

SELF-SUPPORTING TOWER

Chapais, QC

STRUCTURAL AND ELECTRICAL SPECIFICATION

No PWGSC: R.060667.001

Solicitation no: EE520-142319

ISSUED FOR BID

December 13th, 2013

<u>Sections</u>	<u>Pages</u>
01 11 01 Work related general information	4
01 33 00 Submittal procedures	5
01 35 29.06 Health and safety requirements	3
01 35 43 Environmental procedures	4
01 45 00 Quality control	2
01 52 00 Construction facilities	4
01 61 00 Common product requirements	4
01 74 11 Cleaning	2
01 74 21 Construction-Demolition waste management and disposal	6
01 78 00 Closeout submittals	5
03 10 00 Concrete forming and accessories	3
03 20 00 Concrete reinforcing	2
03 30 00 Cast-in-place concrete	6
05 12 23 Structural steel for buildings	3
26 05 00 Common Work Results For Electrical	9
26 55 36 Electrical - Obstruction Lighting	2
31 00 99 Earthwork for minor works	6
<i>Section Performance</i>	
D1014 Self-Supporting Tower	5

Part 1 General

1.1 WORK BY OTHERS

- .1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from the Departmental Representative.
- .2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to the Departmental Representative, in writing, any defects which may interfere with proper execution of Work.

1.2 WORK SEQUENCE

- .1 Construct Work in stages to accommodate the Departmental Representative's use of premises during construction.
- .2 Maintain fire access/control.

1.3 CONTRACTOR USE OF PREMISES

- .1 Use of site until Substantial Performance.
- .2 Co-ordinate use of premises under direction of Departmental Representative.
- .3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .4 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .5 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
- .6 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.4 OCCUPANCY BY THE DEPARTMENTAL REPRESENTATIVE

- .1 The Departmental Representative will occupy premises during entire construction period for execution of normal operations.
- .2 Co-operate with the Departmental Representative in scheduling operations to minimize conflict and to facilitate the Departmental Representative usage.

1.5 RESPONSIBILITIES OF THE CONTRACTOR

- .1 Contractor Responsibilities:

- .1 Designate submittals and delivery date for each product in progress schedule.
- .2 Review shop drawings, product data, samples, and other submittals. Submit to Departmental Representative notification of observed discrepancies or problems anticipated due to non-conformance with Contract Documents.
- .3 Receive and unload products at site.
- .4 Inspect deliveries jointly with the Departmental Representative; record shortages, and damaged or defective items.
- .5 Handle products at site, including unpacking and storage.
- .6 Protect products from damage, and from exposure to elements.
- .7 Assemble, install, connect, adjust, and finish products.
- .8 Provide installation inspections required by public authorities.
- .9 Repair or replace items damaged by Contractor or subcontractor on site (under his control).

1.6 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to building operations and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.7 EXISTING UTILITY SERVICES

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to vehicular traffic.
- .3 Provide alternative routes and vehicular traffic.
- .4 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.
- .5 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .6 Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.
- .7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.

- .8 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .10 Record locations of maintained, re-routed and abandoned service lines.

1.8 REQUIRED DOCUMENTS

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 List of Outstanding Shop Drawings.
 - .6 Change Orders.
 - .7 Other Modifications to Contract.
 - .8 Field Test Reports.
 - .9 Copy of Approved Work Schedule.
 - .10 Health and Safety Plan and Other Safety Related Documents.
 - .11 Other documents as specified.

1.9 FEES, PERMITS AND CERTIFICATES

- .1 The Contractor will be required to obtain all necessary permit needed for the execution of the work. It shall comply with all federal, provincial and municipal regulations and any other law or any rules related to this work. He will be required to assume responsibility for any offense of the relevant laws and regulations.
- .2 The Contractor shall assume (at its expense) all obligations relating to security measures required by the Health and safety laws of Quebec, and all costs arising from such obligations.
- .3 Provide inspection certificates showing that the work complies with the requirements of the competent authorities.
- .4 Submit a copy to the Departmental Representative of applications submitted to the above authorities and approval received documents.

1.10 SITE REVIEW

- .1 To become familiar with project requirements and to obtain all the information required for the proper performance of the contract, examine the work site. The ignorance of site conditions will not constitute, in any case, a valid reason to demand an additional payment.

1.11 LAYOUT OF WORK

- .1 From the lines and levels of control indicated on the plans, the Contractor shall establish the major landmarks necessary for the execution of the works and provide all required materials.
- .2 Take the required measures to prevent the landmarks to be moved during construction.
- .3 Provide all th necessary equipment to allow the Departmental Representative to the examine, audit or perform any verification deemed necessary.
- .4 Before starting work, the Contractor shall verify all measurements on site and notify the Departmental Representative for any errors or mismatches.
- .5 During work if non -compliances are identified following picket or leveling errors performed by the Contractor, it will resume in nonconforming work at his own expense.

1.12 ERRORS OR OMISSIONS

- .1 If the Contractor in the execution of his work, finds contradictions between the drawing and the physical conditions at the site, or any errors or omissions in the drawings, it will be obligated to immediately inform the Departmental Representative by writing, if failing to inform the Representative the Contractor will proceed at its own risk until it has received approval from the departmental Representative

1.13 WEATHER

- .1 The Contractor may not claim any additional amount to adverse weather conditions including work during fall, winter or heavy rains.
- .2 The Contractor shall plan its work according to the conditions likely to be encountered during implementation and submit bid amounts as may be necessary for the resumption of deficient work due to climate conditions, etc.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 03 10 00 – Concrete forming and accessories
- .2 Section 03 20 00 – Concrete reinforcing
- .3 Section 05 12 23 – Structural steel for buildings
- .4 Section 31 00 99 – Earthwork for minor works
- .5 D1014

1.2 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are co-ordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10 Keep one reviewed copy of each submission on site.

1.3 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec.

-
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
 - .4 Allow 7 days for Departmental Representative's review of each submission.
 - .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
 - .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
 - .7 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
 - .8 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.

- .10 Relationship to adjacent work.
- .9 After Departmental Representative's review, distribute copies.
- .10 Submit electronic copy, 3 prints of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .11 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit 4 electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
- .13 Submit 4 electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .14 Submit 4 electronic copies of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .15 Submit 4 electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .17 Submit 4 electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .18 Delete information not applicable to project.
- .19 Supplement standard information to provide details applicable to project.

- .20 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .21 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.
- .1 This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
- .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.4 SAMPLES

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Departmental Representative's.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .5 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .6 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 MOCK-UPS

- .1 Erect mock-ups in accordance with 01 45 00 - Quality Control.

1.6 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic and hard copy of colour digital photography in jpg format, fine resolution monthly with progress statement as directed by Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Frequency of photographic documentation: monthly as directed by Departmental Representative.

- .1 Upon completion of: excavation, foundation, framing and services before concealment, of Work, as directed by Departmental Representative.

1.7 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Province of Quebec
 - .1 An Act Respecting Occupational Health and Safety, R.S.Q. 1997 (updated 26 July 2005).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
- .3 Submit 1 copie of Contractor's authorized representative's work site health and safety inspection reports to weekly Departmental Representative.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 7 days after receipt of comments from Departmental Representative.
- .7 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .8 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
- .9 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.3 FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to beginning of Work.

1.4 SAFETY ASSESSMENT

- .1 Perform site specific safety hazard assessment related to project.

1.5 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.6 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.7 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.8 COMPLIANCE REQUIREMENTS

- .1 Comply with Occupational Health and Safety Act, Industrial and Commercial Establishments Regulation, R.R.Q. [_____].

1.9 UNFORSEEN HAZARDS

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

1.10 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Departmental Representative.

1.11 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.

- .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.12 BLASTING

- .1 Blasting or other use of explosives is not permitted without prior receipt of written instruction by Departmental Representative.
- .2 Do blasting operations in accordance with Section 31 00 99 – Earthwork for minor works.

1.13 POWDER ACTUATED DEVICES

- .1 Use powder actuated devices only after receipt of written permission from Departmental Representative.

1.14 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Definitions:
 - .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
 - .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.
- .2 Reference Standards:
 - .1 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-[2004], LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum [2007]).
 - .2 Rating System Addenda for New Construction and Major Renovations LEED Canada-NC Version 1.0-[Addendum 2007].
 - .3 LEED Canada-CI Version 1.0-[2007], LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.
 - .4 LEED Canada 2009 for Design and Construction-[2010], LEED Canada 2009 for Design and Construction Leadership in Energy and Environmental Design Green Building Rating System Reference Guide
 - .5 LEED Canada for Existing Buildings, Operations and Maintenance-[2009], LEED Canada 2009 Leadership In Energy and Environmental Design Green Building Rating System Reference Guide.
 - .2 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2-2008 Stipulated Price Contract.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.
- .3 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .4 Address topics at level of detail commensurate with environmental issue and required construction tasks.

- .5 Include in Environmental Protection Plan:
 - .1 Name[s] of person[s] responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Name[s] and qualifications of person[s] responsible for manifesting hazardous waste to be removed from site.
 - .3 Name[s] and qualifications of person[s] responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
 - .5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations and EPA 832/R-92-005, Chapter 3.
 - .6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
 - .7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.
 - .1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.
 - .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
 - .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
 - .9 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
 - .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
 - .12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
 - .13 Waste Water Management Plan identifying methods and procedures for management discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
 - .14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting

historical, archaeological, cultural resources, biological resources and wetlands.

1.3 FIRES

- .1 Fires and burning of rubbish on site is not permitted.
- .2 Provide supervision, attendance and fire protection measures as directed.

1.4 DRAINAGE

- .1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations[, EPA 832/R-92-005, Chapter 3] [US EPA General Construction Permit].
- .2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.
- .3 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.5 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties as indicated.
- .2 Protect trees and shrubs adjacent to the construction site, to warehousing and trucking routes.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
 - .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation.
- .5 Do not remove trees in the areas shown and designated authorized in writing by the Departmental Representative.

1.6 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.

- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.7 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
 - .1 Take action only after receipt of written approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Bury rubbish and waste materials on site where directed after receipt of written approval from Departmental Representative.
- .3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Part 1 General**1.1 INSPECTION**

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.2 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and reinspection.

1.3 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.4 PROCEDURES

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.

- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.5 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by.

1.6 REPORTS

- .1 Submit 4 copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

1.7 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.
- .2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

1.8 EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for electrical systems.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.189-[00], Exterior Alkyd Primer for Wood.
 - .2 CGSB 1.59-[97], Alkyd Exterior Gloss Enamel.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-[04], Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-0121-[M1978(R2003)], Douglas Fir Plywood.
 - .3 CAN/CSA-S269.2-[M1987(R2003)], Access Scaffolding for Construction Purposes.
 - .4 CAN/CSA-Z321-[96(R2001)], Signs and Symbols for the Occupational Environment.
- .3 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC), Title: General Conditions 'C', In Effect as of: May 14, 2004.
- .4 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.3 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Identify areas which have to be gravelled to prevent tracking of mud.
- .3 Indicate use of supplemental or other staging area.
- .4 Provide construction facilities in order to execute work expeditiously.
- .5 Remove from site all such work after use.

1.4 SCAFFOLDING

- .1 Scaffolding in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms, temporary stairs.

1.5 HOISTING

- .1 Provide, operate and maintain hoists cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.
- .2 Hoists cranes to be operated by qualified operator.

1.6 SITE STORAGE/LOADING

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.7 CONSTRUCTION PARKING

- .1 Parking will be permitted on site provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.

1.8 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.9 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.10 CONSTRUCTION SIGNAGE

- .1 Direct requests for approval to erect Consultant/Contractor signboard to Departmental Representative. For consideration general appearance of Consultant/Contractor signboard must conform to project identification site sign. Wording in both official languages.
- .2 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.
- .3 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.

1.11 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.

- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .7 Construct access and haul roads necessary.
- .8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.
- .9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .10 Dust control: adequate to ensure safe operation at all times.
- .11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.
- .12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .13 Provide snow removal during period of Work.
- .14 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.12 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .2 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .3 Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.2 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.3 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

- .2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.4 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .8 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.5 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.

1.6 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.7 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.8 CO-ORDINATION

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.9 CONCEALMENT

- .1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation inform [Departmental Representative] [DCC Representative] [Consultant] if there is interference. Install as directed by [Departmental Representative] [DCC Representative] [Consultant].

1.10 REMEDIAL WORK

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.11 LOCATION OF FIXTURES

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform Departmental Representative of conflicting installation. Install as directed.

1.12 FASTENINGS

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.13 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.14 PROTECTION OF WORK IN PROGRESS

- .1 Prevent overloading of parts of building of tower. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC), Title: General Conditions "C", In Effect as Of: May 14, 2004.

1.2 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .3 Clear snow and ice from access to building, bank/pile snow in designated areas only.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .7 Dispose of waste materials and debris off site.
- .8 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall.

1.3 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris [other than] [including] that caused by Owner or other Contractors.

- .5 Remove debris and waste materials other than those generated by the Master of the work or by other contractors.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Clean lighting reflectors, lenses, and other lighting surfaces.
- .8 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .9 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .10 Remove dirt and other disfiguration from exterior surfaces.
- .11 Sweep and wash clean paved areas.
- .12 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
- .13 Clean roofs, downspouts, and drainage systems.
- .14 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
- .15 Remove snow and ice from access to building.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

END OF SECTION

Part 1 General**1.1 WASTE MANAGEMENT GOALS**

- .1 Prior to start of Work conduct meeting with Departmental Representative to review and discuss PWGSC's Waste Management Plan and Goals.
- .2 PWGSC's Waste Management Goal 50 percent of total Project Waste to be diverted from landfill sites. Provide Departmental Representative documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced.
- .3 Accomplish maximum control of solid construction waste.
- .4 Preserve environment and prevent pollution and environment damage.

1.2 REFERENCES

- .1 LEED Canadian Green Building Council (CGBC), Green Building Rating System, For New Construction and Major Renovations LEED Canada-NC, Version 1.0 - December 2004.

1.3 DEFINITIONS

- .1 Class III: non-hazardous waste - construction renovation and demolition waste.
- .2 Inert Fill: inert waste - exclusively asphalt and concrete.
- .3 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .4 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
- .5 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .6 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .7 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
 - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
 - .2 Returning reusable items including pallets or unused products to vendors.
- .8 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
- .9 Separate Condition: refers to waste sorted into individual types.

- .10 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.
- .11 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill. Refer to Schedule A.
- .12 Waste Management Co-ordinator (WMC) : contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .13 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA (Schedule A).

1.4 DOCUMENTS

- .1 Maintain at job site, one copy of following documents:
 - .1 Waste Reduction Workplan.
 - .2 Material Source Separation Plan.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare and submit following prior to project start-up:
 - .1 Submit [2] copies of completed Waste Reduction Workplan (WRW): Schedule B.
 - .2 Submit [2] copies of Materials Source Separation Program (MSSP) description.
- .3 Submit before final payment summary of waste materials salvaged for reuse, recycling or disposal by project using deconstruction/disassembly material audit form.
 - .1 Failure to submit could result in hold back of final payment.
 - .2 Provide receipts, scale tickets, waybills, and show quantities and types of materials reused, recycled, co-mingled and separated off-site or disposed of.
 - .3 For each material reused, sold or recycled from project, include amount quantities by number, type and size of items and the destination.
 - .4 For each material land filled or incinerated from project, include amount of material and identity of landfill, incinerator or transfer station.

1.6 WASTE REDUCTION WORKPLAN (WRW)

- .1 Prepare WRW prior to project start-up.
- .2 WRW should include but not limited to:
 - .1 Destination of materials listed.
 - .2 Deconstruction/disassembly techniques and sequencing.

- .3 Schedule for deconstruction/disassembly.
 - .4 Location.
 - .5 Security.
 - .6 Protection.
 - .7 Clear labelling of storage areas.
 - .8 Details on materials handling and removal procedures.
 - .9 Quantities for materials to be salvaged for reuse or recycled and materials sent to landfill.
- .3 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
 - .4 Describe management of waste.
 - .5 Identify opportunities for reduction, reuse, and recycling of materials. Based on information acquired from WA.
 - .6 Post WRW or summary where workers at site are able to review content.
 - .7 Set realistic goals for waste reduction, recognize existing barriers and develop strategies to overcome these barriers.
 - .8 Monitor and report on waste reduction by documenting total volume and cost of actual waste removed from project.

1.7 COST/REVENUE ANALYSIS WORKPLAN (CRAW)

- .1 Prepare CRAW: Schedule D.

1.8 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)

- .1 Prepare MSSP and have ready for use prior to project start-up.
- .2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Departmental Representative.
- .3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
- .4 Provide containers to deposit reusable and recyclable materials.
- .5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
- .6 Locate separated material in area which minimize material damage.
- .7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.
 - .1 Transport to approved and authorized recycling facility.
- .8 Collect, handle, store on-site, and transport off-site, salvaged materials in combined condition.
 - .1 Ship materials to [site operating under Certificate of Approval.
 - .2 Materials must be immediately separated into required categories for reuse or recycling.

1.9 STORAGE, HANDLING AND PROTECTION

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.
- .2 Unless specified otherwise, materials for removal become Contractor's property.
- .3 Protect, stockpile, store and catalogue salvaged items.
- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .5 Protect structural components not removed for demolition from movement or damage.
- .6 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.
- .7 Protect surface drainage, mechanical and electrical from damage and blockage.
- .8 Separate and store materials produced during dismantling of structures in designated areas.
- .9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off-site processing facility for separation.
 - .3 Provide waybills for separated materials.

1.10 DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste, volatile materials, mineral spirits, oil, paint thinner into waterways, storm, or sanitary sewers.
- .3 Remove materials from deconstruction as deconstruction/disassembly Work progresses.
- .4 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.11 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises.
- .2 Maintain security measures established by existing facility provide temporary security measures approved by Departmental Representative.

1.12 SCHEDULING

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 WASTE REDUCTION WORKPLAN (WRW)

.1 Schedule B:

(1) Material Category	(2) Person(s) Respon- sible	(3) Total Quantity of Waste (unit)	(4) Reused Amount (units) Projected	Actual	(5) Recycled Amount (unit) Projected	Actual	(6) Material(s) Destina- tion
Wood and Plastics Material Description							
Chutes							
Warped Pallet Forms							
Plastic Packag ing							
Card- board Packag ing							
Other							
Doors and Windows Material Description							
Painted Frames							
Glass							
Wood							
Metal							
Other							

3.2 COST/REVENUE ANALYSIS WORKPLAN (CRAW)**.1 Schedule D - Cost/Revenue Analysis Workplan (CRAW):**

(1) Material Description	(2) Total Quantity (unit)	(3) Volume (cum)	(4) Weight (cum)	(5) Disposal Cost/Credit \$(+/-)	(6) Category Sub-Total \$(+/-)
Wood					
Wood Stud					
Plywood					
Baseboard - Wood					
Door Trim - Wood					
Cabinet					\$
Doors and Windows					
Panel Regular					
Slab Regular					
Wood Laminate					
Byfold - Closet					
Glazing					\$
		(7) Cost (-) / Revenue (+)			\$

3.3 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT**.1 Schedule E - Government Chief Responsibility for the Environment:**

Province	Address	General Inquires	Fax
Québec	Ministère de l'Environnement et de la Faune, Siège social 150, boul, René-Lévesque Est Québec QC G1R 4Y1	418-643-3127 800-561-1616	418-646-5974
	Conseil de la conservation et de l'environnement 800, place d'Youville, 19e étage Québec QC G1R 3P4	418-643-3818	

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Canadian Environmental Protection Act (CEPA)
 - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
 - .1 Convene meeting one week prior to contract completion with contractor's representative and Departmental Representative to:
 - .1 Verify Project requirements.
 - .2 Review warranty requirements manufacturer's installation instructions.
 - .2 Departmental Representative to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
 - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of operating and maintenance manuals in English and French.
- .3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .4 Provide evidence, if requested, for type, source and quality of products supplied.

1.4 FORMAT

- .1 Organize data as instructional manual.
- .2 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.
- .3 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

- .4 Arrange content by systems, under Section numbers and sequence of Table of Contents.
- .5 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .6 Text: manufacturer's printed data, or typewritten data.
- .7 Provide 1:1 scaled CAD files in dwg format on CD.

1.5 CONTENTS - PROJECT RECORD DOCUMENTS

- .1 Table of Contents for Each Volume: provide title of project;
 - .1 Date of submission; names.
 - .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data.
 - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.6 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 Provide files, racks, and secure storage.

- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.7 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Departmental Representative.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 References to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, and inspection certifications, field test records, required by individual specifications sections.
- .7 Provide digital photos, if requested, for site records.

1.8 EQUIPMENT AND SYSTEMS

- .1 For each item of equipment and each system include description of unit or system, and component parts.
 - .1 Give function, normal operation characteristics and limiting conditions.

- .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.
 - .1 Include regulation, control, stopping, shut-down, and emergency instructions.
 - .2 Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Include manufacturer's printed operation and maintenance instructions.
- .7 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .8 Additional requirements: as specified in individual specification sections.

1.9 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
 - .1 Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Additional requirements: as specified in individual specifications sections.

1.10 MAINTENANCE MATERIALS

- .1 Special Tools:
 - .1 Provide special tools, in quantities specified in individual specification section.
 - .2 Provide items with tags identifying their associated function and equipment.
 - .3 Deliver to location as directed; place and store.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Departmental Representative.
 - .2 Include approved listings in Maintenance Manual.

1.11 DELIVERY, STORAGE AND HANDLING

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Remove and replace damaged products at own expense and for review by Departmental Representative.

END OF SECTION

Partie 1 General**1.1 RELATED SECTIONS**

- .1 Section 03 20 00 – Concrete reinforcing
- .2 Section 03 30 00 – Cast-in place concrete

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-O86S1, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
 - .3 CAN/CSA-S269.3, Concrete Formwork, National Standard of Canada

1.3 SUBMITTALS

- .1 .Submittals in accordance with Section 01 33 00 - Submittal Procedures and section 01 78 00 – Closeout Submittals.
- .2 Submit shop drawings for formwork and concrete pouring method chosen.
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec, Canada.
- .3 Indicate method and schedule of construction, stripping procedures, materials, ties, and locations of temporary embedded parts. Comply with CAN/CSA-S269.3 for formwork drawings.
- .4 Indicate formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.
- .5 Indicate sequence of erection and removal of formwork as directed by Departmental Representative.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling.
 - .2 Place materials defined as hazardous or toxic in designated containers.
 - .3 Dispose of all waste to approved site by the Departmental Representative.

Partie 2 Products**2.1 MATERIALS**

- .1 Formwork materials:

- .1 For concrete, use wood and wood product formwork materials to CAN/CSA-O86.
- .2 Form ties:
 - .1 For all concrete, use snap ties complete with plastic cones and light grey concrete plugs.
 - .1 Plastic cone sizes : Concrete cover of 100 mm applies only to reinforcement. Ties are not consider as reinforcement. For ties, concrete cover may be less than 100 mm. Thus, standard cones can be used.
 - .2 Clarification on the use of plugs. Light grey concrete plugs are used to seal holes formed by plastic cones in form ties : Using a sealant of type Sikaflex1A or a mortar of type Sikatop 123 will be considered equivalent. Contractor will have to submit a data sheet to Ministerial Representative for approval. Result of this method has to be similar to the result obtained with plugs.
 - .3 Form stripping agent: colourless mineral oil, non-toxic, low VOC, free of kerosene, concrete stain free and with a low flashpoint (150°C minimum in open cup).

Partie 3 Execution

3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels and centres before proceeding with formwork and ensure dimensions agree with drawings.
- .2 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .3 Align form joints and make watertight.
 - .1 Keep form joints to minimum.
- .4 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.
- .5 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
 - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .6 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

3.2 REMOVAL AND RESHORING

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
 - .1 three (3) days for foundations.

- .2 Remove formwork when minimum period noted above and replace immediately with adequate reshoring.
- .3 Re-use formwork subject to requirements of CSA-A23.1/A23.2.

END OF SECTION

Partie 1 General**1.1 RELATED SECTIONS**

- .1 Section 03 30 00 – Cast-in place concrete.
- .2 Section 03 10 00 – Concrete forming and accessories

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CAN/CSA-G30.18, Billet-Steel Bars for Concrete Reinforcement, A National Standard of Canada.
 - .3 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles, A National Standard of Canada.
- .2 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC, Reinforcing Steel Manual of Standard Practice.

1.3 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.
- .3 Submit shop drawings including placing of reinforcement and indicate:
 - .1 Bar bending details.
 - .2 Lists.
 - .3 Quantities of reinforcement.
 - .4 Sizes, spacing and locations of reinforcement, with identifying code marks to permit correct placement without reference to structural drawings.
 - .5 Indicate sizes, spacings and locations of chairs, spacers and hangers.
- .4 Detail lap lengths and bar development lengths to CSA-A23.3 or drawings. Take larger of both values.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling.
- .2 Rebar shall be stored so that they are not in contact with ground and no deformation occurs before being placed in forms.

Partie 2 Products**2.1 MATERIALS**

- .1 Substitute different size bars only if permitted in writing by Departmental Representative.
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18.
- .3 Tying wire: annealed steel wire and cold drawn
- .4 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

Partie 3 Execution**3.1 FIELD BENDING**

- .1 Do not field bend or field weld reinforcement.
- .2 Replace bars, which develop cracks or splits.

3.2 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on placing drawings and in accordance with CSA-A23.1/A23.2.
- .2 Prior to placing concrete, obtain Departmental Representative approval of reinforcing material and placement.
- .3 Ensure cover to reinforcement is maintained at all time.
- .4 Protect coated portions of bars with covering during transportation and handling.
- .5 Concrete cover must be 75 mm for interior and exterior faces of exterior elements and 40 mm for interior elements. Provide a written note 24 hours before concrete pouring.
- .6 Provide Departmental Representative an attestation of reinforcement.

3.3 FIELD TOUCH-UP

- .1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

END OF SECTION

Partie 1 General**1.1 RELATED SECTIONS**

- .1 Section 03 10 00 – Concrete forming and accessories
- .2 Section 03 20 00 – Concrete reinforcing

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA A283, Qualification Code for Concrete Testing Laboratories.
 - .3 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .1 CSA-A3001, Cementitious Materials for Use in Concrete.

1.3 ACRONYMS AND TYPES

- .1 Cement: hydraulic cement or blended hydraulic cement (XXb - where b denotes blended).
 - .1 Type GU or GUb - General use cement.

1.4 DESIGN REQUIREMENTS

- .1 In accordance with CSA-A23.1/A23.2 and as described in MIXES of PART 2 - PRODUCTS.

1.5 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures and 01 78 00 – Closeout Submittals.
- .2 Submit WHMIS MSDS - Material Safety Data Sheets.
- .3 Do not proceed without written approval when deviations from mix design or parameters are found.
- .4 Concrete pours: submit accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken as described in PART 3 - FIELD QUALITY CONTROL.
- .5 Concrete hauling time: submit for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.

1.6 QUALITY ASSURANCE

- .1 Submit to Departmental Representative, minimum two (2) weeks prior to starting concrete work, valid and recognized certificate from plant delivering concrete.

- .1 When plant does not hold valid certification, provide test data and certification by qualified independent inspection and testing laboratory that materials used in concrete mixture will meet specified requirements.
- .2 Minimum 4 weeks prior to starting concrete work, submit proposed quality control procedures for review by Departmental Representative on following items:
 - .1 Hot weather concrete.
 - .2 Cold weather concrete.
 - .3 Curing.
 - .4 Finishes.
 - .5 Formwork removal.
- .3 Health and Safety Requirements: do construction occupational health and safety in accordance with division 1.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Concrete hauling time: maximum allowable time for concrete to be delivered to site of Work and discharged not to exceed 120 minutes after batching.
 - .1 Modifications to maximum time limit must be agreed to Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
 - .2 Deviations to be submitted for review by Departmental Representative.
- .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.
- .3 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling.
 - .2 Divert unused concrete materials from landfill to local facility approved by Departmental Representative.
 - .3 Provide an appropriate area on the job site where concrete trucks can be safely washed.
 - .4 Divert unused admixtures and additive materials (pigments, fibres) from landfill to official hazardous material collections site as approved by the Departmental Representative.
 - .5 Unused admixtures and additive materials must not be disposed of into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.
 - .6 Prevent admixtures and additive materials from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with inert, noncombustible material and remove for disposal. Dispose of waste in accordance with applicable local, Provincial/Territorial and National regulations.

Partie 2 Products**2.1 MATERIALS**

- .1 Cement: to CAN/CSA-A3001, Type GU.
- .2 Supplementary cementing materials: with minimum 20% Type F, CI or CH fly ash replacement, by mass of total cementitious materials to CAN/CSA-A3001.
- .3 Water: to CSA-A23.1.
- .4 Aggregates: to CAN/CSA-A23.1/A23.2
- .5 Admixtures:
 - .1 Air entraining admixture: to ASTM C 260.
 - .2 Chemical admixture: to ASTM C 494. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .6 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents to CSA-A23.1/A23.2.
 - .1 Compressive strength: 50 MPa at 28 days.

2.2 MIXES

- .1 Prescriptive Method for specifying concrete: owner's concrete mix in accordance with CAN/CSA-A23.1.
 - .1 Ensure materials to be used in concrete mix have been submitted for testing.
 - .2 Co-ordinate construction methods to suit Departmental Representative concrete mix proportions and parameters.
 - .3 Identify and report immediately to Departmental Representative when concrete mix design and parameters pose anticipated problems or deficiencies related to construction.
 - .4 CONCRETE EXPOSED TO BAD WEATHER : Without limitation, this concrete will be use for tower foundation.. Departmental to proportion concrete mix for normal including:
 - .1 Capacity at 28 days : 35 MPa
 - .2 Class of exposure: C-1
 - .3 Supplementary cementing materials: with minimum 20% Type F, CI and/or CH fly ash replacement, by kg/m³ of total cementitious material.
 - .4 Maximum W/CM ratio: .50.
 - .5 Air content category: 4% to 7%.
 - .6 Slump: at time and point of discharge 80±20 mm.
 - .7 Concrete type required : Class of exposure has to be look at before any other data. Thus, specification for the given class of exposure in CAN/CSA A23.1/2 is the first reference to consider and take into consideration.

- .5 Submit quality plan to control concrete quality according to specification.
- .6 Provide concrete supplier's certification.

Partie 3 Execution**3.1 PREPARATION**

- .1 Obtain Departmental Representative approval before placing concrete.
 - .1 Provide 48 hours notice prior to placing of concrete.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 Pumping of concrete is permitted only after approval of equipment and mix.
- .4 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .5 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .6 Protect previous Work from staining.
- .7 Clean and remove stains prior to application for concrete finishes.
- .8 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .9 Do not place load upon new concrete until authorized by Departmental Representative.

3.2 CONSTRUCTION

- .1 Execute construction according to CSA-A23.1/A23.2.
- .2 Finishing and curing:
 - .1 Finish concrete in accordance with CSA-A23.1/A23.2.
 - .2 Use procedures as reviewed by Departmental Representative to remove excess bleed water. Ensure surface is not damaged.
 - .3 Use curing compounds compatible with applied finish on concrete surfaces. Applied finish on concrete: Provide written declaration that compounds used are compatible.
 - .4 Unless indicated otherwise, finish concrete at Departmental Representative satisfaction.
 - .5 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated.
 - .6 If wet curing is use, provide 100% humidification during seven (7) consecutive days using a polyethylene membrane and a continuous sprinkler system.

3.3 SURFACE TOLERANCE

- .1 Concrete tolerance in accordance with CSA-A23.1/A23.2.

3.4 FIELD QUALITY CONTROL

- .1 Site tests: conduct following test and submit report as described in section 01 33 00 – Submittal Procedures and section 01 78 00 – Closeout Submittals.
 - .1 Concrete pours.
 - .2 Slump tests.
- .2 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by Departmental Representative for review in accordance with CSA-A23.1/A23.2.
 - .1 Ensure testing laboratory is certified in accordance with CSA A283.
- .3 Ensure test results are distributed for discussion at pre-pouring concrete meeting between testing laboratory and Departmental Representative.
- .4 Departmental Representative will pay for costs of tests.
- .5 Departmental Representative will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .6 Non-Destructive Methods for Testing Concrete: in accordance with CSA-A23.1/A23.2.

3.5 COLD WEATHER CONCRETING

- .1 When air temperature is 5°C or lower, or when it is forecast that temperature will drop below this threshold during pouring or curing period, requirements of this chapter applies.
- .2 When cold weather concreting, every item required for concrete pouring must be at reach of hand. These tools must be able to keep required temperatures during pouring and curing. Heating systems used shall not have harmful quality affect on concrete neither finishing materials. Heating systems releasing carbon monoxide are not permitted.
- .3 Concrete shall not be placed against ground, forms, rebar or any surfaces at 5°C or less.
- .4 When pouring, concrete temperature must be between 15°C and 30°C. When temperature is relatively low, concrete shall meet upper temperature limit.
- .5 Take precaution so that concrete against all surfaces is at least maintained to a temperature of 20°C for 3 days or 10°C for five days after pouring. Air shall be moistened within covered places and concrete and forms shall be maintained moistened if a dry heat source is employed.
- .6 Concrete must be maintain to a temperature above freezing for first seven consecutive days after pouring. Take precautions against thaw and refreezing cycles for first fourteen (14) days following pouring.
- .7 Protective measures:
 - .1 Requirements specified above can be obtained by using an additional sufficient insulation system, by creating a confined space with elevated tarpaulin (tarpaulin in contact with concrete are totally ineffective) or by

building walls around concrete. An opening shall be made to allow heat source entry.

Please note: required level of protective installation will depend on wind speed, ambient temperature and concrete thermal inertia.

- .2 When ambient temperature during concrete pouring or curing is or may drop below -12°C, building walls around concrete shall be the retained solution. An additional heat source may be required depending on equipment used.
- .3 When temperature is between -4°C and -12°C, tarpaulin or insulation shall be used. An additional heat source may be required depending on equipment used.
- .4 When temperature can drop to -4°C, tarpaulin or insulation shall be used. An additional heat source may be required depending on equipment used.
- .5 At the end of specified protection period, concrete temperature must be reduced down to ambient temperature by steps not exceeding 10°C per day.
- .6 Usage of salt or other chemicals which pretends to reduce concrete freezing point will not be accepted unless a written notice from Departmental Representative says the contrary.

END OF SECTION

Partie 1 General**1.1 REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A 325M, Specification for High-Strength Bolts for Structural Steel Joints.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA-S37-01 Antennas, Tower and antenna supporting Structures
 - .3 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.
 - .4 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.
 - .5 CSA W55.3, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
 - .6 CSA W59, Welded Steel Construction (Metal Arc Welding).

1.2 DESIGN REQUIREMENTS

- .1 Design details and connections in accordance with requirements of CAN/CSA-S16 and CAN/CSA-S37-01 to resist forces, moments, shears.
- .2 Shear connections:
 - .1 Select framed beam shear connections from an industry accepted publication such as "Handbook of the Canadian Institute of Steel Construction" when connection for shear only (standard connection) is required.
 - .2 Select or design connections to support reaction from maximum uniformly distributed load that can be safely supported by beam in bending, provided no point loads act on beam, when shears are not indicated.
- .3 Submit sketches and design calculations stamped and signed by qualified professional engineer licensed in Province of Quebec, Canada for non standard connections.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings including fabrication and erection documents and materials list in accordance with Section 01 33 00 - Submittal Procedures and 01 78 00 – Closeout Submittals.
- .2 Erection drawings: indicate details and information necessary for assembly and erection purposes including:
 - .1 Description of methods.
 - .2 Sequence of erection.

- .3 Type of equipment used in erection.
- .4 Temporary bracings.
- .3 It is required that drawings submitted for assemblies, components and components designed by a shaper carry the bucket and the signature of a qualified engineer authorized to practice in the province of Quebec.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with these specifications.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate packaging material in appropriate container on-site for recycling in accordance with Waste Management Plan.
- .4 Divert unused paint material from landfill to official hazardous material collections site approved by Departmental Representative.
- .5 Do not dispose of unused paint materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

Partie 2 Products

2.1 MATERIALS

- .1 Structural steel: to CAN/CSA-G40.20/G40.21 Grade 350W.
- .2 Anchor bolts: to CAN/CSA-G40.20/G40.21, Grade 400W.
- .3 Steel components from the freestanding tower : to CAN/CSA-S16.1
- .4 Bolts, nuts and washers: to ASTM A 325M.
- .5 Welding materials: to CSA W48 Series and CSA W59 and certified by Canadian Welding Bureau.
- .6 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA-G164, minimum zinc coating of 600 g/m².

2.2 FABRICATION

- .1 Fabricate structural steel in accordance with CAN/CSA-S16 and in accordance with approved shop drawings.
- .2 Continuously seal members by continuous welds where indicated. Grind smooth.

2.3 SHOP PAINTING

- .1 Clean, prepare surfaces and shop prime structural steel in accordance with CAN/CSA-S16 except where members to be welded to existing.
- .2 Clean members, remove loose mill scale, rust, oil, dirt and other foreign matter. Prepare surface according to SSPC-SP-6.

- .3 Apply one coat of primer in shop to steel surfaces to achieve minimum dry film thickness, except:
 - .1 Surfaces to be encased in concrete.
 - .2 Surfaces to receive field installed stud shear connections.
- .4 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5 degrees C.
- .5 Maintain dry condition and 5 degrees C minimum temperature until paint is thoroughly dry.
- .6 Strip paint from bolts, nuts, sharp edges and corners before prime coat is dry.

Partie 3 Execution**3.1 GENERAL**

- .1 Structural steel work: in accordance with CAN/CSA-S16.
- .2 Welding: in accordance with CSA W59.
- .3 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel structures. Companies under CSA W55.3 (Division 3) will be refused.
- .4 Welder shall have a minimum of five (5) years of experience and have required qualifications for vertical welds on existing structures in confined space. Welds quality is of primordial importance in this project.

3.2 MARKING

- .1 Mark materials in accordance with CAN/CSA G40.20/G40.21. Do not use die stamping. If steel is to be left in unpainted condition, place marking at locations not visible from exterior after erection.
- .2 Match marking: shop mark bearing assemblies and splices for fit and match.

3.3 ERECTION

- .1 Erect structural steel, as indicated and in accordance with CAN/CSA-S16 and CAN/CSA S37-01 if applicable.
- .2 Field cutting or altering structural members: to approval of Departmental Representative.
- .3 Continuously seal members by continuous welds where indicated.
- .4 In order to facilitate steel section installation, it is authorized to cut into pieces all the members. However, rigid connections are required to insure continuous span.

END OF SECTION

Partie 1 General**1.1 RELATED SECTIONS**

- .1 Obstruction Lighting Section 26 55 36
- .2 Contractor is responsible for obtaining a copy of all sections of this specification even if it seems irrelevant to his specialty, Otherwise it will be recognized that it accepts the terms and requirements of all sections of this specification.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International) CSA C22.1-06, Canadian Electrical Code, Part 1 (20th Edition), Safety Standard for Electrical Installations.
- .2 Comply with certification and ballot CSA, NFPA and ULC.
- .3 Comply with specific laws.
- .4 Observe the specific requirements of the owner.
- .5 Comply with the requirements of ROHS and CSST.
- .6 CAN/CSA-B72-M87 (R2008) Installation Code for Lightning Protection Systems.

Partie 2 General Clauses For Electrical Work**2.1 SCOPE OF WORK**

- .1 The electrical specifications in section 26 05 00 and the scope of work describe the work to be executed and materials to be furnished for the electrical works of a new self-support tower.

2.2 EXAMINATION OF SITE, DRAWINGS AND SPECIFICATIONS

- .1 Before submitting a proposal for the work covered by these specifications, each bidder/contractor shall visit and inspect the site and shall also carefully examine the available plans and specifications in order that he may be thoroughly familiar with the site and building construction and with all other matters which can in any way affect the work covered by these specifications.
- .2 No claim will be entertained or allowed for any labor, material or other extras that may be required and necessary for the proper execution and completion of this contract.

2.3 ELECTRICAL PLANS AND SPECIFICATIONS.

- .1 The plans and specifications are intended to provide for and comprise the available information for the completion of each branch of the work. Any work or material shown on the plans, even if not particularly described in the specifications needed for the proper functioning of equipment or systems shall be done or supplied by the contractor as if they were both shown and specified.
- .2 The proper functioning and the start-up of equipments to supply, install and connect must be considered included in this contract.
- .3 It is understood that while the plans must be followed as closely as the site conditions will permit, the contractor shall be held responsible for the installation of the work according to the true intent and meaning of the available drawings and specifications. Should it occur that conditions existing at the site require that certain minor deviations be made from the plans and specifications, these shall be made by the contractor without expense to the tenant/owner provided. However, those changes do not require the furnishing of more materials, or the performance of more labor, than the true intent and meaning of the plans and specifications.

2.4 GEOTECHNICAL REPORT

- .1 A geotechnical report with soil properties of the site is provided by the Ministry of Public Works and Government Services Canada (PWGSC). The Contractor shall be responsible for interpreting the report correctly.
- .2 Although the geotechnical report presents several soil properties of the site, it does not include data on soil resistivity. It is the responsibility of the Contractor to perform the measurements of soil resistivity. The Contractor shall submit its calculations for the system's resistance to the proposed grounding to the Departmental Representative.

2.5 DÉFINITIONS

- .1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

2.6 OPERATING VOLTAGES

- .1 Operating voltages must comply to CAN3-C235.
- .2 Electrical, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

2.7 SHOP DRAWINGS

- .1 Unless they are provided with the tender documents, before undertaking any work, submit shop drawings for approval by the Departmental Representative for the panels, junction boxes, fasteners, protection of equipment, piping, cable trays or any other facility to meet the needs of particular assembly.
- .2 The term "shop drawings" means designs, drawings, illustrations, schedules, performance charts, brochures and other information that must be provided to show in detail some of the work.
- .3 The Contractor shall arrange for the preparation of shop drawings as required by the contract documents or the Departmental Representative may reasonably require. These shop drawings must be clearly identified in this project using the titles, terminology and symbols defined in the plans and specifications of the engineer. These drawings shall, moreover, show only the equipment, materials, systems, etc., Specific project. Drawings should be arranged so as to release a minimum space of 75 mm x 75 mm (3 "x 3") to enable the Departmental Representative to affix the print review.
- .4 The contractor shall review all shop drawings prior to submission to the Departmental Representative. This review recognizes that all measurement, the special conditions of locations, materials, catalog numbers and similar data, have been determined and verified on site, or that it have been controlled and coordinated with the demands of work and contract documents.
- .5 The contractor must submit shop drawings for consideration by the Departmental Representative in a reasonable time and in a logical order so as not to delay the work or the work of other contractors. When you submit shop drawings to the Departmental Representative, the contractor must inform in writing of any difference between shop drawings and contract documents.
- .6 The Departmental Representative must review the shop drawings and return a copy to the contractor and a copy to the owner within the time agreed or if no such agreement, with all due diligence, so do not delay the work. Other copies required under this project will be prepared and distributed by the contractor from the copy reviewed and stamped by the Departmental Representative and returned to the contractor.
- .7 The review of the Departmental Representative is limited to monitoring of shop drawings compliance with conceptual design and general layout. This review does not relieve the contractor from responsibility for errors or omissions in shop drawings or his responsibility to comply with all provisions of contract documents and site conditions, unless an exemption clearly indicated on shop drawings have been approved in writing by the Departmental Representative.
- .8 The Contractor shall provide shop drawings corrections and changes that the Departmental Representative requires compliance with contract documents and resubmit them, unless a Departmental Representative exemption. In submitting shop drawings again, the contractor must inform the Departmental

Representative in writing, other than those requested by the Departmental Representative, of revisions who had been made.

- .9 The shop drawings must be in French and English.
- .10 Transmission of shop drawings by fax is prohibited.

2.8 MAINTENANCE AND OPERATION MANUAL

- .1 Provide a manual for maintenance and operation of facilities with all required forms.
- .2 The manual relating to the operation and maintenance should include the following information:
 - .1 details of components, structural features, function and maintenance requirements of various components to facilitate the start-up, operation, maintenance, repair, alterations, extension and expansion of any portion or feature of the facility;
 - .2 Technical data and specifications of products must be accompanied by supplementary information such as newsletters, illustrations and exploded views of component parts, technical descriptions and parts lists. The pamphlets are not accepted;
 - .3 Diagrams and wiring principle;
 - .4 The names and addresses of local suppliers of products referred to manuals;
 - .5 A copy of each shop drawing revised;
 - .6 Provide 2 copies of this manual complete with cards;
 - .7 Cards will be in French and English.

2.9 REVISIONS AND CHANGES IN WORK

- .1 The Departmental Representative may modify the plans and specifications, in any respect whatsoever, without thereby impairing the obligations of the contract. No change will be valid unless expressed in writing.
- .2 No claim for extra work and materials of any nature will be at any time recognized or entertained by the Departmental Representative unless the contractor has first obtained a written order as such from the Departmental Representative. The contractor shall only be entitled to payment for such extra work and materials for which he has received written orders signed by the tenant/owner.

2.10 SPECIFICATIONS OF MATERIALS AND OF THEIR EQUIVALENTS

- .1 The contractor must supply the exact material and equipment specified in the available plans and specifications. Any substitution can't be installed without the Departmental Representative written authorization. Otherwise, substitution material or equipment shall be removed from the premises at the expense of the contractor.

- .2 All materials and installed equipment must be new and CSA approved. In cases where there is no choice but to provide equipment not approved by the CSA, obtain prior approval by a certification organization recognized by the CSA.

2.11 TEMPORARY SERVICES

- .1 The contractor shall provide with all the necessary temporary electrical services needed for the work.

2.12 CODES, NORMS AND BY-LAWS

- .1 The contractor must conform all of his work with the latest editions of codes, norms and by-laws relative to the project (federal, provincial, municipal, CSA, NFPA, UL etc.), and with all of the directives from the authorities having jurisdiction over said project. All violations to these codes, norms and by-laws will be modified by contractor without any cost.
- .2 Follow all province labor and workforce development standards.

2.13 PERMITS REPORTS, TAXES AND FEES

- .1 The contractor is responsible for the obtention of all necessary permits. All applicable federal, provincial and municipal permits, taxes and costs of fees or other changes related with the work.

2.14 TESTS CERTIFICATES, PERMITS AND FEES

- .1 The contractor shall thoroughly test all his work and all equipment supplied by him while it is being installed and shall remedy immediately any defects that may be found. The contractor shall also carry out all tests required by the local authorities.

2.15 COORDINATION OF POWER SHUTDOWN

- .1 All power shutdowns for preliminary and final connection must be coordinated with all stakeholders before doing any work.

Partie 3 General Specifications

- .1 The electrical contractor must supply new material and equipment approved by CSA, qualified manpower, tools and scaffolding required to execute all work.
- .2 This list is non-restrictive and does not release the contractor from all other necessary work shown on the available plans. The contractor is responsible for all work and equipment supply that might not be shown on the plans, but would be required in order to ensure safe and quality work.

3.2 ELECTRICAL CODE

- .1 All materials provided and all work done under these specifications shall conform with the requirements of the Canadian electrical code, latest revision and with the requirements of the local authorities, board of electrical inspectors of the province where work is done. The contractor shall provide a certificate of acceptance from the electrical inspectors before the installation is accepted by the Departmental Representative. Should anything occur on the plans or in the specifications which is not in accordance with the above, the contractor shall notify the Departmental Representative before proceeding with the work or make allowance in his bid for correcting the situation and notify the Departmental Representative in writing with his tender.

3.3 TESTS CERTIFICATES, PERMITS AND FEES

- .1 The contractor shall give all necessary notices, obtain all necessary permits and pay all fees in order that the work herein after specified may be performed. The contractor shall furnish any certificates necessary as evidence that the work installed conforms to the laws and regulations of all authorities having jurisdiction, before final certificates are issued.
- .2 The contractor shall thoroughly test all his work and all equipment supplied by him while it is being installed and shall remedy immediately any defects that may be found. The contractor shall also carry out all tests required by the local authorities.

3.4 CONDUITS

- .1 All exterior conduits shall be PVC type.
- .2 All metallic conduits shall be grounded together.
- .3 All empty conduits must have pull cords and must be identified at each ends.

3.5 GROUND CONNECTIONS

- .1 The Contractor shall provide and install all the equipment, such as conductors, rods, lightning rods, connectors and other accessories necessary for complete installation of the system grounding of the self-supporting tower.
- .2 Grounding connections shall be provided to all equipments in all systems. There must be a grounding conductor in each conduit or metallic profiling. This grounding conductor must be isolated with a green jacket. All grounding shall be done in accordance with the Canadian electrical code section 10, using approved conductors and connectors. All tests shall be made as required by code and any local board and organization having jurisdiction. The electrical supply and distribution will be connected to the shelter's grounding system.
- .3 The Contractor shall design and install a grounding system having a resistance between 25 and 30 ohms or less (as measured in dry atmospheric conditions)

based on direct current calculations taking into account the site-specific resistivity of the soil (refer to geotechnical report) and other features of the site. The Contractor is to take into account in his calculations that the soil resistivity of the backfill and surface material(s) may be different from the resistivity values of the existing soil indicated in the geotechnical report. The Contractor shall submit his calculations for the resistance of the proposed grounding system to the Departmental Representative.

- .4 It is the responsibility of the Contractor to make the measurement of the resistivity of the site's ground. The Contractor has to submit his calculations for the resistance of the grounding system proposed to the Departmental Representative.
- .5 The four-pin Wenner method shall be used to determine soil resistivities of the site. These soil resistivity values shall be used by the Contractor to design the site grounding system.
- .6 The Contractor shall submit grounding drawings for review detailing his site specific grounding design. The design shall respect the requirements of this Specification. The drawings are to be sealed by a Professional Engineer experienced in grounding design and licensed to practice in the jurisdiction in which the Telecommunication Structure is being constructed. General standard grounding drawings not specific to the site in question will not be accepted.
- .7 Grounding system proposed is for information only. The system (lightning, cable grounding rod and grounding) installed on the tower will follow standards or regulations.
- .8 Include a report of the installation of conformity issued by a firm specialized in this area.
- .9 Requirements of this Specification may be modified but only if permission is obtained beforehand from the Departmental Representative.
- .10 If it is not possible to design a grounding system having a resistance between 25 and 30 ohms or less based on the layouts of drawings, the Contractor shall contact the Departmental Representative prior to completing the grounding system design.

3.6 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates and labels as follows:
 - .1 Engraving plates in lamicoïd plastic 3 mm thick with lettering in black on white, accurately aligned and engraved into core, mechanically attached with self tapping screws.
 - .2 Nameplate sizes:

Format	Dimensions	Number of lines	Character height
1	10 mm x 50 mm	1	3 mm
2	12 mm x 70 mm	1	5 mm
3	12 mm x 70 mm	2	3 mm
4	20 mm x 90 mm	1	8 mm
5	20 mm x 90 mm	2	5 mm
6	25 mm x 100 mm	1	12 mm
7	25 mm x 100 mm	2	6 mm

- .2 Wording on nameplates and labels to be approved by the Departmental Representative prior to manufacture.
- .3 Allow for minimum of twenty-five (25) letters per nameplate and label.
- .4 Entries must be in French and English.
- .5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.

3.7 WIRING TERMINATIONS

- .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.
- .2 All the pods of cabling have to be for compression for the appropriate calibre.

3.8 NAMEPLATES AND LABELS

- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.9 QUALITY CONTROL ON SITE

- .1 The contractor must ensure the presence of skilled personnel, availability of measuring devices and testing to run tests requested by the Departmental Representative to the satisfaction thereof. Furthermore, any test requested by the local representative of the competent authority must be implemented without additional cost. The Departmental Representative must be notified verbally and in writing two weeks in advance of the proposed tests and may, if desired, inspect the facility and attend trials.
- .2 All tests should take place with the permission of the Departmental Representative and other contractors involved. Any imperfection or defects discovered during testing must be corrected to the satisfaction of the Departmental Representative.

3.10 CO-ORDINATION OF PROTECTIVE DEVICES

- .1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

3.11 OPENINGS AND SLEEVES

- .1 It is the responsibility of the Contractor to make all required openings in the floor, ceiling and walls as well as provide and install all required sleeves in concrete slabs. All walls, floors, ceilings and other existing, damaged by the passage of wiring or installation of the equipment must be repaired in accordance with the existing finishes.
- .1 All slab and interior wall boring must be sealed, on each face, with a high performance firewall sealant made up of an acrylic water-based intumescent compound or equivalent approved.

Partie 1 General**1.1 REQUIREMENTS OF REGULATORY AGENCIES**

- .1 Obstruction lights for the free standing tower shall conform to Canadian Aviation Regulation 621.19/TP382. The tower height shall be based on the highestintended projection of the structure.
- .2 When required by the Canadian Aviation Regulation, make arrangements to provide temporary lighting until the Telecommunication Structure is accepted and the permanent power supply is available.
- .3 All electrical installations are to be in accordance with CSA C22.1.
- .4 All flashing obstruction lights should flash synchronously.

1.2 REFERENCE STANDARD

- .1 Whenever any of the following standards are referred to in this Specification, the revision dates of the standards listed below shall apply.
- .2 CSA C22.1 Canadian Electrical Code Part 1
- .3 Canadian Aviation Regulation (CAR) 621.19/TP382 "Standards Obstruction Markings", June 1, 2000 and updates.

1.3 SYSTEM DESIGN

- .1 The Contractor shall design a site specific obstruction lighting system respecting the requirements of this Specification. The equipment manufacturer shall be consulted during the design phase. The drawings are to be sealed by an experienced Professional Engineer licensed to practice in the jurisdiction in which the Telecommunication Structure is being constructed.

Partie 2 Products**2.1 SYSTEM**

- .1 Medium intensity aviation obstruction lightning. Use an electrical cable: Teck 90, # 14 and 4 conductors or as recommended by the manufacturer between the control box located at the base of the tower and the beacon on the end of the tower. Do not use Double Obstruction Light (DOL) system. If the headlight housing requires a specific power, it will be provided and installed by the contractor.
- .2 The light must be designed to operate in a temperature range of -40 ° C to +55 ° C (-40 ° F to +131 ° F).

- .3 The weight of the lighting must not exceed 10kg (without control box).
- .4 Intensity white LED lighting will be 20 000 cd day and 2,000 candelas night.
- .5 The light will be installed at the end of the tower with a galvanized steel support and approved for this application.
- .6 The controller is designed for lighting systems to medium L865 for lighting radio towers, wind and other obstacles to air navigation, as specified by the FAA and Transport Canada.
- .7 The controller is a compact model, in a housing of type 4 with screwed access door, power is 120V, 50/60Hz, and allows control of the LED lighting according to ambient outdoor lighting.
- .8 Provide photocell and wall mount according to the manufacturer's specifications.
- .9 The control box is installed according to the manufacturer's recommendations.
- .10 LED lights are to be kept on at all times.
- .11 Make the connection between the cable from the building (air / underground) and lighting cable in a junction box at the base of the tower with appropriate terminals.
- .12 Install a Breather Box at the base of the tower (water exhaust); Install two (2) Grounding kits on this electrical cable, at the base of the tower (on the tx line bridge without grounding bar) and at the top of the tower.
- .13 Use Teck 90 Minus 40degC. cable minimum # 14 gauge. Wire size shall be selected so that the maximum voltage drop will not exceed 2 % from point of supply to the end device.
- .14 All wires should be stranded copper.
- .15 All cables must be CSA approved and meet the criteria of the test for resistance to fire FT4 Canada.
- .16 Junction boxes and accessories shall be waterproof type, rigid fitting to be of cast iron or aluminium. Provide junction boxes with drain holes to ensure water is not trapped in the cable and at the base of the tower to ensure water does not enter the control panel via the cable.
- .17 The contractor is responsible to provide and install all other materials, pipes and fittings required to complete installation of the lighting system, even if they are not specifically described in the plans and specifications.

Partie 1 General**1.1 REFERENCES**

- .1 ASTM International
 - .1 ASTM D 698-[07e1], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft²) (600kN-m/m²).
- .2 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-[2004], LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations.
- .3 CSA International
 - .1 CSA A23.1/A23.2-[09], Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .4 Ministère des Transports du Québec
 - .1 Cahier des charges et devis généraux (CCDG) : infrastructures routières, Édition 2013.
- .5 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

Partie 2 Products**2.1 MATERIALS**

- .1 Clean granular free from shale particle and organic matter, and approved by the Ministry Representative.
- .2 MG-112 granular; compliant to the QDT (Quebec Departement of Transport) CCDG – 2013
- .3 MG-20 crushed stone; compliant to the QDT CCDG – 2013
- .4 CG-14 sand; compliant to the QDT CCDG – 2013
- .5 Non-shrink backfill : a mixture of sand and cement with a 28th day compressive strength of 15 MPa.
- .6 Rebar; high bond capacity rebar made of steel billets, grade 400W according to the CAN/CSA-G30.18 standards

[

Partie 3 Execution**3.1 EXAMINATION**

- .1 Verification of Conditions:
 - .1 Examine borehole log displayed on the drawings. The full soil report will be provided to the contractor after the contract is signed.
 - .2 Before commencing work verify and establish locations of buried services on and adjacent to site.
 - .3 Arrange with appropriate authority for relocation of buried services that interfere with execution of work. Pay costs of relocating services.
 - .4 Testing of materials and compaction of backfill will be carried out by testing laboratory designated by the Departmental Representative.
 - .5 Not later than 2 week before backfilling or filling, provide to designated testing agency, 23 kg sample of backfill material proposed for use.
 - .6 Not later than 48 hours before backfilling or filling with approved material, notify [Departmental Representative] so that compaction tests can be carried out by designated testing agency.
 - .7 Before commencing work, conduct, with Departmental Representative, condition survey of existing structures, trees and plants, lawns, fencing, service poles, wires, rail tracks and paving, survey bench marks and monuments which may be affected by work.

3.2 PREPARATION

- .1 Temporary Erosion and Sedimentation Control:
 - .1 Use temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties, in accordance with requirements of authorities having jurisdiction
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- .2 Protection of in-place conditions:
 - .1 Protect excavations from freezing.
 - .2 Keep excavations clean, free of standing water, and loose soil.
 - .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative's.

- .4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
- .5 Protect buried services that are to remain undisturbed.
- .3 Removal:
 - .1 Remove obsolete buried services within 2 m of foundations. Cap cut-offs.
 - .2 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
 - .3 Remove trees, stumps, logs, brush, shrubs, bushes, vines, undergrowth, rotten wood, dead plant material, exposed boulders and debris within areas designated on drawings.
 - .4 Remove stumps and tree roots below footings and the service area and to 600 mm below finished grade elsewhere.

3.3 EXCAVATION

- .1 Shore and brace excavations, protect slopes and banks and perform work in accordance with Provincial and Municipal regulations.
- .2 Bed rock excavation
 - .1 Do blasting in accordance with Provincial and Municipal regulations. Repair damage to approval of Departmental Representative. No blasting will be permitted within 3 m of any building and where damage would result.
 - .2 Type of rock : See the borehole log on drawings
 - .3 The contractor must use its own expert to interpret the available data on the soil nature
 - .4 In the alternative where blasting operation were performed before excavation work, the contractor shall use all necessary and applicable measures for such work.
 - .5 The exposed rock surface at the bottom of the excavation must be horizontal, uniform and free from loose and shaken parts. All salient rock pike must also be removed.
 - .6 Excavation must meet the required depth of 2.5meters for the foundation and foresee a layer of 75mm of lean non-shrink concrete.
 - .7 Excavation slope must be in the range of 1,0 horizontal for 10,0 vertical in allowing conditions.
 - .8 Provide a pumping system to drain surface and infiltration water that can accumulate at the bottom of the excavations. Please note that water infiltration in bedrock may vary depending on the amount of fracture and may increase in case of blasting.
- .3 Excavate as required to carry out work, in all materials met.

- .1 Do not disturb soil or rock below bearing surfaces. Notify Departmental Representative when excavations are complete.
- .2 If bearings are unsatisfactory, additional excavation will be authorized in writing and paid for as additional work.
- .3 The service area is a circular surface of approximately 10m of diameter centred on the tower. Provide a 4 meter wide access path to the service area from the adjacent road. Foresee an excavation of 600mm for these surfaces.
- .4 Excavate trenches to provide uniform continuous bearing and support for 150 mm thickness of pipe bedding material on solid and undisturbed ground. Trench widths below point 150 mm above pipe not to exceed diameter of pipe plus 600 mm.

3.4 SITE QUALITY CONTROL

- .1 Fill material and spaces to be filled to be inspected and approved by Departmental Representative.

3.5 BACKFILLING

- .1 Start backfilling only after inspection and receipt of written approval of fill material and spaces to be filled from Departmental Representative.
- .2 Remove snow, ice, construction debris, organic soil and standing water from spaces to be filled.
- .3 Lateral support: maintain even levels of backfill around structures as work progresses, to equalize earth pressures.
- .4 Compaction of subgrade: compact existing subgrade undersurface area, to same compaction as specified for fill. Fill excavated areas with MG-112 and a top layer of 250 mm of MG-20, both compacted as specified for fill.
- .5 Compaction: compact each layer of material to following densities for material to [ASTM D 698]:
 - .1 Compaction of: 95%.
- .6 In trenches:
 - .1 Up to 300 mm above pipe or conduit: CG-14 sand.
 - .2 Over 300 mm above pipe or conduit: MG-112 backfill with a variable thickness depending of the trench depth and finish backfill with a layer of 250mm of MG-20.
- .7 .
- .8 Blown rock material, are not acceptable for fine grading, , imported material must be placed on this type of material.

- .9 Foundations : grade the bottom of the excavation with a 75mm layer of non-shrink concrete under the foundation. Backfill with layers of MG-112 not exceeding 300mm et finish with a 250mm layer of MG-20 .

3.6 GRADING

- .1 Grade to ensure that water will drain away from the tower, but it is rather directed at other drainage work outside the site approved by Departmental Representative. Leveling the ground giving it a gradual slope toward the outside of the site.

3.7 CLEANING

- .1 Progress Cleaning: clean in accordance with Section [01 74 11 - Cleaning].
 - .1 Dispose of cleared and grubbed material off site daily.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section [01 74 11 - Cleaning].

3.8 ROCK ANCHOR

- .1 Materials:
 - .1 Rock anchors consist of 30M rebar made of steel billets , Grade 400W , according to standard CAN/CSA-G30.18
 - .2 Use an expansive grout with a compressive strength at 28 days of 50 MPa.
- .2 The Contractor is responsible for the supply and installation of anchors. The work, without being limited to, are:
 - .1 Provide materials
 - .2 Labor , equipment and required services
 - .3 Drilling
 - .4 Anchor installation
 - .5 Grouting
 - .6 Anchor pulling test
 - .1 Tested in tension at 200 kN
 - .2 Provide and pay for the services of a laboratory expertise and deliver the results to the Departmental Representative
- .3 Submittals :
 - .1 Submit anchor and grout data sheet to the Departmental Representative
 - .2 Submit working method to the Departmental Representative

- .4 Drilling will be done by rotation and percussion; the dimensions are shown on the plans. Drill holes must be closed tightly until the completion of the grouting.
- .5 Use a positioning device for centering the anchors in the hole.
- .6 Placing grout :
 - .1 The grout will be introduced by injection from the bottom of the drill holes with the rebar anchors in place
 - .2 Grouts continuously to completely fill the hole
- .7 If a temperature lower than 0 ° C persists for more than 18 hours over a period of 24 hours or if the rock is frozen, anchor grouting is prohibited
- .8 Pullout tests
 - .1 Perform tests of tensile load on three different anchors, one by tower foundation
 - .2 Apply a tension load of 200 kN on the rebar
 - .3 Increase the load by step
 - .4 Maintain the test load for 5 minutes and record movement or loss of tension in the system to identify any movement of the anchor
 - .5 A copy of the report must be submitted to the Departmental Representative

Partie 1 General**1.1 Summary**

- .1 Section include
 - .1 Performance criteria for self-supporting tower made from galvanized steel.
- .2 Related requirements
 - .1 Section 05 12 23

1.2 REFERENCES

- .1 CSA-S37-01 Antennes, tours et structure de support d'antennes
- .2 CAN/CSA-A23.1/A23.2, Concrete materials methods.
- .3 National Building code (NBC).
- .4 CAN/CSA-S16.1 Design of steel structure
- .5 CAN/CSA-G164 Galvanizing standards

1.3 SYSTEM DESCRIPTION

- .1 36.58 meters (120 ft.) self-supporting tower for atmospheric sampling including, without limitation:
 - .1 Provide all required elements
 - .2 On site delivery, unloading included
 - .3 Erection of the structure
- .2 All members and bolts must be galvanized
- .3 The tower must include the following items:
 - .1 A ladder
 - .2 Fall-arresting device
 - .3 Anti-climb device
 - .4 Supporting structure for a flashing beacon on top of the tower
 - .5 A lightning rod
 - .6 The required grounding elements
- .4 Provide anchor bolts and an installation template
- .5 The base width must be equal or smaller than 3 meters

1.4 PERFORMANCE REQUIREMENTS

- .1 The tower must be designed according to the following design criteria:
 - .1 CSA-S37-01 Standards
 - .2 Wind pressure $q = 320$ Pascal
 - .3 Ice load of 25 mm (zone II)
 - .4 Service factor $\tau = 1$
 - .5 Risk factor = 1
- .2 The tower must be able to withstand the following equipment's loads:
 - .1 Charge de l'équipement de prise d'échantillon décrits dans le tableau suivant (tel que sur plans) :

LISTE DES ÉQUIPEMENTS / EQUIPMENT LIST							
No EQUIPEMENT / EQUIPMENT No	DESCRIPTION	ELEVATION	AZIMUT (°)	CÂBLE PRINCIPAL / MAIN CABLE	EQUIPEMENT DANS LE PYLÔNE / EQUIPMENT IN TOWER	PROPRIÉTAIRE / OWNER	ÉTAT / STATUE
①	PHARE CLIGNOTANT TYPE CL-864 / TYPE CL-864 FLASHING BEACON	40.00m	N/A	3C. #14 TECK		TPSGC	CE PROJET / THIS PROJECT
②	SMALL AIR SAMPLE INLET #1	40.00m	N/A	3/8"Ø SYNDFLEX (OR DEKORON)	BOITE EN ACIER INOX. 127mmx127mm AVEC SUPPORT (L51mmx51mmx610 LG) EN ALUMINIUM (2 LB±) / 127mmx127mm STAINLESS STEEL BOX WITH ALUMINIUM SUPPORT (L51"x51"x610" LONG), (2 LB±)	TPSGC	CE PROJET / THIS PROJECT (1)
③	SMALL AIR SAMPLE INLET #2	40.00m	N/A	3/8"Ø SYNDFLEX (OR DEKORON)	BOITE EN ACIER INOX. 127mmx127mm AVEC SUPPORT (L51mmx51mmx610 LG) EN ALUMINIUM (2 LB±) / 127mmx127mm STAINLESS STEEL BOX WITH ALUMINIUM SUPPORT (L51"x51"x610" LONG), (2 LB±)	TPSGC	CE PROJET / THIS PROJECT (1)

- .1 Foresee a future load of 25 kg at an elevation of 36.58m with the following dimensions: 700mm x 700mm x 700mm. Linked to the ground with a 20mm cable weighting 1.5 kg/m.
- .2 For equipment 2 and 3 the main cable is a thermoplastic tube of equal or superior quality than those produced by SYNDFLEX or DEKORON or approved equivalent (the Contractor shall provide a document issued by the supplier to demonstrate compliance of the product offered).

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Shop Drawings: submit the required shop drawing in accordance with section 01 33 00 – Submittal Procedures and 01 78 00 – Closeout submittals.
 - .1 The submitted shop drawing must indicate the anchor layout
 - .2 Factored and on-factored ground reaction should be indicated on the drawings
 - .3 Provide an elevation view showing the dimensions of the various tower member

- .4 Shop drawings as well as the ground reactions must be sealed by an engineer member of the "Ordre des ingénieurs du Québec"
- .5 Provide the required torque for the anchors bolts
- .2 Submit to the Departmental Representative a written statement confirming the installation of anchor bolts according to plans and specifications. This document must be signed by an engineer member of the "Ordre des ingénieurs du Québec".
- .3 Submit a template for anchor bolts
- .4 Conduct an inspection that includes a visual inspection of the structural members and fall arrest element 1 year after commissioning the tower. The inspection must include a check of 2% of the connexion and must be submitted to the Ministry Representative.
- .5 A final inspection report containing As Built plans, signed by an engineer member of the "Ordre des ingénieurs du Québec" must be submitted to the Ministerial Representative

1.6 QUALITY ASSURANCE

- .1 Health and Safety
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .2 Installer Qualifications: company or person experienced in performing work in installation of work similar to that required for this project, with minimum five years experiences.

1.7 DELIVERY, STORAGE AND DISPOSAL

- .1 Waste management and disposal :
 - .1 Deposit packaging materials in appropriate container on site for recycling or reuse.
 - .2 Avoid using landfill waste disposal procedures when recycling facilities are available.
 - .3 Collect and separate plastic, paper packaging and corrugated cardboard.
 - .4 Dispose of corrugated cardboard, polystyrene and plastic packaging material in appropriate on-site bin.
- .2 Include on site delivery
- .3 Coordinate with the owner and the contractor the date of delivery
- .4 Coordinate the delivery with the contractor in order to minimise the storage period on site before the work begins.

1.8 WARRANTY

- .1 For the materials involved in the tower construction, a 12 month warranty period is prescribed in subsection CG 32.1.
- .2 Manufacturers Warranty: Submit, for Departmental Representative's, acceptance, manufacturer's standard warranty document executed by authorized company official.

Partie 2 Products**2.1 MATÉRIAUX/MATÉRIELS**

- .1 Sustainable requirements :
 - .1 Materials and products in accordance with Section 01 47 15 - Sustainable Requirements: Construction.
- .2 Materials: as required to achieve specified performance criteria; functionally compatible with adjacent materials and components.
- .3 Material as required in CSA S37-01 standards
 - .1 Steel with a minimum yield strength of 300 MPa for vertical and diagonal members
 - .2 All components of the tower shall be hot dip galvanized with a minimum thickness of galvanizing equal or higher specification CAN/CSA-G164
 - .3 All bolts must be galvanized and respect ASTM-A325 standards
 - .4 400W galvanized anchor with galvanization exceeding 50 mm in concrete foundation
 - .5 Repair broken zinc coating according ASTM A780
 - .6 Minimum thickness :
 - .1 5 mm for connections
 - .2 4 mm for structural tubing
 - .3 3 mm for structural steel parts

2.2 ALIMENTATION EN ÉNERGIE ÉLECTRIQUE

- .1 Matériel mécanique : [alimentation normale et alimentation de secours], courant alternatif [] phasé, [] V, [] A, [] fils, 60 Hz.
- .2 Matériel d'éclairage : [alimentation normale et alimentation de secours], courant alternatif [mono] phasé, [120] V, [] A, [] fils, 60 Hz.

Partie 3 Execution

3.1 INSTALLATION

- .1 Only the air sampling device will be installed by a Ministry Representative. All others elements will be installed by the general contractor or it's subcontractor.

3.2 CLEANING

- .1 Remove protective coverings from finished surfaces and components.
- .2 Clean surfaces and components ready for inspection.

END OF SECTION