front end documents consist of the Instructions to Bidders, Supplementary Instructions to Bidders, General Conditions, Supplementary General Conditions, Certificate



of Insurance, the Tender Form and the Agreement Between Owner and Contractor Form. These documents are available from TW's internet site.

2. Modifications to the standard front end documents are not permitted for legislative reasons, without the prior approval of the Deputy Minister. Project specific requirements are to be accommodated in the Technical Specifications.

### 5.5.3 SPECIFICATION OF EQUIPMENT & PRODUCTS

1. Through the application of generic product specifications the use of local manufactured products of equivalent quality is to be promoted.
2. Material and equipment shall be specified by:
  - a. reference to a relevant Standard
  - b. by reference to an accepted product evaluation publication
  - c. by prescriptive or performance criteria
3. Trade names may be used if the foregoing methods cannot be reasonably or fully applied. In case of named products, where possible specify at least three "Acceptable Products" or include "or approved equal".

### 5.5.4 SCHEDULING OF CONSTRUCTION WORK

1. Projects involving renovations while remaining occupied or multi phased projects require a project implementation strategy. This strategy shall be clearly presented in the technical specifications to guide the Contractor in planning and scheduling his work methods. Key milestone dates shall also be identified. Typical issues which shall be addressed are:
  - a. normal business hours for work and exceptions such as noise or dust producing work
  - b. payment for extended security costs
  - c. responsibility and sequencing for furniture moving and relocation
  - d. maintenance of fully functional entrances and exits at all times
  - e. specific client requirements to ensure continuity of operations
2. The time period permitted for completion of construction must be stipulated directly on the Tender Form or the Tender/Contract Form.

3. A reasonable substantial completion date shall be stipulated in the tender documents with a clause outlining any late completion assessments. The Design Manager will check that the completion date submitted with the Contractor's tender is within the stipulated completion time prior to recommending award.

#### 5.5.5 LIQUIDATED DAMAGES

1. The standard clause for liquidated damages forms part of the Supplementary General Conditions.
2. Liquidated damages are intended to cover reasonable costs estimated to be incurred by the Owner due to late completion by the Contractor. This would normally include such items as additional leasing costs, consulting fees and expenses, salary and traveling costs of the Construction Manager, and Inspectors, resident project staff, etc.
3. In addition to late completion, the Department has incurred extra expense arising from untimely requests for inspection by the Contractor. If the Contractor requests for inspection or special testing, and the work is not ready upon arrival of the Inspection Team, then the Contractor is to be held responsible for the cost of future inspections for the same purpose.

#### 5.5.6 SEPARATE CONTRACTS

1. TW promotes separate contract packages for certain facility installations based on life cycle principles. Standardized contract documents are currently available for:
  - a. passenger elevators
  - b. controls
  - c. intrusion alarm systems
  - d. medical gas inspector
2. The Design Manager shall co-ordinate Division 1 - General Requirements regarding the Contractor's responsibilities in dealing with other Contractors engaged by TW.
3. Life cycle contracts require the initial capital cost and the maintenance service cost to be identified. It is common practice to assign the capital portion of the separate contract to the General Contractor, while TW enters into a direct contract with the successful sub-Contractor for the maintenance service portion.

### 5.5.7 FURNISHINGS & SPECIAL EQUIPMENT

1. For major projects, furnishings and special equipment are normally included in the project budget. The Design Manager, in consultation with the client, shall decide if such furnishings and equipment shall be included in the construction contract, a separate contract, or supplied by other means.

### 5.5.8 PROJECT RECORDS SYSTEM

1. On major projects it is important that a standardized project records system be set up and maintained at the location of the Design Manager, the Construction Manager, and the Field Office on the construction site.
2. With rapid advancement in technology and communications, and computer equipped field offices, a fully interactive high speed communications, project document control, and records system is possible.
3. An electronic document management system has been set up and is in use by the Design & Construction Division for the management, storage and retrieval of divisional and project communications. This system is available for implementation on a project specific basis or regional office operations.

### 5.5.9 CASH ALLOWANCES

1. When Cash Allowances are required, they are to be identified in the Tender Price Table – Appendix-C of the Tender Form and shall be clearly identified in section 01 21 00 – Allowances of the specifications.
2. Cash allowances are specified net amounts, with the overhead and profit of the General Contractor to be included in the base tender price.
3. Cash allowances may be used, at the discretion of the Design Manager, to cover specific materials, work or services that cannot reasonably be quantified in the tender documents.
4. Payment against cash allowance shall normally be supported by the Contractor's time sheets, supplier's invoices, or other documentation, and would not provide for any overhead or profit.
5. Cash allowances shall be kept to a minimum, and applied to specified items of work such as testing and inspection, door hardware.

6. Cash allowances shall not be used for contingency provisions or unspecified uses such as unforeseen site conditions.
7. Contingency allowances shall be budgeted and allocated in the project budget, and not the construction tender.
8. When work related to the cash allowance is completed, the Construction Manager shall adjust the contract amount with a change order equal to the difference between the cash allowance and the final cost of the specified materials, work or services.

#### 5.5.10 SEPARATE PRICES

1. Separate Prices are included in the total value of tender. They identify the premiums for optional quality of materials, systems, etc.
2. Tender to be awarded for full bid price and change orders issued during the construction period for separate price items.
3. Separate prices shall be used cautiously.
4. Separate prices for credits to delete items should be avoided.

#### 5.5.11 UNIT PRICES

1. Unit Prices are used when there are elements of work that have unknown quantities and therefore cannot be priced with a lump sum contract. Examples include excavation, rock removal and disposal of contaminated soil.
2. Estimates of quantities and unit shall be listed in Appendix C of the Tender Form in the Unit Price section. Bidders are expected to fill in their unit prices in that table. The value of unit price work is included in the total tender amount.

#### 5.5.12 TENDER DOCUMENTS

1. The Design Manager shall submit final documents to the Tendering & Contracts Division.
2. Final documents shall be a single print ready Adobe (.pdf) document containing the cover page, index, front end, technical specifications and drawings.

### 5.5.13 ARCHITECTURAL

1. This submission comprises complete contract documents ready for tender call, with all corrections and comments from previous submissions incorporated. Provide contract drawings and specifications in accordance with this manual.
2. Incorporate product colors into the contract documents in accordance with the approved color scheme.
3. Provide finish schedule on drawings.
4. Provide finalized color boards.
5. List status of submissions to regulatory authorities, and include regulatory forms submitted for the project. Pay all application fees charged by the regulatory authority.
6. Provide a pretender estimate and updated cost plan for the work.
7. Provide edited Master Specification with track changes on at pre-tender submission. Make changes required by TW and resubmit with the accepted changes to be included in the tender documents.
8. Complete technical review of the architectural documents by the architect of record must be completed prior to the submission of document for review by TW. Indication of such will be by a wet ink initial on all documents submitted to TW.
9. Inter-disciplinary review by the architect of all other disciplines must be completed prior to the submission of document for review by TW. The goal is to eliminate coordination issues. Indication of such will be by a wet ink initial on all documents submitted to TW.
10. For LEED® projects the following shall be submitted with the tender package:
  - a. TO BE DEVELOPED

### 5.5.14 CIVIL

1. This submission comprises complete contract documents ready for tender call, with all corrections and comments from previous submissions included. Provide contract drawings and specifications in accordance with this manual.
2. Provide edited Master Specification with track changes on at pre-tender submission. Make changes required by TW and accept changes for tender documents.
3. Coordinate with Authorities Having Jurisdiction as required and provide copies of correspondence respecting regulatory approvals of the proposed work.

4. In conjunction with the Transportation & Works staff, establish testing and inspection requirements.
5. Provide a pretender estimate and updated cost plan for the work.
6. Provide specified product literature manual prior to tender call.
7. Complete technical review by the engineer of record must be completed prior to the submission of document for review by TW. Indication of such will be by a wet ink initial on all documents submitted to TW.
8. Inter-disciplinary review by the engineer of all other disciplines must be completed prior to the submission of document for review by TW. The goal is to eliminate coordination issues. Indication of such will be by a wet ink initial on all documents submitted to TW.
9. For LEED ® projects the following shall be submitted with the tender package:
  - a. TO BE DEVELOPED

#### 5.5.15 STRUCTURAL

1. This submission comprises complete contract documents ready for tender call, with all corrections and comments from previous submissions included. Provide contract drawings and specifications in accordance with this manual.
2. Tender documents shall be completed and include the following:
  - a. structural notes
  - b. typical details
  - c. foundation plans and schedules
  - d. floor and roofing plans and details
  - e. schedules and details for columns, beams and walls
  - f. connections
  - g. sequence of construction if critical to the function of the finished structure
3. Coordinate structural system compliance with fire assembly resistance ratings.
4. Provide product catalogue cuts of specialized materials appended to the design development submission.
5. Provide a pretender estimate and updated cost plan for the work.

6. Complete technical review by the engineer of record must be completed prior to the submission of document for review by TW. Indication of such will be by a wet ink initial on all documents submitted to TW.
7. Inter-disciplinary review by the engineer of all other disciplines must be completed prior to the submission of document for review by TW. The goal is to eliminate coordination issues. Indication of such will be by a wet ink initial on all documents submitted to TW.
8. For LEED ® projects the following shall be submitted with the tender package:
  - a. TO BE DEVELOPED

### 5.5.16 MECHANICAL

1. This submission comprises complete contract documents ready for tender call, with all corrections and comments from previous submissions included. Provide contract drawings and specifications in accordance with this manual.
2. Tender drawings shall be complete and include the following:
  - a. Floor plans showing detailed system layout of all mechanical systems, showing sizes, locations, and flow quantities
  - b. All equipment locations
  - c. Relevant details and sections
  - d. Schedules
  - e. Detailed control schematics including sequence of operation
  - f. Air handling equipment sections showing all components, fans, spacers, access doors, vibration isolation and mounting. Dimension each component section length, and the unit width, length and height.
3. Provide final cost estimate.
4. Provide edited Master Specification with track changes on at pre-tender submission. Make changes required by TW and accept changes for tender documents.
5. Provided detailed equipment list with the following information:
  - a. Identification number
  - b. Location
  - c. Type, proposed manufacturer, make, model
  - d. Operating parameter (max, normal, min)

- e. Electrical requirements
  - f. Control comments
  - g. Other pertinent information
6. Complete technical review by the engineer of record must be completed prior to the submission of document for review by TW. Indication of such will be by a wet ink initial on all documents submitted to TW.
7. Inter-disciplinary review by the engineer of all other disciplines must be completed prior to the submission of document for review by TW. The goal is to eliminate coordination issues. Indication of such will be by a wet ink initial on all documents submitted to TW.
8. For LEED® projects the following shall be submitted with the tender package:
  - a. CAD drawings indicating all zones used in the HVAC design. Both electronic and hard copy shall be submitted in accordance with this manual
  - b. Signed Model National Energy Code for Buildings or the ASHRAE mandatory requirement checklists
  - c. Calculations for workarounds and renewable energy credits performed outside of the energy modeling software. Calculations shall be detailed enough so that the reviewer can follow the thought process and assess applicability
  - d. Support for all utility rates used in the energy model
  - e. The energy simulation package
  - f. Narrative explaining modeling techniques so the reviewer can follow the logic used to generate the energy models
  - g. Base building electronic simulation file
  - h. Proposed building electronic simulation file

### 5.5.17 ELECTRICAL

1. This submission comprises complete contract documents ready for tender call, with all corrections and comments from previous submissions included. Provide contract drawings and specifications in accordance with this manual.
2. Tender drawings shall be a completion of the design development drawings and include all comments from TW and TW representatives.
3. Drawings showing:



- a. Detailed system layout of all electrical systems, showing sizes, locations, and quantities
  - b. All equipment locations
  - c. Relevant details and sections
  - d. Schedules
  - e. Detailed control schematics including sequence of operation
4. Provide final cost estimate.
  5. Provide edited Master Specification with track changes on at pre-tender submission. Make changes required by TW and accept changes for tender documents.
  6. Complete technical review by the engineer of record must be completed prior to the submission of document for review by TW. Indication of such will be by a wet ink initial on all documents submitted to TW.
  7. Inter-disciplinary review by the engineer of all other disciplines must be completed prior to the submission of document for review by TW. The goal is to eliminate coordination issues. Indication of such will be by a wet ink initial on all documents submitted to TW.
  8. For LEED ® projects the following shall be submitted with the tender package:
    - a. TO BE DEVELOPED

### 5.5.18 CONSTRUCTABILITY REVIEW

1. In an effort to reduce the incidence of change orders due to errors or omissions exceeding stated benchmarks, the following is a guide for a constructability review to be completed by the Consultant prior to issue of tender documents.
2. This guide should be used for reviews of both in-house design and work contract to external Consultants.
3. Review the front end documents regarding:
  - a. contract award conditions
  - b. project duration and progress requirements
  - c. measurements for payment clauses as applicable
  - d. site operations, safety and security
  - e. exculpatory language
4. confirm that the Tender Form includes:

- a. correct project number
  - b. correct project title
  - c. correct mailing address
  - d. Article 2 – reasonable period of time for substantial completion: (X months from award)
  - e. Article 9 – indicate if the Bid Depository is to be used
5. Check Certificate of Insurance, add Environmental Impairment Liability (\$2 M) if required (e.g. Abatement Projects)
6. Review the drawings for:
  - a. discrepancies
  - b. poor or vague details
  - c. insufficient as built information reflecting existing conditions
  - d. differences between specified and actual dimensions of specified equipment
  - e. conflicting dimensions
  - f. undersized mechanical rooms
  - g. access for moving equipment around during installation of equipment
  - h. LEED® requirements where applicable
  - i. safety in constructability and operation of the facility
  - j. access for proper regular maintenance
7. Review technical specifications for:
  - a. non- specificity of references
  - b. missing or duplicated drawing notes and specification sections
  - c. conflict between drawing and technical specifications
  - d. subsurface conditions report
  - e. clarity in scope and payment of site works and services
  - f. requirements of full-time vs. part time site safety officers
8. Review Utilities in relation to:
  - a. availability of temporary utilities
  - b. relocation of utilities by others
  - c. description and location of existing utilities
  - d. deteriorated condition of existing utilities
  - e. unmarked existing utility lines

9. Perform an interdisciplinary interference check to identify:
  - a. insufficient space to accommodate systems
  - b. inadequate ceiling space particularly to accommodate HVAC ductwork
  - c. inadequate mechanical rooms
  - d. inadequate structural support
  - e. conflict between sewer lines and other items
  - f. conflict in reflected ceiling plans

### 5.5.19 LEED®

1. The finalized LEED® scorecard forms part of the contract documents. Throughout the construction phase, the Contractor, Consultant, and Project LEED® AP, and TW Staff shall ensure that their respective responsibilities are fulfilled to meet the requirements of each credit sought.
2. All documentation is to be turned into the LEED® AP for the project for monitoring, and organization in preparation for submittal to the CaGBC.
3. Portions of the contract costs for each line item of the contract break-down, for the Contractor and Consultants, shall be held to cover the LEED® documentation process unless specific line items are identified.

### 5.5.20 COMMISSIONING

1. The Consultant shall provide to the Commissioning Authority a complete list of equipment with the following information:
  - a. identification number
  - b. location
  - c. type, proposed manufacturer, make, model
  - d. operating parameter (max, normal, min)
  - e. electrical requirements
  - f. control comments
  - g. other pertinent information
2. Finalized Commissioning Manual will be prepared by the Commissioning Authority and issued with the contract documents. Including:

3. Commissioning tests and documentation forms
4. Training and instruction requirements
5. The Consultant shall include complete commissioning specifications which shall provide sufficient information to bidding Contractors to properly evaluate and bid the cost of facility commissioning.
6. The appropriate sub-Contractors shall be responsible for carrying out the physical activities required for checking and operating components and systems during the commissioning process. The Contractor shall be responsible for coordinating manufacturer's representative on site with the Commissioning team as required.
7. Portions of the contract costs for each line item of the contract break-down, for the Contractor and Consultants, shall be held to cover the commissioning process unless specific line items are identified.

#### **5.5.21 SAFETY SPECIFICATION**

1. The safety specifications found on TW's website, should be modified with respect to the full time on site contractor safety officer. The consultant is responsible for obtaining from the Design Manager the decision to include or not include the full time on site contractor safety officer.

### **5.6 PHASE 2, STEP 5 – TENDERING AND CONTRACT AWARD**

#### **5.6.1 PUBLIC TENDERS**

1. Procedures covering tenders are covered under the "Public Tender Act", "Public Tender Regulations", and "The Atlantic Procurement Agreement".
2. A Public Tender is required for work estimated to cost \$20,000 or greater.
3. Tenders that are advertised shall allow reasonable time for industry to respond. The Tender period is fifteen (15) calendar days. Depending on the complexity and if a site briefing is required, a longer period may be necessary and are assessed on a per project basis.

#### **5.6.2 INVITED PRICES**

1. Public service work with an estimate less than \$20,000 may be tendered by invitation:

- a. Written quotations should be obtained where practical. Where, for good reason, written quotations cannot be obtained, telephone quotations may be used.
- b. A minimum of three companies must be invited to submit pricing.
- c. Invited prices are to be written in sufficient detail to precisely identify the requirements of the contract and permit the work to be independently inspected. Specifications, scope of work and drawings shall be attached to invite letter as required.
- d. The letter of invite shall indicate, the following documentation is required to be submitted prior to the start of work:
  2. Letter of good standing with the Newfoundland and Labrador Construction Safety Association's Certificate of Recognition Program
  3. Certificate of good standing with Workplace Health, Safety and Compensation Commission
  4. Certificate of Insurance
  5. The required completion date is to be clearly specified.

### 5.6.3 SITE BRIEFINGS / VIEWINGS

1. Normally, site briefings / viewings shall be used when the preparation of detailed plans and specifications will adversely affect the schedule of the work, or site clarification is required.
2. Attendance at site briefings should be strongly encouraged but not mandatory.

### 5.6.4 INQUIRIES FROM PROSPECTIVE BIDDERS

1. Inquiries may be received by the Tendering & Contracts Division, who will then forward to the appropriate person for review, usually the Design Manager.
2. Inquiries may also be received directly by the Design Manager or others involved in the project, including the Consultant. The Design Manager is responsible for ensuring appropriate responses are provided.
3. Responses to inquiries may result in the requirement to issue an addendum. No directions or changes to the tender documents shall be made verbally.
4. Responses to any inquiry shall be disseminated to all prospective bidders.
5. Pretender estimates are not to be released.

### 5.6.5 PREPARATION OF ADDENDA

1. Addenda shall be issued to notify bidders of changes to the tender documents, to clarify and/or correct portions of the tender documents, and to identify products as acceptable substitutes.
2. Addenda shall be issued no later than five (5) days prior to tender closing.
3. If an addendum is necessary with five (5) days prior to the tender closing, the tender closing date shall be extended accordingly.

### 5.6.6 SUBSTITUTION OF MATERIAL

1. Material may be substituted during the tender period or after contract award, in accordance with the procedures as outlined in the NL Master Specification Guide for Public Funded Buildings, Section 01 61 00 – Common Product Requirements.

### 5.6.7 BID DEPOSITORY

1. Contracts which include substantial amounts of subtrade work may use the Bid Depository operated by Newfoundland and Labrador Construction Association.
2. Where the Bid Depository is being used, the Design Manager will:
  - a. Notify the Consultant and Tendering & Contracts Division accordingly
  - b. Ensure appropriate Appendix is listed in Article 9, USE OF BID DEPOSITORY, in Instructions to Bidders

### 5.6.8 LISTING OF MAJOR SUB-CONTRACTORS AND SUPPLIERS

1. The Design Manager and the Consultant may establish a listing of all major Sub-Contractors, and equipment suppliers required for the work.
2. The finalization of who the major Sub-Contractors and suppliers will be on the project is important:
  - a. to discourage shopping of prices indefinitely
  - b. to facilitate early shop drawing submissions
  - c. to avoid construction delays due to late arrival of major equipment or product items

3. The listing shall form part of Appendix-A to the Tender Form, and be completed prior to the contract award.
4. As per the Supplementary Instructions to Bidders Item 6, Appendix A does not have to be completed at time of tender close. Bidders are given 72 hours following request by Owner to submit completed appendices.

#### 5.6.9 REQUESTS FOR TENDER WITHDRAWAL

1. Approval for a Contractor to withdraw their tender after the tender closing date will be, subject to the approval of the Executive, based on recommendation of the Design Manager.
2. Approval may be granted without prejudice, if the Contractor can demonstrate that an error was made in the preparation of the bid arising from errors or contradictions within the tender documents. Errors made by the bidder in the preparation of the bid may not be an acceptable cause to grant withdrawal.
3. If a request is denied, a contract may be awarded and immediate action will be taken by the Construction Manager to obtain the bonding and insurance. If the necessary documents are not submitted, the Construction Manager will cause the contract to be terminated and Tendering & Contracts will be notified to make the necessary claim against the bid bond.

#### 5.6.10 TENDER EXCEEDING PROJECT BUDGET

1. Changes in the project scope related to negotiations aimed at reducing the amount of the tender to meet a predetermined budget are not permitted. In such instances the reduced contract amount would be equivalent to an untendered contract, as defined by the “Public Tender Act”.
2. If the tender is not awarded at the price submitted by low bidder, the tender documents may be revised to reflect a change in the scope of work to comply with the predetermined budget. A new tender call may be issued.
3. The Consultant is responsible for the preparation of contract documents within the predetermined budget. If the tender exceeds the project budget for reasons within the control of the Consultant, the Consultant shall provide redesign services at no additional expense.

### 5.6.11 TENDER ANALYSIS, APPROVAL AND AWARD

1. Once Tendering & Contracts Division confirms that the tenders from eligible bidders are submitted in accordance with the requirements (signed, sealed, bid security in order etc.) they forward the tender docket to the designated Design Manager for analysis and recommendation.
2. If the work is to proceed (funding in place, and with client approval), the Design Manager will recommend that the tender be awarded to the low bidder. The Design Manager prepares a recommendation in PARTS, initials the docket and returns it to Tendering & Contracts. The recommendation in PARTS, includes the Review of Tender Form, Contractor Evaluation, Cost Comparison and Project Budget.
3. A copy of the low bid is retained by the Design Manager. The second and lowest bid may also be retained for regional files.
4. If the contract value is less than \$100,000, the Regional Director may approve the contract award. Request for approval to award the contract for bids greater than \$100,000 are forwarded to TW executive for approval, as well as client executive as applicable.
5. Tendering & Contracts Division prepares the contract award letter following notification of approval.

### 5.6.12 CONTRACT AGREEMENT

1. Tendering & Contracts Division shall prepare the Agreement between Owner and Contractor.
2. The signed agreement is sent to the Contractor with an original retained by the Tendering & Contracts Division. A copy is sent to the Construction Manager.

### 5.6.13 CONSTRUCTION DOCUMENT PACKAGE

1. The Consultant shall provide complete “Issued for Construction” document package incorporating all addenda no later than 5 days after the tender close.
2. This package shall include all:
  - a. Drawings
  - b. Specifications
  - c. LEED® documentation from the design phases if the project is to follow the LEED® requirements



- d. Issued for construction Commissioning Manual
  - e. A finalized construction estimate, including the addenda
3. The issuance of IFC documents to reflect revisions made to the contract drawings and specifications by addenda is a requirement and is to be included in the Consultant basic services. IFC drawings shall be prepared by the Consultant and delivered to TW five (5) days after tender close. When there is a scope change, a change order from the Consultant will be considered.
  4. Issued for Construction Drawings are to be issued with the appropriate revisions noted in accordance with documentation standards outlined in this manual in reproducible, full size paper copy and electronic Adobe Acrobat (.pdf) format as well as AutoCAD (.dwg) file format.
  5. Specifications are to be re-issued with addenda changes incorporated in each specification section.
  6. Specifications are to be provided in reproducible paper copy (unbound) as well as electronically in Adobe Acrobat (.pdf) and WORD (.DOC) formats.
  7. The Consultant may be required to prepare additional drawings to properly clarify and interpret the contract drawings. This service is included in the Consultant's basic services fee, under the category of contract administration services. Sketches are not acceptable.

## 5.7 PHASE 2, STEP 6 - DESIGN MANAGER TO CONSTRUCTION MANAGER HANDOVER

1. Once the construction contract is awarded, the Construction Manager assumes responsibility for the implementation of the project, and administration of the contract(s) in the construction phase.
2. The Design Manager is to ensure the Construction Manager has all necessary documentation for a smooth transition to the construction phase including the Prime Consultant Agreement with associated change orders and payment certificates, commissioning manual, LEED® scorecard and Consultant evaluation.