Public Works and Government Services Canada (PWGSC)

Restoration of the edge beam of the workshop and site drainage—Stage I

Specifications

For Bid

PWGSC Reference: R.064816.019

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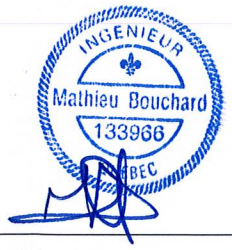
For Bid

PWGSC Reference: R.064816.019
BPR Reference : 22906A

2014/10/21

PREPARED BY:



28 oct. 2014

Mathieu Bouchard, Eng. Date

SPECIFICATIONS AND DRAWINGS

SPECIFICATIONS

DRAWINGS

STRUCTURE

S01 Plan view

S02 Details

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

1. Section 01 14 00 - Restriction of Work.

2. Section 01 52 00 - Construction Facilities.

1.2 WORK COVERED BY THE CONTRACT DOCUMENTS

1. The present work consists of replacing the structural wood edge beam around the entire perimeter of the building. Work will take place at the workshop, in the center of the other buildings forming the heritage site of Cap-Tourmente.

1.3 SCOPE OF WORK

1. Work include, but are not limited to :
    1. Establish a system of supports on steel piles.
    2. Restraining the building with a steel structure disposed in the bottom of the peripheral walls and connect to the piles.
    3. Establish a new concrete footing.
    4. Establish a new insulation, membrane and protection grid.

1.4 WORK BY OTHERS

1. All information shown on plans to be executed by the Contractor.

2. Work with all stakeholders and execute the instructions Departmental Representative.

3. If the performance or the result of any part of the work covered by this contract, rely on work of another contractor, to immediately report in writing any abnormalities or defects likely to interfere with the proper workmanship.

1.5 FUTURE WORK

1. Insure that Work avoids encroachment into areas required for future work.

1.6 WORK SEQUENCE

1. Co-ordinate Progress Schedule and co-ordinate with Owner Occupancy during construction.

1.7 CONTRACTOR USE OF PREMISES

1. The construction site may be used until a substantial achievement of the work, inside areas identified by the Departmental Representative. Comply with the restrictions mentioned in Section 01 14 00 – *Work Restriction.*

2. Limit use of premises for Work, for storage, or access to allow:
    1. Owner occupancy;
    2. Partial owner occupancy.

3. Coordinate the use of the site based on the directives of the Departmental Representative.

4. Find additional work or storage areas necessary for the execution of the work as defined in the contract and assume the expenses.

5. Remove or modify the existing works to avoid damaging the sections that are to remain in place.

6. Repair or replace the sections of the existing structure that have been modified during construction in accordance with the directives of the Departmental Representative and for the purpose of connecting to or ensuring harmony with existing or adjacent structures.

7. After the completion of the work, the condition of the existing structure must be equivalent or better than its condition before the beginning of the work.

1.8 OWNER OCCUPANCY

1. The owner will occupy the areas located outside of the construction site's enclosure for the entire duration of construction, and will pursue normal activities during this period.

2. Collaborate with the owner to establish the work schedule in order to avoid conflicts and to facilitate the latter's use of the facilities.

1.9 PARTIAL DEPARTMENTAL REPRESENTATIVE OCCUPANCY

1. Establish a schedule that will anticipate considerable progress in designated areas so that they can be occupied by the owner before the work defined in the contract is complete.

2. Owner will occupy designated areas for purpose of storage of furnishings and installation of equipment

3. Execute Certificate of Substantial Performance for each designated portion of Work prior to Departmental representative occupancy. Contractor shall allow:
    1. Access for owner personnel;
    2. Operation of HVAC and electrical systems.

4. On occupancy, owner will provide for occupied areas:
    1. Operation of HVAC and electrical systems;
    2. Maintenance;
    3. Security.

5. Execute Partial Interim Certificate of Completion for each designated portion of Work prior to Owner occupancy. Contractor shall allow :
    1. Access for owner personnel;
    2. Operation of HVAC and electrical systems.

1.10 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

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

1.11 EXISTING 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 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 pedestrian, vehicular traffic and tenant operations.

3. Provide alternative routes for personnel, pedestrian 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 Consultant 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.

1.12 DOCUMENTS REQUIRED

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.

1.13 RIGHTS, PERMITS AND CERTIFICATES

1. The General Contractor is obligated to obtain the required permits for the execution of the work and has to assume the entire costs. He will comply with all of the federal, provincial and municipal regulations and with any other law or regulation related to the work defined in this contract. He is also obligated to assume responsibility for any violation of relevant laws and regulations.

2. The General Contractor will pay for any obligation related to safety measures required by the “Loi sur la santé et la sécurité du travail du Québec” (Quebec law on health and safety in the work place), as well as for any expense deriving from such obligations.

3. Supply inspection certificates confirming that the work is compliant with the requirements of the competent authorities.

4. Provide to the Departmental Representative a copy of the applications submitted to the above mentioned authorities and the approval documents received.

1.14 SITE VISIT

1. In order to ensure familiarity with the conditions of the contracts and to obtain all of the information relevant to the execution of the work, visit the work site. Ignorance of site conditions does not constitute a valid reason to claim additional payment.

1.15 WORK IMPLEMENTATION

1. Based on the control lines and levels indicated on the plans, the General Contractor will establish the main control and reference points required for the execution of the work and provide the required materials.

2. Take the necessary measures to ensure that the control points will not be moved during construction.

3. Provide all of the required materials to allow the Departmental Representative to make the verifications deemed necessary.

4. Before beginning work, the General Contractor must verify all of the measurements on site and notify the Departmental Representative of any error or discrepancy.

5. During the work, if non-conformities are identified following marking errors from the General Contractor, the latter will do the work again at his expense.

1.16 ERRORS OR OMISSIONS

1. If, during the execution of the work, the General Contractor identifies contradictions between the plans and the site's physical configuration, or errors and omissions on the plans, he is obligated to notify the Departmental Representative in writing immediately. If the General Contractor elects to proceed without notifying the Departmental Representative, he will do so at his own risk until he receives the authorization to proceed from the Departmental Representative.

1.17 WEATHER CONDITIONS

1. The General Contractor cannot claim additional amounts due to inclement weather, including during the winter period. He will plan his work based on the weather conditions likely to occur at the time of execution and include in his bid the amounts necessary to re-do some work due to weather conditions.

1.18 PAYMENT METHODS

1. Demolition
    1. Demolition consist of a bulk sample. The total price includes labor and equipment necessary to carry out this procedure. Demolition includes, without limitation, removal of the decay of wood, plywood and fittings, insulating and of withdrawal of the existing edge beam.

2. Structural steel
    1. Structural steel is a lot overall. The total price of the lot includes labor, equipment, material supply and installation of equipment, hardware and all procedures required to set up the steel structure and cased piles steel.

3. Concreting
    1. Concreting is paid overall price. The price includes the supply and installation of concrete formwork, steel rod and all that encompasses concrete work.

4. Ecavation, mesh and insulation
    1. The item excavation, mesh and insulation is paid to overall price. The price includes the supply of materials, labor, equipment and all that is required for the implementation of these elements, without limitation, including membrane elements and insulating foundations.

5. Walls rebuilding
    1. The work of walls rebuilding are paid overall price. This price includes the supply of materials, labor, equipment and all that is required to refit the walls, including insulation, air barrier and all wood components.

6. Clapboard of wood to replace
    1. Clapboard replacement is paid to the unit. The price includes the supply, installation, labor and equipment required. New sections of clapboard must be as similar as possible to the original sections.

7. This list should include everything that is required to plan interventions as, without limitation.

PART 2 - PRODUCTS

2.1 NOT USED

1. Not used.

PART 3 - EXECUTION

3.1 NOT USED

1. Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

1. Section 01 11 01 – general information on works.

2. Section 01 52 00 - construction facilities.

3. Section 01 74 11 – Cleaning

1.2 ACCESS AND EGRESS

1. Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.3 USE OF SITE AND FACILITIES

1. Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

2. Maintain existing services to building and provide for personnel and vehicle access.

3. Where security is reduced by work provide temporary means to maintain security.

4. Departmental Representative will assign sanitary facilities for use by General Contractor's personnel. Keep facilities clean.

1.4 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

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

1.5 EXISTING 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 of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

3. Provide for personnel, pedestrian and vehicular traffic.

1.6 SPECIAL REQUIREMENTS

1. This section presents various specific requirements that need to be met, at all times, during the work. These specific requirements include:
    1. Coordinate the work with the Departmental Representative in order to permit the normal operations of the building and its occupants.
    2. Normal working hours are from Monday to Friday, 6:00 AM to 6:00 PM, except for statutory holidays.
    3. Ensure that the General Contractor's onsite workers are aware of the regulations and respect them, most especially the rules concerning fire safety, traffic, and construction site safety.
    4. Ensure that the access points to the construction site remain blocked whenever the site is not in use. The General Contractor is responsible for providing protection against trespassing.
    5. Remain within the limits of the work area and access roads.
    6. Ensure that the materials/equipment are delivered outside of rush hour and early in the morning, except with the approval of the Departmental Representative, see section 01 52 00 – *Construction Facilities*.
    7. The use of tools or equipment powered by an internal combustion engine (gas, propane, etc.) is strictly forbidden in all areas of the building, including basements, mechanical rooms, the shed and the warehouse. The use of tools such as a propane welding torch or other types of tools will require authorization.
2. This list of special requirements is non-exhaustive and the General Contractor must comply with all of the requirements stated in the specifications.

1.7 CONSTRAINTS FOR THE OCCUPATION OF TRAFFIC LANES AND SIDEWALKS

1. Before work begins, the General Contractor is responsible for making all of the necessary arrangements and to coordinate the closure of streets and sidewalks with the authorities concerned by the project work.

2. The General Contractor must refer to section 01 52 00 - *Construction Facilities* for the site boundaries to be respected adjacent to the building.

1.8 BUILDING SMOKING ENVIRONMENT

1. Comply with smoking restrictions. Smoking is not permitted.

PART 2 - PRODUCTS

2.1 NOT USED

1. Not used.

PART 3 - EXECUTION

3.1 NOT USED

1. Not used.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

1. Section 01 45 00 – Quality Control.

2. Section 01 35 29.06 – Health and Safety Requirements.

3. Section 01 74 11 – Cleaning.

4. Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

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. The documents issued by a Subcontractor must be sent through the General Contractor, both incoming and outgoing. The Subcontractor must stamp the documents with the received date and keep a log of the documents that are both received and issued. The representative of the General Contractor must also ensure the overall coordination in terms of drawings and follow up with suppliers.

3. Do not undertake work for which the delivery of documents and samples is requested before all of the pieces submitted have been completely finished, and that the shop drawings, samples and product descriptions have not been returned as well as reviewed by the Departmental Representative.

4. Present shop drawings, product data, samples and mock-ups in SI Metric units.

5. Where items or information is not produced in SI Metric units converted values are acceptable.

6. 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.

7. Arrange the submitted documentation with the work requirements and contractual documents. The drawings will not be approved one at a time. The audit will be performed when all of the related drawings have been submitted.

8. Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

9. Verify field measurements and affected adjacent Work are co-ordinated.

10. General Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

11. General Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

12. 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 General 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 of Canada (Engineer who is a member of the “Ordre des ingénieurs du Québec”, or OIQ).

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 10 days for Departmental Representative's review of each submission. The General Contractor’s delay for the production of shop drawings, and their review by the Departmental Representative, must be taken into consideration in the General Contractor’s deadline and cannot be used as an excuse for missed deadlines.

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 2, containing:
    1. Date;
    2. Project title and number;
    3. General 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:
        a. General Contractor;
        b. Subcontractor;

c. Supplier;

d. Manufacturer;

e. Retailers.

4. General Contractor's stamp, signed by General 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:

   a. Fabrication;

   b. Layout, showing dimensions, including identified field dimensions, and clearances;

   c. Setting or erection details;

   d. Capacities;

   e. Performance characteristics;

   f. Standards;

   g. Operating weight;

   h. Wiring diagrams;

   i. Single line and schematic diagrams;

   j. Relationship to adjacent work.

9. After Departmental Representative's review, distribute copies.

10. Submit one (1) electronic copy of the shop drawings prescribed in the technical sections of the specifications and according to the reasonable requirements of the Departmental Representative. After a review by the Departmental Representative, the shop drawings, including comments if any, will be scanned in the PDF format and returned to the General Contractor, who will be advised via email at the address provided to the Departmental Representative. This notification

11. This notice will specify the procedure for the pick-up of the reviewed shop drawings. No paper copies of the reviewed shop drawings will therefore be sent to the General Contractor. The General Contractor must pick up the drawings and distribute them, as required.

12. Certaines sections du devis prévoient, qu'en certains cas, les croquis schématiques normalement fournis par le fabricant, caractéristiques indiquées dans ses catalogues, diagrammes, tableaux, abaques, illustrations et données descriptives ordinaires, peuvent tenir lieu de dessin d'atelier.

13. La documentation ci-dessus (point 11) n'est acceptée que si elle est conforme aux prescriptions suivantes :

    1. elle ne doit pas contenir de renseignements qui ne concernent pas le projet;

    2. les informations de base doivent être complétées par des informations additionnelles propres au projet.

14. Submit 1 electronic copy 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.

15. Submit 1 electronic copy 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.

16. Submit 1 electronic copy of manufacturer's 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.

17. Submit 6 electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

18. Submit 1 electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

19. Delete information not applicable to project.

20. Supplement standard information to provide details applicable to project.

21. If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, transparency 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.

22. The procedure for the submittal and review of shop drawings is intended to enable the Departmental Representative to review the drawings and detect, if appropriate, any cases of non-compliance or deviations. Under no circumstances does this review constitute an exhaustive verification of the data or information appearing therein.

23. 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 General Contractor submitting same, and such review shall not relieve General 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, General 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. The comments and/or the corrections included in these drawings do not constitute any surety or approval, if an exemption to these requirements should be present.

1.4 SAMPLES

1. Submit for review samples in triplicate 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. Where colour, pattern or texture is criterion, submit full range of samples.

5. 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.

6. Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

7. Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 SAMPLES OF WORK

1. Provide samples of the work required in section 01 45 00 – *Quality Control*.

1.6 CERTIFICATES AND TRANSCRIPTS

1. Submit the relevant documents required by the “Commission de la santé et de la sécurité au travail" or CSST (workplace health and safety commission) immediately after the contract has been awarded.

PART 2 - PRODUCTS

2.1 NOT USED

1. Not Used.

PART 3 - EXECUTION

3.1 NOT USED

1. Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

1. Section 01 33 00 – Submittal procedures
2. Section 01 35 43 – Environmental procedures

1.2 INCLUDED IN THE SECTION

1. The General Contractor must manage their activities so that the health and safety of the public and their employees, as well as the environment, always takes precedence over issues related to work costs and schedule.

1.3 REFERENCES

1. Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
2. Canadian Standards Association (CSA).
3. Health Canada/Workplace Hazardous Materials Information System (WHMIS).
    1. Material Safety Data Sheets (MSDS).
4. An Act Respecting Occupational Health and Safety, R.S.Q. 1997 (updated 26 July 2005)
5. Saftey Code for the Construction Industry, S-2.1, r.4.
6. National Building Code of Canada, Volume 8.
7. CSA Z462-F12 – Workplace Electrical Safety.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

1. Make submittals in accordance with section 01 33 00 - Submittal Procedures.
2. Submit site-specific Health and Safety Plan to the "Commission de la santé et de la sécurité du travail",or CSST (workplace health and safety commission) and (“Association paritaire en santé et sécurité du secteur de la construction" or APSAM (joint health and safety association of the construction sector) (ASP Construction), as described in article 1.8, within 10 days after date of Notice to Proceed and prior to commencement of Work. Submit copies of General Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative. The Departmental Representative can, after receiving the program and at any time during the project, request that the system be modified or competed in order to better reflect the reality of the work site. The General Contractor must then make the requested changes before the beginning of the work.
3. Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors indicated in article 1.13.1.

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. Submit WHMIS MSDS - Material Safety Data Sheets, at least seven (7) days before their use at the site.

7. Provide the Departmental Representative with copies of the applicable training certificates that are required for the prevention program, specifically:
    1. General health and safety courses for construction sites.
    2. Security guard certificate.
    3. Workplace first aid and CPR.
    4. Work susceptible to causing asbestos dust.
    5. Enclosed spaces work.
    6. Locking procedures
    7. Wearing and adjustments to personal protection equipment.
    8. Safe operation of forklifts.
    9. Elevated electrical platforms.
    10. And all other training required by regulation or by the prevention program.

8. Medical exams: When medical examinations are required, whether by a law, a regulation, a directive, a specification or a prevention program, the General Contractor must:
    1. Before mobilization, send to the Departmental Representative the certificates of medical examinations for the supervisory personnel and all employees covered by the first paragraph of this article that will be present at the opening of the construction site.
    2. Send any subsequent certificates of medical examinations as soon as possible for all of the newly arrived personnel at the construction site that are covered by the first paragraph of this article.

9. On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

10. Notice of opening of the construction site: The notice of opening of the construction site must be sent to the "Commission de la santé et de la sécurité du travail" or CSST (workplace health and safety commission) before work can begin, with a copy to the Departmental Representative. A copy of this notice must also be prominently displayed at the site. During the closing of the site, a closing notice must be sent to the CSST, with a copy of the Departmental Representative.

11. Engineering compliance plans and certificates: The General Contractor must send to the CSST and to the Departmental Representative a copy, signed and sealed by an engineer, of the compliance plans and certificates that are required as per the Safety Code for the Construction Industry (S-2.1, r. 6), another law, another regulation, or another clause of the specifications or contract. A copy of these documents must be available at all times at the construction site.

12. Certificate of compliance issued by the CSST: The compliance certificate is a document delivered by the CSST, confirming that the General Contractor has complied with the CSST, in other words, have paid

the total amount due in relation to that particular contract. This document must be delivered to the Departmental Representative at the end of the work.

1.5 SAFETY ASSESSMENT

1. The General Contractor must identify the hazards related to each task performed on the construction site.

2. The General Contractor must plan and organize the work in a way that favors the elimination of the sources of danger or has collective protection and thus keep to a minimum the use of personal protective equipment. When personal protection against falls is required, workers must use a safety harness in accordance with the standard CAN/CSA-Z-259.10-M90. The safety harness must not be used as protection against falls.

3. Equipment, tools, or a means of protection that cannot be installed or used without compromising the health and safety of the workers or the public is deemed to be inadequate for the work to be completed.

4. All mechanical equipment must be inspected before it is delivered to the construction site. Before the use of mechanical equipment, the General Contractor must send to the Departmental Representative a compliance certificate signed by a competent mechanic. If the Departmental Representative suspects a defect or risk of an accident, they can, at any time, order the immediate shutdown of the equipment and request a second inspection by a specialist of their choice.

5. For the use of lifting equipment, for either personnel or materiel, ensure that the inspections required by the applicable and current standards are met and be able to provide a copy of the inspection certificate to the Departmental Representative.

1.6 MEETINGS

1. A decision-maker for the General Contractor must be present at all of the meetings that are related to health and safety on the construction site.

2. If required, depending on the number of workers on the construction site, the General Contractor should put together a construction site committee and hold meetings as per the requirements in the Safety Code for the Construction Industry.

1.7 REGULATORY REQUIREMENTS

1. Conform to all of the laws, regulations, and all other standards that are applicable to the execution of the work.

2. Observe and enforce le safety measures for construction work required by the codes and standards listed in Article 1.3 in addition to complying with the standards of the Quebec provincial government and the municipal organizations.

3. In the case of conflict between the provisions of the above authorities, follow the strictest provision.

4. Follow the standards and regulations prescribed to ensure the normal flow of work on land contaminated by hazardous or toxic materials.

5. Notwithstanding the publication date of the standards indicated in the Safety Code for the Construction Industry, the current version should always be used when it applies.

1.8 PROJECT/SITE CONDITIONS

1. At this construction site, the General Contractor must take into account the following characteristics, among others:
    1. Take into consideration that business is conducted in the building and the occupants are always 7 days on 7 present. When the work is in progress, make every effort to not hinder the building's activities outside of the work zones delineated on the plans.
    2. The proximity of the road traffic requires increased vigilance in relation to health and safety of the workers.
    3. The General Contractor will provide a sufficient quantity of portable fire extinguishers within the construction site area.

1.9 HEALTH AND SAFETY REQUIREMENTS

1. Accept and assume all of the tasks and obligations normally assigned to the principal contractor under the Act Respecting Occupational Health and Safety (L.R.Q., Chapter S-2.1) and the Safety Code for the Construction Industry (S-2.1, r.4).

2. Develop a prevention program specific to the construction site that is based on the identification of risks and have this program in place from the beginning of the project until the final stage of demobilization. The prevention program must take into account the information in Article 1.7. It must be sent to all individuals involved, in accordance with Article 1.3. The prevention program must, at a minimum, include:
    1. The company policy on health and safety;
    2. The description and total cost of the work, the schedule, and the anticipated labour needs;
    3. The organizational chart of the individuals responsible for health and safety;
    4. The physical and materiel organization of the construction site;
    5. First aid standards;
    6. Identification of risks in relation to the construction site;
    7. Identification of risks in connection with the work performed, including preventative measures and the modality of implementation;
    8. Required training;
    9. Procedure in case of accidents/injuries;
    10. Written agreement for all of the stakeholders in relation to the prevention program;
    11. Construction site inspection checklist based on the preventative measures;
    12. Rescue procedures if there is the risk of falls due to working at heights

3. The General Contractor must develop an efficient emergency plan, taking into account the characteristics and the constraints of the construction site and its environment. This emergency plan must be sent to everyone concerned, in accordance with Article 1.3. The emergency plan must include in particular:

1. The evacuation procedure;
2. Identifications of resources (police, fire department, ambulances, etc.);
3. Identification of those responsible on the construction site;
4. Identification of first-aid attendant;
5. The necessary training for those responsible for its implementation;
6. And any other information required, given the characteristics of the construction site.

4. When the General Contractor uses or brings products regulated by the WHMIS into the building, they must have in their possession the updated material safety data sheets (MSDS) for the hazardous products regulated by the WHMIS. These data sheets are kept onsite so that they may be consulted for the dangers of using these products and for the information of doctors should there be an incident involving these products. In addition, the General Contractor must ensure that all of the workers understand the risks associated with these products, and that they have and use adequate individual protection equipment. Also, the workers must evaluate if any of the fumes from these products could seep into the various ventilation systems and cause incidents and harm to customers.

1.10 RESPONSIBILITY

1. No matter the size of the construction site or the number of workers present, one competent person must be named as the supervisor responsible for health and safety, and take every measure necessary to ensure the health and safety of the people onsite and in the immediate surroundings that could be affected by the ongoing work.

2. Take all of the measures necessary to ensure the implementation and enforcement of the health and safety requirements contained in the contractual documents, federal and provincial regulations, the applicable norms, and the prevention program designed specifically for the construction site and immediately comply with any order or notice of correction issued by the CSST.

3. Take all of the measures necessary to keep the construction site clean and orderly throughout the work.

1.11 COMMUNICATION AND SIGNAGE

1. Take all of the necessary steps to ensure effective communication of the health and safety information at the construction site. Upon arrival at the site, all workers must be informed of the specifics of the prevention program, their obligations and their rights. The General Contractor must insist on the right of the workers to refuse to perform a job if they believe that the task will compromise their health, safety, physical wellbeing, or that of others present at the construction site. A log must be kept onsite and updated with the information provided and the signature of the all of the workers who have received this information.

2. The following information and documents must be posted for the workers in an easily accessible area:
    1. Notice of the initiation of construction;
    2. The identity of the prime contractor;
    3. Company policy on health and safety;
    4. Prevention program specific to the construction site;
    5. Emergency plan;

6. Material safety data sheets for all of the controlled products used on the construction site;
7. Construction site committee meeting minutes;
8. List of construction site committee members
9. Names of the first-aid attendants;
10. Intervention and correction reports issued by the CSST.

1.12 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. The General Contractor must thereafter make the necessary changes to the prevention program so that work may safely resume.

1.13 INSPECTION OF THE WORKPLACE AND CORRECTION OF HAZARDOUS CONDITIONS

1. Inspect the workplace and complete the construction site inspection checklist at least once per day.

2. Promptly take all necessary measures to correct deviations from the laws and regulations and hazardous situations that are identified by a government inspector, by the Departmental Representative, by the construction health and safety coordinator, or during periodic inspections.

3. Send to the Departmental Representative a written confirmation that all of the measures have been taken to correct the deviations and hazardous situations.

4. Work stoppage: Grant the security guard, or if there is no security guard, the person responsible for the health and safety, all of the authority required to order the stoppage and the resumption of work when they judge it necessary or for reasons of health and safety. This person must ensure that the health and safety of the public and the workers at the site, as well as the protection of the environment, override issues related to cost or schedule.

5. Without limiting the scope of articles 1.8 and 1.9, the Departmental Representative may at any time order a work stoppage if, according to his opinion, there is danger or a risk to the health and safety of the workers on the site or the public or the environment.

1.14 NAIL GUNS AND OTHER CARTRIDGE DEVICES

1. The use of nail guns, Ramset type explosive-actuated nail guns, or other cartridge devices is not authorized, unless with the authorization of the Departmental Representative.

2. Anyone that uses a nail gun must obtain a training certificate and meet all of the requirements of section 7 of the Safety Code for the Construction Industry (S-2.1, r. 6).

3. Any other cartridge device must be used according to the manufacturer instructions and conforming with the applicable standards and regulations.

1.15 WORK AT HIGH TEMPERATURES (WELDING, CUTTING, GRINDING, ETC.)

1. All work that causes heat, smoke or sparks (welding, cutting, using a grinder, etc.) requires a "High Temperature Work Permit". The permit that authorizes this type of work is issued by the Departmental Representative and must be completed in conjunction with the General Contractor. The arrangements must be made a minimum of 48 hours in advance. No high temperature work can take place with the high temperature work permit. The General Contractor must be in possession at all times (on the construction site) of the high temperature work permit that was issued when the work necessitated this type of permit. The high temperature work permit form will be provided to the General Contractor at the beginning of the work. When performing work at high temperatures, take all of the temporary protection precautions so that the work can be carried out safely for both the workers and the existing building.

1.16 ELECTRICAL WORK

1. In accordance with standard CSA Z462-2012, any worker performing electrical work and working in these facilities must wear at the very least wear clothing that is infusible (does not melt) or non-treated natural fibers, with long sleeves, or as the case may be, clothing resistant to electrical arcs corresponding to the risk associated with the task being performed.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

1. Section 01 33 00 – Submittal procedures.
2. Section 01 74 11 – Cleaning.
3. Section 01 74 21 – Construction/demolition waste management and disposal.
4. Section 01 35 29.06 – Health and safety requirements.

1.2 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 humankind; 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. U.S. Environmental Protection Agency (EPA)/Office of Water
        a. EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter 3.
        b. General construction permit from EPA 2012.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

1. Provide submittals in accordance with Section 01 33 00 - *Submittal Procedures*.
2. Technical data sheets
    1. Submit the required technical data sheets, as well as instructions and literature from the manufacturer regarding the various products used at the construction site. The technical data sheets must include product characteristics, performance criteria, dimensions, limitations, and the type of finish.
    2. Submit two (2) copies of the data sheets required for the Workplace Hazardous Materials Information System (WHMIS), as specified in Section 01 35 29.06 – *Health and Safety Requirements* and in Section 01 35 43 – *Environmental Procedures*.
3. Prior to commencing construction activities or delivery of materials to site, provide Environmental Protection Plan for review and approval by Departmental Representative.
4. Ensure Environmental Protection Plan includes comprehensive overview of known or potential environmental issues to be addressed during construction.

5. Address topics at level of detail commensurate with environmental issue and required construction task.

6. Include in Environmental Protection Plan:
    1. Names of persons responsible for ensuring adherence to Environmental Protection Plan.
    2. Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
    3. Descriptions of environmental protection personnel training program.
    4. 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, EPA 832/R-92-005, Chapter 3 requirements.
    5. Drawings showing 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.
    6. Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.
        a. Ensure plans include measures to minimize amount of mud transported onto paved public roads by vehicles or runoff.
    7. Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
        a. Ensure plan includes measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
    8. Spill Control Plan including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
    9. Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
    10. Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
    11. 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.
    12. Waste Water Management Plan identifying methods and procedures for management and/or 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.
    13. Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

1.4 FIRES

1. Fires and burning of rubbish on site not permitted.

2. Where fires or burning permitted, prevent staining or smoke damage to structures, materials or vegetation which is to be preserved.

1.5 WASTE DISPOSAL

1. Unless expressly authorized by the Ministry's representative, burying waste material at the construction site is strictly prohibited.

2. Dumping waste or volatile materials, such as mineral essences and oil or paint solvents, in watercourses and in storm and sanitary sewers is strictly prohibited.

1.6 DRAINAGE

1. Provide Erosion and Sediment Control Plan identifying type and location of erosion and sediment controls provided. Ensure plan includes 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 requirements.

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. Dumping water containing suspended particles from materials in watercourses, sewers and drainage systems is strictly prohibited.

6. Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.7 SITE CLEARING AND PLANT PROTECTION

1. Protect trees and plants on site and adjacent properties as indicated.

2. Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes.

3. Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.

4. Minimize stripping of topsoil and vegetation.

5. Restrict tree removal to areas indicated or designated by Departmental Representative.

6. When trees or shrubs are removed, supply and plant trees and shrubs of the same species and size once the work is finished.

1.8 POLLUTION CONTROL

1. Maintain temporary erosion and pollution control features installed under this Contract.

2. Control emissions from equipment and plant to 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.

1.9 ARCHEOLOGICAL

1.10.1 Generality

1. The area of the Petite Ferme at Cap Tourmente National Wildlife Area is considered as an archeological site of national importance. Contractor must collaborate with Canada if archeological remains are discovered.

1.10.2 Archeological findings

1. If Contractor thinks to have discovered archeological remains during construction, immediately advise Departmental Representative and wait for written directives before proceeding with construction in area of discovery.

2. Remains and antiquities, and any other element having a historic, archeological or scientific interest, such as, angular stones, commemorative plaques, slates, and other objects (remains or fragment) found on-site or in excavation or demolition areas, remain the property of Canada. Protect objects and obtain directives from Departmental Representative.

1.10.3 Protection of remains and objects

1. Contractor must take every reasonable precaution during excavation to protect every discovered remains and clear area for archeological examination. Canada will not tolerate any violation. If Contractor negligently deteriorates any type of remains, he will be held responsible and judged accordingly by Canada.

2. During demolition work, take necessary precautions to protect kept existing structures. Progressively demolish elements in a controlled manner. Carefully demolish elements which have sections for future use. If elements are damaged during demolition work, immediately inform Departmental Representative.

1.10 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 Representativeof proposed corrective action and take such action for approval by Departmental Representative.
    1. Do not take action until 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. Clean in accordance with Section 01 74 11 - Cleaning.
    1. Leave the premises clean at the end of each work day.
2. Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
3. Final cleaning: Remove materials, surpluses, waste, tools and equipment from the construction site, as specified in Section 01 74 11 - *Cleaning*.
4. Waste management: Sort the waste for reuse/recycling purposes, as specified in Section 01 74 21 - *Construction/Demolition Waste Management and Disposal.*
    1. Remove the recycling bins from the construction site and dispose of the waste material in appropriate facilities.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

1. Requirements specifically related to inspection and testing by a laboratory designated by the Departmental Representative are included in various sections of the specifications.

1.2 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.

1.3 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. The Departmental Representative will designate the laboratory that will perform the testing and will pay for their services, with the exception of the following cases, which will be paid for by the General Contractor:
    1. The inspection and testing required by law, decrees, regulations or instructions of a public nature;
    2. The inspection and testing performed exclusively at the convenience of the General Contractor;
    3. The tests specified as having to be performed by the General Contractor under the supervision of the Departmental Representative;
    4. Additional testing specified in Paragraph 1.3.3.

3. When the tests or inspections by testing laboratories show the non-conformity of the work *versus* the requirements of the contract, the General Contractor must pay for the additional fees that may be demanded by the Departmental Representative in order to verify the acceptability of the corrective actions.

4. Provide equipment required for executing inspection and testing by appointed agencies.

5. Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

6. 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.

1.4 RESPONSIBILITIES OF THE GENERAL CONTRACTOR

1. Provide the labour and necessary facilities to:
    1. Allow access to the structures for inspection and testing;
    2. Facilitate inspection and testing;
    3. Return the structures affected by inspection and testing to their original condition;
    4. Provide a room on the construction site where laboratory personnel will store materials and process the samples.

2. Notify the Departmental Representative sufficiently in advance of operations to allow him to schedule meetings with the laboratory personnel and establish a testing schedule.

3. When materials must be tested, ship the required quantity of representative samples to the testing laboratory.

4. Assume the expenses related to the work required to uncover the structures that were protected before inspection or testing has been approved by the Departmental Representative, and to their subsequent covering afterward

1.5 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.

1.6 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.

1.7 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 Departmental Representative.

1.8 REPORTS

1. Submit three (3) 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.

1.9 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 and may be authorized as recoverable.

1.10 MOCK-UPS

1. Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.

2. Construct in locations acceptable to Departmental Representative as specified in specific Section.

3. Prepare mock-ups for Departmental Representative review with reasonable promptness and in orderly sequence, to not cause delays in Work.

4. Failure to prepare mock-ups 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.

5. If requested, Departmental Representative will assist in preparing schedule fixing dates for preparation.

6. Remove mock-up at conclusion of Work or when acceptable to Departmental Representative.

7. Mock-ups may remain as part of Work.

8. Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.11 MILL TESTS

1. Submit mill test certificates as required of specification Sections.

1.12 EQUIPMENT AND SYSTEMS

1. Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

PART 2 - PRODUCTS

2.1 NOT USED

1. Not used.

PART 3 - EXECUTION

3.1 NOT USED

1. Not used.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

1. Section 01 14 00 – work restrictions.
2. Section 01 33 00 – submittal procedures.
3. Section 01 56 00 – temporary barriers and enclosures.

1.2 REFERENCES

1. Canadian Standards Association (CSA International)
    1. CAN/CSA-S269.2-FM1987(C2003), Access Scaffolding for Construction Purposes.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 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.

1.5 SCAFFOLDING

1. Scaffolding in accordance with CAN/CSA-S269.2 and according to the current regulations and laws.
2. Provide and maintain scaffolding, ramps, ladders, swing staging, platforms, temporary stairs.
3. The scaffolding must be approved and sealed by an engineer who is a member of the “Ordre des Ingénieurs du Québec” (Quebec order of engineers).
4. The scaffolding anchors to the building must be adequately sealed once the scaffolding has been dismantled.

1.6 HOISTING

1. Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.

2. Hoists and cranes to be operated by qualified operator.

1.7 ELEVATORS

1. Designated existing and permanent elevators not to be used by construction personnel and transporting of materials.

1.8 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.

1.9 BUILDING ACCESS

1. Look at the drawings included in this section for the conditions for building access.

2. Develop and maintain convenient access inside the building.

3. Clean the access points (doors, stairs, corridors, windows) that were used by the General Contractor for the entry and exit of workers, materials and debris. Maintain the access points throughout the work and repair all damage caused by the use of the General Contractor.

4. The delivery of materials and the disposal of waste must be performed at the times indicated by the Departmental Representative, in accordance with Section 01 14 00 - *Work Restriction*. In all cases, the General Contractor must take care not to damage or dirty the streets, local or adjacent surfaces. If the General Contractor damages these surfaces through the work or because of passing machinery, the costs for all of the necessary repairs to return the surface to its original state will be assumed by the General Contractor.

1.10 CONSTRUCTION PARKING

1. Parking will be permitted on site.

2. Clean runways and taxi areas where used by General Contractor's equipment.

3. Maintain access for fire control purpuses. Also anticipate means to fight fire for the entire duration of the work.

1.11 SECURITY

1. Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.12 OFFICES

1. A small heated space shall be provided to the Contractor in the barn to allow installing a table and some chairs. If the Contractor needs additional space, it must provide, at its expense, a construction trailer.

1.13 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. Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition gardés à l'abri des intempéries, mais s'assurer qu'ils gênent le moins possible le déroulement des travaux.

3. The Contractor will pay for the storage of the material belonging to the Departmental Representative that must be temporary relocated during the work, with the exception of furniture. Prior to the beginning of the work, the Contractor must inform the Department Representative of the location where he intends to store the material prior to its return at the end of the work, for approval. The selected location must be clean, tidy and safe in order to ensure the return of the material in its original condition. The Contractor will be held responsible for any damage to the material and will pay for replacements at the satisfaction of the Departmental Representative, if applicable.

4. The Contractor must maintain access to the storage areas and will be held responsible for damages he may cause.

1.14 SANITARY FACILITIES

1. The Public Toilet, Located at the End of the Workshop, will be available to the Contractor during work. Keep existing local clean.

1.15 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. Comply with the requirements and recommendation of competent authorities regarding the occupation of traffic lanes, including partial occupation for the delivery of material.

4. 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.

5. Protect travelling public from damage to person and property.

6. General Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

7. Verify adequacy of existing roads and allowable load limit on these roads. General Contractor: responsible for repair of damage to roads caused by construction operations.

8. Construct access and haul roads necessary.

9. Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.

10. Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

11. Dust control: adequate to ensure safe operation at all times.

12. Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.

13. Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.

14. Provide snow removal during period of Work.

15. Remove, upon completion of work, haul roads designated by Departmental Representative.

16. Coordinate all of the traffic protection and management activities with competent authorities.

1.16 ANTI-INTRUSION ALARM SYSTEM

1. The Contractor will not have access to the security codes of the alarm system. The deactivation and reactivation of the alarm system or any work to the alarm system must be performed by building management. The Contractor must notify the Departmental Representative regarding work and inspections performed on the alarms system.

1.17 ELECTRIC PANEL

1. Any employee qualified to perform electrical work must first obtain the approval of the Departmental Representative and follow the padlocking procedure. This procedure must be submitted in writing to the Departmental Representative for approval prior to the work. The Contractor must notify the Department Representative regarding modifications to any electrical panel.

1.18 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, sediment and erosion control drawings, sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.

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.

PART 4 - DRAWINGS

4.1 CONSTRUCTION SITE LAYOUT AND TEMPORARY OUTDOOR FACILITIES

1. See drawing attached.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

1. Section 01 74 21 - construction/demolition waste management and disposal.

1.2 PROJECT CLEANLINESS

1. Maintain Work in tidy condition, free from accumulation of waste products and debris, including other than 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 remove from site.

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 at designated dumping areas on Crown property 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. Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

11. Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

12. Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

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 materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.

5. Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

6. Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

7. Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors or from any other building architectural element.

8. Clean lighting reflectors, lenses, and other lighting surfaces.

9. Vacuum clean and dust building interiors, behind grilles, louvres and screens.

10. Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.

11. Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

12. Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

13. Remove dirt and other disfiguration from exterior surfaces.

14. Clean and sweep roofs, gutters, areaways, and sunken wells.

15. Sweep and wash clean paved areas.

16. Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.

17. Clean roofs, downspouts, and drainage systems.

18. Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

19. Remove snow and ice from access to building.

20. Clean the carpets in all of the areas directly or indirectly affected by the work.

21. Clean the solarium and the windows directly or indirectly affected by the work.

1.4 WASTE MANAGEMENT AND DISPOSAL

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

PART 2 - PRODUCTS

2.1 NOT USED

1. Not Used.

PART 3 - EXECUTION

3.1 NOT USED

1. Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 WASTE MANAGEMENT GOALS

1. Accomplish maximum control of solid construction waste.

2. Preserve environment and prevent pollution and environment damage.

1.2 RELATED REQUIREMENTS

1. Section 01 33 00 – Submittal procedures.

2. Section 01 74 11 – Cleaning.

1.3 DEFINITIONS

1. Definitions
    1. Class III: non-hazardous waste - construction renovation and demolition waste.
    2. Inert Fill: inert waste - exclusively asphalt and concrete.
    3. Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
    4. Recycling: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products. Recycling does not involve combustion, incineration or destruction of waste through heat.
    5. Re-utilization/re-use: Repeated use of a product or material in its original form for the purpose of using it in a different context in the case of re-utilization or in a similar context in the case of re-use. Re-utilization/re-use involves the following:
        a. The recovery of products and materials from the rehabilitation or modernization of a structure which can be re-utilized or re-used, before they are demolished, for the purpose of selling them, re-utilizing them, re-using them in the context of the same project, or storing them for subsequent use.
        b. Return of products or materials that can be re-used by suppliers, such as pallets and unused products.
    6. Recovery: Removal of components and construction materials, load bearing or not, during the deconstruction or dismantling of industrial, commercial or institutional structures, for the purpose of re-utilizing or re-using them or recycling.
    7. Separate Condition: refers to waste sorted into individual types.
    8. Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

2. References
    1. Public Works and Government Services Canada (PWGSC)
        a. National protocol for the management of non-hazardous solid waste from construction, renovation and demolition work, 2002.

b. Market research report on construction, renovation and demolition waste management (available from the PWSGC's Environmental Services Directorate).

c. Sustainable development strategy 2007-2009: Target 2.1, Sustainable use of natural resources.

1) For real estate projects of more than one million dollars in communities where industrial recycling is available, CRD waste management practices will be implemented to re-use/re-utilize or recycle waste.

2) Make sure that under the contract, the resources used for construction or maintenance are used and recovered in a sustainable manner.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

1. Submittals in accordance with Section 01 33 00 - *Submittal Procedures*.

1.5 SORTING OF WASTE

1. Place the containers in locations where it will be easy to deposit waste without hindering the activities of the construction site.

2. Waste materials must be collected, handled and stored on the construction site, then removed after sorting.

3. Recovered waste materials must be transported to approved and authorized recycling facilities.

1.6 USE OF SITE AND FACILITIES

1. Execute the work while disturbing the normal use of the site as little as possible.

2. Maintain in effect the safety measures established for the facility. Implement temporary safety measures approved by the Departmental Representative.

1.7 WASTE PROCESSING SITES

1. The Contractor is responsible for finding resources regarding waste reclamation, as well as service providers. Recuperated waste must be transported to approved and/or authorized recycling facilities or to material recyclers.

1.8 STORAGE, HANDLING AND PROTECTION

1. Unless specified otherwise, materials for removal do not become Contractor's property.

2. Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

3. Protect structural components not removed for demolition from movement or damage.

4. Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.

5. Protect surface drainage, mechanical and electrical from damage and blockage.

6. Separate and store materials produced during dismantling of structures in designated areas.

7. 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.
    4. The materials re-used/re-utilized on site are considered reclaimed and that they must be included in reports.

1.9 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.

1.10 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 CLEANING

1. Cleaning during the work: Carry out cleaning activities in compliance with section 01 74 11 - *Cleaning.*
    1. Leave the site clean at the end of each workday.
    2. Provide containers on site for the removal of debris and waste materials.
    3. Remove the debris and waste materials from the site at the end of each work shift.
    4. Take the waste and demolition materials to a site approved by competent authorities.
    5. Provide the Departmental Representative with the bills of lading from the waste disposal site regarding the construction material.

2. Final cleaning: Remove materials, surplus materials, waste, tools and equipment from the construction site in accordance with section 01 74 11 - *Cleaning*.

3. Waste management: Sort the waste for the purpose of re-utilization/re-use and recycling, in compliance with this section.
    1. Remove the recycling bins from the construction site and dispose of the materials at the appropriate facilities.
    2. Sort the waste material that will be re-used/re-utilized or recycled at the source and place them at the specified locations.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

1. Section 01 14 00 - Work Restrictions.
2. Section 01 33 00 - Submittal Procedures.
3. Section 01 35 43 - Environmental Procedures.
4. Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.2 REFERENCES

1. Definitions :
    1. Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, include but not limited to: poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or materials that endanger human health or environment if handled improperly.
    2. Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as co-ordinating related, required submittal and reporting requirements.
    3. Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.
2. References
    1. CSA International
        a. CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
    2. Department of Justice Canada (Jus)
        a. Canadian Environmental Assessment Act (CEAA), 1995
        b. Canadian Environmental Protection Act (CEPA), 1999
            1) SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.
            2) SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.
            3) Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
    3. Underwriters' Laboratories of Canada (ULC)
        a. CAN/ULC-S660-08, Standard for Nonmetallic Underground Piping for Flammable and Combustible Liquids.
        b. ULC/ORD-C58.15-1996, Overfill Protection Devices for Flammable Liquid Storage Tanks.
        c. ULC/ORD-C58.19-1996, Spill Containment Devices for Underground Tanks.

4. U.S. Environmental Protection Agency (EPA)
    a. EPA CFR 86.098-10, Emission standards for 1998 and later model year Otto-cycle heavy-duty engines and vehicles.
    b. EPA CFR 86.098-11, Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles.
    c. EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 SCOPE OF WORK

1. Execute all demolition work as specified on the plans.
2. Prepare a file on site conditions prior to the beginning of the work.
3. Eliminate restrictions, interferences and obstructions regarding access to the building and site.
4. Provide and install waste chutes, screens, barricades and safety scaffolds on site to protect workers and the Owner's representatives.
5. Provide and install all of the necessary temporary protections to avoid damaging the equipment, buildings and/or existing services.

1.4 ADMINISTRATIVE REQUIREMENTS

1. Pre-Installation Meetings :
    1. Convene pre-installation meeting one week prior to beginning work of this Section and on-site installation, with Contractor's Representative and Departmental Representative to :.
        a. Verify project requirements.
        b. Verify existing site conditions adjacent to demolition work.
        c. Co-ordination with other construction subtrades.
    2. Ensure key personnel site supervisor, project manager and subcontractor representatives attend.
2. Scheduling:
    1. Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion.
        a. In event of unforeseen delay notify Departmental Representative.

1.5 DOCUMENTS/SAMPLES TO SUBMIT FOR APPROVAL/INFORMATION

1. Submit the documents and samples required as specified in section 01 33 00 - *Submittal Procedures* and in section 01 74 21 - *Construction/Demolition Waste Management and Disposal*.
2. The Conctractor will see that all of the requirements related to document, sample and report submittals are met.

3. Shop drawings
    1. Submit, for review and approval, shop drawings, diagrams or details indicating the sequence of the demolition, shoring and underpinning work, as well as the elements used to complete the task.

4. Submitted demolition shop drawings must display the seal and signature of a competent engineer certified to work in Canada, in the province of Quebec, as specified in section 01 33 00 - *Submittal Procedure*.

5. Upon request from the engineer, submit a certificate confirming that the drawings have been approved by relevant authorities.

1.6 QUALITY ASSURANCE

1. Regulatory Requirements: Ensure Work is performed in compliance with CEPA, CEAA, TDGA, and applicable Provincial/Territorial and Municipal regulations.

1.7 SITE CONDITIONS

1. Environmental protection :
    1. Ensure Work is done in accordance with Section 01 35 43 - *Environmental Procedures*.
    2. Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
    3. Fires and burning of waste or materials is not permitted on site.
    4. Do not bury rubbish waste materials.
    5. Do not dispose of waste or volatile materials including but not limited to: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
        a. Ensure proper disposal procedures are maintained throughout project.
    6. Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.
    7. Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction as directed by Departmental Representative.
    8. Protect trees, plants and foliage on site and adjacent properties where indicated.
    9. Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.
    10. Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

1.8 EXISTING CONDITIONS

1. If material resembling spray or trowel applied asbestos or other designated substance listed as hazardous be encountered in course of demolition, stop work, take preventative measures, and notify Departmental Representative immediately. Proceed only after receipt of written instructions have been received from Departmental Representative.

2. Structures to be demolished are based on their condition on date that tender is accepted, at time of examination prior to tendering.

1. Remove, protect and store salvaged items as directed by Departmental Representative. Salvage items as identified by Departmental Representative. Deliver to Departmental Representative as directed.

PART 2 - PRODUCTS

2.1 EQUIPMENT

1. Equipment and heavy machinery :
    1. On-road vehicles to : CEPA-SOR/2003-2, On-Road Vehicle and Engine Emission Regulations and CEPA-SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.

2. Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

PART 3 - EXECUTION

3.1 INSPECTIONS

1. Inspect the building with the Departmental Representative and verify the location and extent of the elements that must be removed, eliminated, emphasized, recycled, recovered and remain in place.

2. Identify and protect public utilities pipes and ensure that those remaining on site remain in good condition.

3. Notify the public utilities and obtain the necessary approval from them before beginning demolition work.

4. Disconnect, block or divert, as needed, the existing public utilities pipes located on site and that are hindering the execution of the work, as required by competent authorities. Identify the location of those pipes and those which had been left behind on site and mark them on the drawings (vertical and horizontal planes) after completion of the work. Support, brace and immobilize the identified pipes and conduits.
    1. Immediately inform the Departmental Representative, as well as the public utilities company involved, of any damage to a service conduit that must be saved.
    2. Immediately inform the Departmental Representative of the discovery of any unidentified public utilities service conduit and wait for written instructions regarding the action to be taken.

5. Unless otherwise indicated, remove demolished material from the site, while complying with the requirements of competent authorities in this matter, including the requirements applicable to environment protection.

6. Carefully remove all products and materials that must be re-installed in the context of this project or given to the Owner. Store them in a well-protected area. Leave them ready for installation by other trades or take them over to the location that has been specified by the Owner.

3.2 PREPARATION

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 demolition.
    3. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.

2. Protection of in-place conditions :
    1. Work in accordance with Section 01 35 43 - *Environmental Procedures* and Erosion and Sedimentation Control Plan and Stormwater Pollution Prevention Plan.
    2. Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades properties parts of existing building to remain.
        a. Provide bracing, shoring and underpinning as required.
        b. Repair damage caused by demolition as directed by Departmental Representative.
    3. Support affected structures and, if safety of structure being demolished appears to be endangered, take preventative measures, stop Work and immediately notify Departmental Representative.
    4. Support affected structures and, if safety of structure being appears to be endangered, take preventative measures, stop Work and immediately notify Departmental Representative.
    5. Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.
    6. Assume responsibility for the damages incurred during work due to weather, negligence, lack of coordination or precautions, both inside and outside the building.
    7. Protect the surfaces to be saved from any possible damage and make all of the necessary repairs or replacements to the satisfaction of the Departmental Representative without additional costs.
    8. Coordinate demolition and removal of debris with the Departmental Representative in such as was as to avoid blocking elevators and electrical and mechanical systems that must remain operational.
    9. Execute demolition work using tools and equipment that allows demolition without risk of fire, collapse or other adverse effect on the property.

3. Surface Preparation :
    1. Disconnect and re-route electrical and telephone service lines entering buildings to be demolished.
        a. Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of demolition.
    2. Disconnect and cap designated mechanical services
    3. Do not disrupt active or energized utilities traversing premises designated to remain undisturbed.

3.3 DEMOLITION

1. Upon request of the Departmental Representative, provide the demolition methods and procedures in writing and for comment. Do not begin demolition or dismantling structural elements before having received the comments of the Departmental Representative.

2. Blasting operations not permitted during demolition.

3. Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.

4. Prior to start of Work remove contaminated or hazardous materials listed as directed by Departmental Representative from site and dispose of at designated disposal facilities in safe manner and in accordance with TDGA and other applicable requirements and Section 02 81 01 - *Hazardous Materials*. Refer Existing Conditions in PART 1.

5. Demolish structures or parts of structure

6. To permit construction of addition and as indicated.

7. Crush concrete generated due to demolition of foundations to size suitable for recycling as directed.
    1. Where possible identify markets which will accept crushed material as aggregate.

8. Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.

9. At end of each day's work, leave Work in safe and stable condition.
    1. Protect interiors of parts not to be demolished from exterior elements at all times.

10. Demolish to minimize dusting. Keep materials wetted as directed by Departmental Representative.

11. Demolish the concrete masonry walls in small pieces. Remove and carefully bring frame elements or other heavy or large objects down to the ground.

12. Contain fibrous materials to minimize release of airborne fibres while being transported within facility.

13. Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction. Selling or burning demolition materials on site is prohibited.

14. Execute the demolition work within the time periods specified in section 01 14 00 - *Work Restriction*.
    1. At the end of each work day, turn off all light sources with the exception of those used for safety purposes

15. Removal of hard siding, curbs and gutters
    1. Cut adjacent surfaces unaffected by the work at right angles, using a saw or any other means approved by the Departmental Representative.
    2. Protect the load transfer devices, as well as adjacent joints.

3. Protect the underlying material or material adjacent to the work area.

16. Recut the framing headers of the partially demolished elements of the building in accordance with the tolerances specified in these contractual documents and by the Departmental Representative in order to facilitate the installation of the new elements.

17. Demolition work includes that which is required on the drawings and any other work required to complete the work or modifications. The demolition of a construction element involves the obligation to repair finishes or other adjacent construction elements.

18. Coordinate the execution of the work in such a way as to restrict to a minimum the disturbance and degradation of finishes or adjacent structures.

19. Include in this work any demolition work required for the execution of this project but not specifically included in the drawings: slab drilling to embed hardware or for the passage of mechanical or electrical infrastructures, etc.

20. The Contractor must include the demolition of any existing element or infrastructure rendered obsolete, specifically those left in service spaces, ceiling spaces, etc.

3.4 CLEANING

1. Develop Construction Waste Management related to Work of this Section.

2. Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - *Construction/Demolition Waste Management and Disposal*.
   1. Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3. Divert excess materials from landfill to site approved by Departmental Representative.

4. Designate appropriate security resources / measures to prevent vandalism, damage and theft.

5. Locate stockpiled materials convenient for use in new construction. Eliminate double handling wherever possible.

6. If they are hindering the progression of the work, materials must be removed as specified in section 01 74 21 - *Construction/Demolition Waste Management and Disposal* and as directed by the Departmental Representative.

7. Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.

8. Dispose of materials not designated for alternate disposal in accordance with applicable regulations.
   1. Disposal facilities must be those approved of and listed in Waste Reduction Workplan.
   2. Written authorization from Departmental Representative is required to deviate from disposal facilities listed in Waste Reduction Workplan.

9. Refer to the specifications and demolition drawings to identify which materials are to be recovered for re-utilization/re-use.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

1. Section 01 33 00 - submittal procedures.

1.2 RÉFÉRENCES

1. Association canadienne de normalisation (CSA)/CSA International
    1. CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
    2. CSA-O86S1-F05, Supplement No. 1 to CAN/CSA-O86-D09, Engineering Design in Wood.
    3. CSA O121-08(R2013), Douglas Fir Plywood.
    4. CSA O151-09, Canadian Softwood Plywood.
    5. CSA O153-13, Poplar Plywood.
    6. CAN/CSA-O325-07(R2013), Construction Sheathing.
    7. CSA O437 Series-F93(C2011), Standards for OSB and Waferboard.
    8. CSA S269.1-1975(R2003), Falsework for Construction Purposes.
    9. CAN/CSA-S269.3-FM92(C2013), Concrete Formwork, National Standard of Canada.
2. Underwriters' Laboratories of Canada (ULC)
    1. CAN/ULC-S701-11 Norme sur l'isolant thermique en polystyrène, panneaux et revêtements de tuyauterie.

1.3 SCOPE OF WORK

1. Provide labour, equipment and material to build and install the formwork as specified on all plans and required for the complete and correct execution of the work.
2. Provide and install the blade seals, if applicable.
3. Make the construction, control and expansion joints as specified in the plans and specifications.
4. Install all of the anchors, plates, supports, bolts and accessories that must be incorporated into the concrete works or required by other disciplines.
5. Remove all of the formworks and waste generated in the course of the work.
6. Make all of the openings in the formworks required by other disciplines.
7. Caulk all of the construction, control and expansion joints.
8. Implement and verify all of the levels and dimensions of the structures covered by this section.

9. Provide and install the temporary shoring and braces, when required.

10. Fill the cones of the tie-beams.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

1. N/A.

1.5 DELIVERY, STORAGE AND HANDLING

1. Waste Management and Disposal :
    1. Place materials defined as hazardous or toxic in designated containers.
    2. Divert wood materials from landfill to a recycling reuse composting facility as approved by Departmental Representative.
    3. Divert plastic materials from landfill to a recycling reuse composting facility as approved by Departmental Representative.
    4. Divert unused form release material from landfill to an official hazardous material collections site as approved by the Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

1. Formwork materials
    1. For concrete without special architectural features, use wood and wood product formwork materials to CAN/CSA-O86 and CAN/CSA A23.1.
    2. For concrete with special architectural features, use new high-density overlay plywood, compliant with the O121 standard.
    3. Rigid insulation board: to CAN/ULC-S701.
    4. Material for temporary structures: Compliant with the ACNOR S269.1 standard, Table 1. The materials must have a quality index or come with certificates, testing reports or other confirmations of conformity.

2. Form ties :
    1. For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface and fitted with polyethylene cones for apparent surfaces. After the removal of the formwork, no part of the tie-beams must appear less than 16 mm from the surface.
    2. For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.

3. Filling of the tie-beam cones: Quick setting, two-component cement based mortar modified with polymers, cement gray in colour. Compressive strength 20 MPa minimum after 24 hours and 50 MPa after 28 days.

4. Form oil: Chemical in nature, consisting of components that react with the free lime in the concrete to form water-insoluble soaps and that keep concrete from sticking to the forms, such as Grace's Releaser, ChemRex's Cast-Off or Euclid's Formshield Pure or equivalent approved.

5. Falsework materials: to CSA-S269.1.

6. Support for the caulking of construction or control joints: Flexcell, from Sternson or Scelco or Sika equivalent approved by the Departmental Representative.

7. Caulking of unexposed construction or control joints in unexposed conditions: Duoflex, from Sternson or Sikaflex 2C or equivalent from Scelco or equivalent approved by the Departmental Representative.

PART 3 - EXECUTION

3.1 FABRICATION AND ERECTION

1. Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings. The formwork contractor must take into account that tolerance regarding excavation bottoms is 100 mm and that additional formwork is not admissible for this value.

2. Obtain Departmental Representative's approval for use of earth forms framing openings not indicated on drawings.

3. Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete and obtain the approval of the Departmental Representative.

4. Fabricate and erect falsework in accordance with CSA S269.1.

5. Refer to architectural drawings for concrete members requiring architectural exposed finishes.

6. Do not place shores and mud sills on frozen ground.

7. Provide site drainage to prevent washout of soil supporting mud sills and shores.

8. 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.

9. Align form joints and make watertight.
    1. Keep form joints to minimum.

10. Unless otherwise indicated, use 30 mm bevel strips for any visible edges and all edges in contact with a waterproof liner or membrane.

11. Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.

12. Construct forms for architectural concrete, and place ties as indicated.
    1. Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.

13. 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.

14. Anticipate an adequate camber in the beam and slab forms to correct form slump. This camber must be added to that which is required on the plans, if applicable.

15. If the formwork and temporary structures must be used again, comply with the CAN3-A23.1 standard, Article 11.

16. Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

17. If sliding or floating forms are used, submit the details as specified in section 01 33 00 - *Submittal Procedures*, described in Part 1. The forms may or may not be accepted by the Departmental Representative following the evaluation of the working methods and of the proposed mechanical material.

3.2 REMOVAL AND RESHORING

1. Once the concrete is poured, in weather conditions near 15 C, the Contractor may remove the forms after the following periods of time, providing that the curing method for free surfaces complies with the specifications and that they are satisfactory to the Departmental Representative:
    1. 48 h for walls and sides of beams;
    2. 48 h for columns;
    3. 28 days for beam soffits, slabs, decks and other structural members, or 7 days when replaced immediately with adequate shoring to standard specified for falsework;
    4. 12 days for footings and abutments.

2. Remove formwork when concrete has reached 75% of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring. The curing method for the free surfaces must comply with the specifications and prove to be satisfactory to the Departmental Representative.

3. Provide necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.

4. Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

3.3 TOLERANCES

1. N/A.

3.4 INSPECTION OF THE FORMWORK PRIOR TO CONCRETING

1. Immediately prior to the pouring of concrete, inspect the formworks to make sure they are positioned correctly, adequately rigid, leak tight, clean, and that the walls have been adequately primed and free of snow, ice or other foreign substances.

2. Make temporary openings at the bottom of deep elements, such as columns and walls, to facilitate cleaning and inspection. Regarding elements where space is restricted, the openings must be located where water can be used to flush out debris and then sealed at the same level as the bottom of the wall.

3.5 PREPARATION OF THE FORMWORK PRIOR TO CONCRETING

1. Use form oil on all of the prepared form walls. Use form oil that will not stain or modify the colour of the exposed concrete surfaces. Use only the required quantity and remove the form oil where it came in contact with the reinforcement structure. If a coating is applied to the concrete surface, make sure it is compatible with the form oil. If necessary, use another product for form removal.

2. Wet all untreated formwork surfaces to avoid shrinkage and wet the surfaces again immediately prior to concreting.

3.6 LINES AND LEVELS

1. Mark all level and reference points.

2. During concreting, verify the lines, levels and alignment of the formworks.

3.7 CONSTRUCTION, CONTROL AND EXPANSION JOINTS

1. N/A.

3.8 ELEMENTS TO BE INTEGRATED INTO THE CONCRETE AND CSST CERTIFICATE

1. N/A.

3.9 REINFORCING STEEL ON STAND BY

1. At some locations, reinforcement steel rods are indicated as standing by. The Contractor must take these details into account when preparing his bid. If required, he will have to perforate, notch or saw the formwork in order to respect the details shown.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

1. Section 01 33 00 - Submittal Procedures.
2. Section 01 45 00 - Quality Control.
3. Section 01 74 11 - Cleaning.
4. Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.2 REFERENCES

1. American Concrete Institute (ACI)
    1. SP-66-04, ACI Detailing Manual 2004.
2. ASTM International
    1. ASTM A 82/A 82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
    2. ASTM A 143/A 143M-07, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
    3. ASTM A 185/A 185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
    4. ASTM A 775/A 775M-07b, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
3. CSA International
    1. CSA-A23.1-F09/A23.2-F09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
    2. CAN/CSA-A23.3-F04 (R2010), Design of Concrete Structures.
    3. CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
    4. CSA-G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
    5. CAN/CSA-G164-FM92 (C2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
    6. CSA W186-FM1990 (C2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.
4. Institut d'acier d'armature du Canada (RSIC/IAAC)
    1. RSIC-2004, Reinforcing Steel Manual of Standard Practice.

1.3 SCOPE OF WORK

1. Provide all material, equipment and labour required to build and install the steel framework required on all of the plans and/or required for the complete and correct execution of the structure.

2. Provide and install all rod chairs, anchor bars and spacers in reinforced concrete inverts, walls, slabs and beams required to support the reinforcing steel.

3. Provide and install the cement bricks required to support the reinforcing steel and/or metal mesh in the slab on ground, footings and inverts.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

1. N/A.

1.5 QUALITY ASSURANCE

1. Submit in accordance with Section 01 45 00 - *Quality Control* and as described in PART 2 - SOURCE QUALITY CONTROL.
    1. Mill Test Report: upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, minimum 2 weeks prior to beginning reinforcing work.
    2. Upon request submit in writing to Departmental Representative proposed source of reinforcement material to be supplied.

1.6 DELIVERY, STORAGE AND HANDLING

1. Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

2. Storage and Handling Requirements:
    1. Store materials off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area to avoid rust formation.
    2. Protect the reinforcing steel if it must remain unused for long periods of time.
    3. Remove all important traces of rust from the steel before its installation, subject to the approval of the Engineer.
    4. Replace defective or damaged materials with new.

PART 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 CSA-G30.18, unless indicated otherwise.

3. Reinforcing steel devant être soudées à des pièces d'acier incorporées au béton : weldable low alloy steel deformed bars to CSA-G30.18, nuance 400W.

4. Cold-drawn annealed steel wire ties: to ASTM A 82/A 82M and G30.3.

5. Deformed steel wire for concrete reinforcement: to ASTM A 82/A 82M and G30.3.

6. Epoxy Coating of non-prestressed reinforcement: to ASTM A 775/A 775M.

7. If required, Galvanizing of non-prestressed reinforcement: to CAN/CSA-G164, minimum zinc coating 610 g/m².
    1. Protect galvanized reinforcing steel with chromate treatment to prevent reaction with Portland cement paste.
    2. If chromate treatment is carried out immediately after galvanizing, soak steel in aqueous solution containing minimum 0.2% by weight sodium dichromate or 0.2% chromic acid.
        a. Temperature of solution equal to or greater than 32 degrees and galvanized steels immersed for minimum 20 seconds.
    3. If galvanized steels are at ambient temperature, add sulphuric acid as bonding agent at concentration of 0.5% to 1%.
        a. In this case, no restriction applies to temperature of solution.
    4. Chromate solution sold for this purpose may replace solution described above, provided it is of equivalent effectiveness.
        a. Provide product description as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.

8. Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2 and related supplements, with sufficient strength and appropriate for the frame used. The General Contractor must use vinyl covered chairs.

9. Mechanical splices: subject to approval of Departmental Representative

10. Plain round bars: to CSA-G40.20/G40.21.

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. Unless otherwise indicated in the plan, hooks must be standard and sizes must comply with the Reinforcing Steel Institute of Canada's manual of standards.

3. Obtain Departmental Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.

4. Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.

5. Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.
    1. Ship epoxy coated bars in accordance with ASTM A 775A/A 775M.

2.3 SOURCE QUALITY CONTROL

1. Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 2 weeks prior to beginning reinforcing work

2. Upon request inform Departmental Representative of proposed source of material to be supplied.

PART 3 - EXECUTION

3.1 PREPARATION

1. If galvanised reinforcing steel is used, galvanizing is to include chromate treatment
    1. Duration of treatment to be 1 hour per 25 mm of bar diameter.

2. If applicable, conduct bending tests to verify galvanized bar fragility in accordance with ASTM A 143/A 143M.

3.2 FIELD BENDING

1. Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative

2. When field bending is authorized, bend without heat, applying slow and steady pressure.

3. Replace bars, which develop cracks or splits.

3.3 PLACING REINFORCEMENT

1. Place reinforcing steel as indicated on placing drawings and in accordance with CSA-A23.1/A23.2

2. Use plain round bars as slip dowels in concrete.
    1. Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint
    2. When paint is dry, apply thick even film of mineral lubricating grease.

3. Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.

4. Ensure cover to reinforcement is maintained during concrete pour.

5. Protect epoxy coated portions of bars with covering during transportation and handling.

6. Make mechanical splices where indicated on the shop drawings.

7. Clean the reinforcing elements prior to concreting.

8. In slabs on ground, footings and inverts, reinforcements and/or meshes will be installed on chairs, supports and/or cement bricks. The technique consisting in lifting the reinforcement and/or mesh with a hook when pouring the concrete is prohibited, as is the use of stones or wood pieces. Regarding structural slabs, the reinforcement of the lower bed must be installed on continuous supports. Steel wire supports for the reinforcement of the higher layers are prohibited. Use plastic supports.

9. The technique consisting in moving a structural rod under a reinforcement bed in order to use it as an anchoring bar or support bar is prohibited. If bars are to be used for anchoring or support, they must be additional bars.

10. **Welding the reinforcement bars shown on the plans is prohibited**, unless otherwise specified. If welding is required, weldable steel compliant with the G30.18 nuance 400 W standard is required.

11. Wall and column bars must be installed using formworks or templates prior to concreting.

3.4 FIELD TOUCH-UP

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

3.5 CLEANING

1. Progress Cleaning: clean in accordance with Section 01 74 11 - *Cleaning*.
    1. Leave Work area clean at end of each day.

2. Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - *Cleaning*.

3. Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

3.6 INCORPORATION OF REINFORCEMENT IN CONCRETE (TYPICAL, UNLESS OTHERWISE INDICATED ON THE PLANS)

1. Incorporation in concrete must be measured from the surface of the concrete to the crenulation closest to the reinforcement or up to the surface of smooth bars or wires, as the case may be.

2. The reinforcement includes bar filaments (or ligatures), stirrups and the main steel.

3. Regarding textured architectural surfaces, incorporation in concrete must be measured from the deepest point of the textured surface.

4. The minimum net depths (in mm) of the reinforcement bars in concrete is as follows, unless otherwise indicated :

SURFACE CONDITONS	EXPOSURE CLASSIFICATION		
	Unexposed (1)	Exposed to freeze-thaw cycle	Expose to chorides(2)
Concrete against the ground and in permanent contact with the latter	75	75	75
Columns, walls(4), beams, curbs and projections	40	40	60
Slabs	25	40	60
Relation between incorporation and the nominal diameter of the bars	1.0	1.5	2.0
Relation between incorporation and the maximum nominal size of the aggregate	1.0	1.5	2.0

Notes:

(1) Unexposed concrete only applies to concrete that will continually be maintained as dry in a conditioned space, i.e. all of the elements will be inside the vapor barrier around the building.

(2) Subject or not to the freeze-thaw cycle.

(3) Concrete protected by a liner as specified in the S413 standard.

(4) Regarding the incorporation of the reinforcement of the concrete wall on the Dalhousie Street side, refer to detail on page S09.

3.7 SUPERVISION

1. For the entire duration of concreting, the General Contractor will assign a worker to the construction site, who will re-position the reinforcement steel bars and/or metal mesh that may move during the pouring.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

1. Section 01 33 00 - Submittal Procedures.
2. Section 01 45 00 - Quality Control.
3. Section 01 74 11 - Cleaning.
4. Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.2 REFERENCES

1. Abbreviations and Acronyms :
    1. Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement
        a. Type GU, GUb and GUL - General use cement.
        b. Type MS and MSb - Moderate sulphate-resistant cement.
        c. Type MH, MHb and MHL - Moderate heat of hydration cement.
        d. Type HE, HEb and HEL - High early-strength cement.
        e. Type LH, LHb and LHL - Low heat of hydration cement.
        f. Type HS and HSb - High sulphate-resistant cement.
    2. Fly ash :
        a. Type F - with CaO content less than 15%.
        b. Type CI - with CaO content ranging from 15 to 20%.
        c. Type CH - with CaO greater than 20%.
    3. GGBFS - Ground, granulated blast-furnace slag.
2. Reference Standards :
    1. ASTM International
        a. ASTM C171-07, Standard Specification for Sheet Materials for Curing Concrete.
        b. ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.
        c. ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
        d. ASTM C494/C494M-13, Standard Specification for Chemical Admixtures for Concrete.
        e. ASTM C1017/C1017M-013, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
        f. ASTM C882/C882M-13a, Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.

g. ASTM D412-06ae2, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.

h. ASTM D624-00(2007), Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.

i. ASTM D1751-04(2008), Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

j. ASTM D1752-04a(2008), Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.

2. Canadian General Standards Board (CGSB)

a. CAN/CGSB-37.2-M88, Emulsified Asphalt, Mineral Colloid-Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.

b. CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

3. CSA International

a. CSA A23.1/A23.2-F09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

b. CSA A283-06(R2011), Qualification Code for Concrete Testing Laboratories.

c. CSA A3000-F08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005

d. CSA-A5 / A8 / A362-98, Portland Cements / Masonry cements / Cement compounds.

1.3 SCOPE OF WORK

1. Provide and cast concrete in place. Provide the equipment and labour required to complete the concreting work indicated on all plans.

2. Finish the concrete surfaces.

3. Repair the defective concrete surfaces.

4. Heat and cure the concrete.

1.4 ADMINISTRATIVE REQUIREMENTS

1. N/A.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

2. Provide testing results reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.

3. Submit two (2) copies of the most recent technical data sheets for the specified products. These sheets must show the physical properties of the material and include details on the installation method, restrictions, constraints and other manufacturer recommendations.

4. Provide a document produced by the manufacturer certifying that the latter officially recognizes the contractor in charge of the execution of the work as an authorized contractor.

5. Concrete pours: provide 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.

6. Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time specified in section 2.5 of Part 2 for concrete to be delivered to site of Work and discharged after batching.

1.6 QUALITY ASSURANCE

1. Quality Assurance: in accordance with Section 01 45 00 - *Quality Control.*

2. Provide Departmental Representative, minimum 2 weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.
    1. Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.

3. Minimum 2 weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on following items :
    1. Falsework erection.
    2. Hot weather concrete.
    3. Cold weather concrete.
    4. Curing.
    5. Finishes.
    6. Formwork removal.
    7. Joints.

4. Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.

1.7 DELIVERY, STORAGE AND HANDLING

1. Delivery and Acceptance Requirements :
    1. Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
        a. Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative laboratory representative and concrete producer as described in CSA A23.1/A23.2.
        b. Deviations to be submitted for review by Departmental Representative.
    2. Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

2. Packaging Waste Management: remove for reuse and return by manufacturer of packaging materials in accordance with Section 01 74 21 - *Construction/Demolition Waste Management and Disposal.*

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

1. Alternative 1 - Performance : to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.

2.2 PERFORMANCE CRITERIA

1. Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

2.3 MATERIALS

1. Cement : for general use, to CSA A-A5/A8/A362.

2. Water : to CSA A23.1.

3. Aggregates: to CSA A23.1/A23.2.

4. Admixtures :
    1. Air entraining admixture: to ASTM C260.
    2. Chemical admixture: to ASTM C494. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.

5. Concrete adhesive: three-component (3) anticorrosion coating and binding agent, cement and modified water-based epoxy:
    1. Bonding strength/concrete (CAN/CSA A23.2-6B): 2-3 MPa.
    2. Bonding strength/steel (CAN/CSA A23.2-6B): 1-2 MPa.
    3. Bonding strength at 14 days (ASTM C882) fresh on fresh: 20.7 MPa.
    4. Bonding strength at 14 days (ASTM C882) curing time in the open 12 hours: 13.8 MPa.

6. Acceptable materials or products: When materials or products are specified by brand, consult the instructions to the bidders regarding the procedure for the approval of replacement materials or products.

2.4 MIXES

1. Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
    1. Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.

2. Prepare normal density concrete as specified in standard A23.1 in order to obtain the required mix for all of the types of concrete specified in the plans and specifications and in accordance with the exposure types.

3. Concrete type: Unless otherwise indicated in the drawings, anticipate the use of the following types of concrete:

   1. Building foundations (footings, interior of piles) unless otherwise indicated N-1

Concrete Type	Usual Application and Degree of Exposure Considered[1]	Strength at 28 Days (MPa)[7]	Chloride Ion Permeability [6]	Entrained Air [8]	Aggregates Maximum[2] (mm)	Maximum Water/Cement Ratio
N-1	General use Unexposed	30 (26 max at 7 days)	---	4 at 7%	20	[3]
M-1	Lean concrete [4] Unexposed	10	---	4 at 7%	20	[3]

Notes :

[1] Concrete exposure: To freeze-thaw cycles and/or de-icing salts (chlorides). For exposure classes, see A23.1, Table 1.

[2] Aggregates: Provide a certificate compliant with A23.2 confirming that the aggregates are not subject to alkali-aggregate reactions. Anticipate the use of aggregates 10 mm maximum for concreting in thin spaces. Adjust the parameters of the mix, if necessary, to preserve the characteristics of the hardened concrete.

[3] Maximum water/cement ratio: Must be determined based on the dosage required and the specifications.

[4] Lean concrete: If pumpability is desired, enrich the water/cement ratio as required.

[5] Chloride ion permeability: Conduct pre-qualification tests compliant with A23.2.

[6] Strength at 7 days: See Article 2.2.4 for prior tests.

[7] Entrained air: Air content required at the pouring locations in the forms (i.e. at the concrete pump outlet).

4. In order to validate the proposed mix, two weeks at the latest before the beginning of the work, provide the Departmental Representative with a document produced by an independent laboratory recognized by the Departmental Representative, confirming that the mixes proposed by the General Contractor will produce concrete that will meet the requirements of the specifications and of the A23.1 standard. These mixes must have been tested at 7 days in the last six months. The average strength of six (6) samples per mix must fall within the following percentages of strength at 28 days:

   1. Cements Gu et Gu_b – SF = 75% ± 10%
   2. Cements Gu_b – S/SF, Gu_b – F/SF and ternary = 70% ± 10%

5. If required and following the tests and control results for the concrete at the site, the mixes must be corrected at the satisfaction of the Departmental Representative and meet the specifications.

6. Upon request, provide a document confirming that the mixing facility and the materials used to manufacture the concrete are compliant with the requirements of the CSA-A23.1 standard.

7. Obtain the approval of the Departmental Representative before using chemicals other than those specified.

8. The use of calcium chloride is prohibited at all times.

9. Base slump for all of the mixes is 80 mm ±30 (except for M-1 concrete: 100 mm ±30). The slump may be modified by the General Contractor based on the required workability of the concrete and its placement. When superplasticizer is added to facilitate placement, the maximum slump is limited to 175 mm.

10. Adjust the mixes if variations occur at the concrete producer level.

2.5 CONCRETE PROCUREMENT

1. The truck number and the characteristics of the concrete mix must appear on the bills of lading accompanying the delivery of premixed concrete.

2. Unless instructed in writing by the Departmental Representative, adding water to the water already in the concrete mix, whether during transportation or after its delivery on site, is prohibited.

3. The concrete must be unloaded less than 2 hours after water and cement come into contact. After that period of time, the concrete will be refused. If the ambient temperature is 27 °C or more, the unloading delay is shortened to 90 minutes.

2.6 SURFACE FINISH

1. Sidewalk: Finish with wood trowel and brush.

2. Slabs on ground and structural slabs (unless otherwise indicated):
    1. Concrete without entrained air: Monolithic finish smoothed with a steel trowel.
    2. Concrete with entrained air: Monolithic finish with a magnesium trowel.

3. When a wet dash is required on the concrete's surface, coordinate the desired finish with the Architect and the wet dash supplier.

4. When a leak tight membrane is required on the concrete's surface, anticipate an appropriate finish taking adherence into consideration (coordinate with the Architect and the membrane supplier).

5. Based on the options provided by the concrete supplier, cement could be added to the concrete mix. Specific finishing methods will have to be anticipated to take the added cement into consideration.

6. Wet curing: See Article 3.5.

2.7 FINISHING PRODUCTS FOR CONCRETE SLABS

1. N/A.

PART 3 - EXECUTION

3.1 PREPARATION

1. Obtain Departmental Representative'swritten approval before placing concrete.
    1. Provide 24 hours minimum notice prior to placing of concrete and specify the area of work involved and the estimated time of concrete placement.

2. Place concrete reinforcing in accordance with Section 03 20 00 - *Concrete Reinforcing*.

3. During concreting operations :
    1. Development of cold joints not allowed.
    2. Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.

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 or in accordance with Section 03 10 00 - *Concrete Forming and Accessories*

10. Transport the concrete from the truck to its destination using means that will keep the concrete components from separating or from significantly altering its consistency.

11. The concrete dropping height must never exceed 1.5 m. The use of sliders and chutes placed to avoid concrete segregation must be used.

12. Concrete is compacted using vibrators plunged into its mass. Vibrators must be inserted fairly close together to obtain complete compactness. Excessive vibration that could cause the separation of the concrete’s components must be avoided. Do not force the concrete into place horizontally with the vibrators.

13. An adequate number of vibrators must be kept on site. Emergency vibrators must be available at all times, in case the regular vibrators fail.

14. Prior to concrete placing, formworks must be cleaned and the water drained from them.

15. Concrete must not be placed in water without special permission and then, only strictly as spedified and instructed by the Departmental Representative

16. Concrete curing and protection: As specified in the A23.1 standard and these specifications. The latter will prevail on the standard.

17. Prior to placing fresh concrete against hardened concrete, apply a concrete adhesive to the latter.

3.2 INSTALLATION/APPLICATION

1. Do cast-in-place concrete work to CSA A23.1/A23.2.

2. Sleeves and inserts :
    1. Do not permit penetrations, sleeves, ducts, pipes or other openings to pass through joists, beams, column capitals or columns, except where indicated or approved by Departmental Representative.
    2. Where approved by Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.
    3. Sleeves and openings greater than 100 x 100 mm not indicated, must be reviewed by Departmental Representative.
    4. Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from Departmental Representative.
    5. Confirm locations and sizes of sleeves and openings shown on drawings.
    6. Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.

3. Anchor bolts :
    1. Set anchor bolts to templates in co-ordination with appropriate trade prior to placing concrete.

4. Grout under base plates and machinery using procedures in accordance with manufacturer's recommendations which result in 100 % contact over grouted area.

3.3 SURFACE TOLERANCE

1. Concrete tolerance to CSA A23.1.

3.4 FIELD QUALITY CONTROL

1. An independent laboratory retained and paid for by the Departmental Representative will take samples and conduct tests at regular intervals in order to determine if the concrete in place meets the specified quality requirements.

2. Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by Departmental Representative for review to CSA A23.1/A23.2.
    1. Ensure that the testing laboratory is certified according to standard CSA A283.

3. The General Contractor must cooperate fully with this testing by granting access to the site and equipment, by supplying the labour and material necessary for the preparation of the tubes, and by storing the samples to avoid issues or losses. The General Contractor will provide a closed space available exclusively for the storage of the samples.

4. Three (3) tubes will be filled with concrete from the day's placement. If the day's placement exceeds 100 m^3, three (3) additional tubes per 50 m^3 will be filled with concrete.

5. The samples and tests must be processed as close as possible from the point of placement in the forms (e.g. at the outlet of the concrete pump, conveyor or bucket) in order to obtain accurate concrete properties.

6. The tubes will be stored and cured as laboratory specimens. One will be broken after 7 days and the other two after 28 days. Occasionally, the laboratory will fill a fourth tube, which will serve as a control specimen on site and will be broken at its request.

7. All of the testing methods (destructive or not) and storage and curing facilities must meet the requirements of the CSA-A23.1/A23.2 standard.

8. If the concrete is mixed at the plant, the air content and slump will be tested from each truck mixer. If the concrete is mixed at the construction site, control will take place every four (4) cubic meter of concrete or more frequently if required by the Departmental Representative.

9. For testing purposes, submit small and large aggregates to the Departmental Representative, as well as the mix formula, as specified in standard A23.2.

3.5 CURING

1. General
    1. Curing must begin immediately after placing and finishing and the temperature and humidity during the curing period must be suitable to ensure that the concrete will achieve proper strength, durability and other properties.
    2. All of the concrete surfaces must be cured (e.g. sides and top of walls).
    3. The material required to ensure the protection of the concrete and curing must be made available and be ready to be used prior to the beginning of concrete placement.

2. Curing types and duration
    1. Concrete must cure for a minimum duration of 7 consecutive days following placement. During that period, the temperature of the concrete must be higher than 10 °C. The duration of curing must be extended until the concrete achieves a degree of strength higher than 70 % of the specified strength.

3. Curing methods
    1. Concrete curing is achieved through one or several of the following methods:
        a. Ponding or continuous watering;
        b. Water retaining material (canvas or other absorptive material kept wet (Ultracure curing blanket or equivalent));
        c. Forms in contact with the concrete's surface
        d. Other water retaining materials approved by the Departmental Representative.

4. Curing materials
    1. Materials used to cure concrete must meet the requirements of one of the following standards:
        a. ASTM C171 Sheet Materials for Curing Concrete.
        b. ASTM C309 Liquid Membrane – Forming Compounds for Curing Concrete.
    2. The water used for curing must not have damaging effects on concrete.
    3. Notes on curing products:
        a. Most liquid curing products are not suitable for concrete surfaces that will be bonded with a subsequent layer of concrete or with another surface covering. However, they are suitable if the products are to be removed completely after curing through sandblasting or a known solvent, or if tests clearly shoe that traces of the product will not reduce bond below specified values.
        b. The curing products must be applied to form a film sufficiently thick and continuous on the concrete's surface. The mix and application method must comply with the manufacturer's recommendations. This film must be protected to ensure it remains intact for the entre curing period.

5. Reduction of the curing period
    1. Reducing the curing period through means to obtain the specified concrete strength over a shorter period of time must be authorized by the Departmental Representative.

6. Curing during extreme temperatures
    1. Curing in hot weather
        a. When the ambient temperature reaches 27°C or higher, curing during the first three (3) days must be achieve through uninterrupted watering or the use of a water retaining material maintained constantly wet, in order to use cooling as a result of evaporation.
    2. Curing in cold weather
        a. During freezing weather, curing with water must cease 12 hours before the end of the protection period.

3.6 CONCRETE PROTECTION

1. General
    1. Freshly placed and finished concrete must be adequately protected against unfavorable conditions, such as high winds, precipitation, frost, abnormally high temperatures, temperature variations, premature drying and loss of moisture during the period of time required for the concrete to achieve the desired characteristics. In addition, work or other disturbances near the concrete that may affect new concrete negatively, such as soil compaction, pile driving, vibrations, etc., must be taken into consideration when selecting the protection measures.
    2. The General Contractor is responsible for the determination of the various criteria required to establish adequate protection methods based on site conditions. The data will be submitted to the Department Representative for verification and approval. In addition the measuring instruments will have to be made available, upon request from the Department Representative, for periodic validation.

2. Protection against evaporation

    1. If the evaporation rate of superficial moisture is higher than 0.50 kg/m^2, additional action must be taken to prevent the quick drying of the concrete's surface. The General Contractor must implement at least two of the most appropriate measures listed below:

        a. Water the support prior to concrete placement;

        b. Build sun screens above the concrete during finishing;

        c. Lower the temperature of the concrete to bring the evaporation rate under 0.50 kg/m^{2}hr, while respecting the temperature restrictions applicable to the concrete at placement time;

        d. Cover the concrete surface with a white polyethylene sheet in between the various finishing operations;

        e. Spray water (fogging) on the concrete immediately after placement and before the finishing, taking care to avoid water accumulation that would alter the quality of the cement paste;

        f. Place and finish the concrete at night.

        Note

        The General Contractor must estimate the evaporation rate using Figure D1 in Appendix D of the A23.1 standard, based on relative humidity measurements, the temperature of the concrete and of the ambient air and on wind speed, to be submitted to the Departmental Representative for verification.

3.7 CONCRETING IN HOT WEATHER

1. Then ambient temperature is 27°C or higher or when it is likely that temperature will reach 27°C during concrete placement (based on the weather forecasts for the area), the General Contractor must take special care to protect the concrete from the effects of hot and dry weather.

2. Under the intense dry conditions defined in Item 3.4.2 (protection against evaporation), the forms, framework, fresh concrete and concreting materials must be protected against direct sunlight or cooled through fogging.

3. The temperature of the concrete during placement must be as low as possible and must not in any way exceed the temperatures listed in the table entitled "Temperature Range for Concrete Placement". When the temperature of the concrete remains higher than 25°C during placement, the General Contractor must consider using an additive to delay setting, at his own expense.

3.8 CONCRETING IN COLD WEATHER

1. General

    1. If temperature is 5°C or lower, or if there is a possibility that it will drop under 5°C in the 24 hours following concrete placement (based on the weather forecasts in the area), all of the material required to protect the concrete and curing must be available on site and ready to use prior to concrete placement.

    2. In addition, the concrete must be adequately protected during the entire curing period. During curing, the temperature of the concrete must be continually maintained above 10°C and the

maximum temperature variation allowed between the concrete surface and the ambient temperature must not be exceeded.

3. Protection must be ensured through heated shelters, blankets, insulation or a combination of all of the above.

2. Temperature range of concrete at placement time

1. At placement time, the temperature of the concrete mix must comply with the following table:

TEMPERATURE RANGE FOR CONCRETE PLACEMENT

ELEMENT THICKNESS	TEMPERATURE (°C)	
	Minimum	Maximum
Less than 0.3 m	10	35
Between 0.3 m to less than 1 m	10	30
Between 1 m and 2 m	5	25
In excess of 2 m	5	20

3. Preparations for concrete placement in cold weather

1. Prior to the placement of the concrete on the entire surface, snow and ice must be removed. Calcium chloride must not be used as a de-icing agent in the forms. Concrete must not be placed on a surface where the temperature is lower than 5°C or on a surface that could make the temperature of the concrete drop below the minimum range allowed in the table entitled ”Temperature Range for Concrete Placement”.

4. Protection methods

1. Heated shelters

a. The shelters must be built in such a way as to resist driving wind and snow and be reasonably air tight. There must be sufficient space between the concrete and the shelter to allow the circulation of heated air. The shelter must be heated with live steam, forced heated air or using fixed heating devices or others. At concrete placement time and during the curing period, the concrete surfaces must be protected against direct exposure to combustion gas or drying caused by heating devices, using forms or an impervious membrane.

b. Avoid combustion gases inside the heated shelters by using indirect-fired heaters as this could cause severe health problems and the concrete surface could be damaged by carbonation and others.

2. Protection blankets and insulation

a. The type of protection blanket and the quantity of insulation required to ensure proper curing in cold weather must be determined by the General Contractor based on the ACI306R standard (“Guide to cold weather concreting”), and on the ambient temperature and wind speed (chill factor), the size and shape of the concrete structure and on the bond strength of the concrete. Submit the calculations to the Departmental Representative for verification.

3. Minimum protection during curing

a. When the exterior temperature is 5°C or lower, appropriate blankets and sufficient insulation must be properly placed on the concrete elements.

5. Maximum temperature variation allowed

   1. During the protection and curing period, the minimum variations between the temperature of the concrete surface and the ambient temperature must be respected in order to reduce cracking.

   2. In addition, to avoid cracking at the end of the curing period due to abrupt changes in temperature, some protection must be maintained until the temperature variation between the concrete and the ambient air is equal or lower than the variations indicated in the following table.

MAXIMUM TEMPERATURE VARIATION ALLOWED BETWEEN THE CONCRETE SURFACE AND AMBIENT AIR (WIND 25 KM/H AT MOST)

Concrete Thickness (m)	Maximum Temperature Variation Allowed (°C) Length/Height Ratio of the Structure *				
	0**	3	5	7	20 or more
< 0.3	29	22	19	17	12
0.6	22	18	16	15	12
0.9	18	16	15	14	12
1.2	17	15	14	13	12
> 1.5	16	14	13	13	12

* "Length" is the greatest restricted size and "Height" is the unrestricted size.
** Very high and thin elements, such as poles.

3.9 TEMPERATURE RECORDS

1. It is the responsibility of the General Contractor to determine and record the ambient temperature and that of the concrete during the protection and curing period. The records must include the date, time and location of each temperature measurement. In cold weather, the temperature of the shelters and concrete surfaces must be monitored, among other activities. In hot weather, the ambient temperatures and those of the concrete surface must be recorded, as well as wind speeds and relative humidity. The temperatures must be recorded on the form attached to this section. Upon request, the temperature records must be sent to the Departmental Representative for verification.

3.10 NON-CONFORM CONCRETE

1. The Departmental Representative may require the demolition, replacement or repairs with regard to any concrete deemed non-conform to the specifications.

2. If the strength of placed concrete measured through sampling proves to be inadequate versus the specifications, the Departmental Representative may require financial compensation based on the provisions of the CCDG. The control laboratory will be responsible for the calculation of the penalty.

3.11 OPENINGS IN CONCRETE

1. N/A.

3.12 CONSTRUCTION JOINTS

1. N/A.

3.13 SEALANT AND HARDENER

1. N/A.

3.14 SAW KERFS IN SLABS

1. N/A.

3.15 CLEANING

1. Clean in accordance with Section 01 74 11 - *Cleaning*.

2. Waste Management: separate waste materials for reuse/recycling in accordance with Section 01 74 21 - *Construction/Demolition Waste Management and Disposal.*
    1. Provide appropriate area on job site where concrete trucks and be safely washed.
    2. Divert unused admixtures and additive materials (pigments, fibres) from landfill to official hazardous material collections site as approved by Departmental Representative.
    3. Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard
    4. Prevent admixtures and additive materials from entering drinking water supplies or streams.
    5. Using appropriate safety precautions, collect liquid or solidify liquid with inert, non-combustible material and remove for disposal.
    6. Dispose of waste in accordance with applicable local, Provincial/Territorial and National regulations.

3.16 ANNEXE

1. Records
    1. Temperature records

END OF SECTION

Project : ______________________________
BPR project number : ______________________________
Reading by : ______________________________

temperature records

Checked item, date and time		During the concrete pouring						During the concrete curing								
		A.T. (°C)	R.H. (%)	C.T. (°C)	W. Speed (km/h)	evap. rate		A.T. (°C)			C.T. (°C)			R.H. (%)		
							Time	7h00	12h00	16h00	7h00	12h00	16h00	7h00	12h00	16h00
							Day 1									
							Day 2									
	Day 1						Day 3									
							Day 4									
							Day 5									
							Day 6									
							Day 7									
							Time	7h00	12h00	16h00	7h00	12h00	16h00	7h00	12h00	16h00
							Day 1									
							Day 2									
	Day 1						Day 3									
							Day 4									
							Day 5									
							Day 6									
							Day 7									
							Time	7h00	12h00	16h00	7h00	12h00	16h00	7h00	12h00	16h00
							Day 1									
							Day 2									
	Day 1						Day 3									
							Day 4									
							Day 5									
							Day 6									
							Day 7									
							Time	7h00	12h00	16h00	7h00	12h00	16h00	7h00	12h00	16h00
							Day 1									
							Day 2									
	Day 1						Day 3									
							Day 4									
							Day 5									
							Day 6									
							Day 7									

*** the verificated item must be clearly described and located**

R.H. : Relative humidity
C.T. : Concrete temperature
W. Speed : Wind speed
Evap. rate : Evaporation rate
A.T. : Ambient temperature

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

1. Section 01 33 00 - Submittal Procedures.
2. Section 01 74 11 - Cleaning.
3. Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.2 REFERENCES

1. ASTM International Inc.
    1. ASTM A 36/A 36M-12, Standard Specification for Carbon Structural Steel.
    2. ASTM A 193/A 193M-12b, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature or High-Pressure Service and Other Special Purpose Applications.
    3. ASTM A 307-12, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
    4. ASTM A 325-10e1, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
    5. ASTM A 325M-13, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength.
    6. ASTM A 490M-12, Standard Specification for High-Strength Steel Structural Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints.
    7. ASTM A 780M-09, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
2. Canadian General Standards Board (CGSB)
    1. CAN/CGSB-85.10-99, Protective Coatings for Metals.
3. Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturers Association (CPMA).
    1. Handbook of the Canadian Institute of Steel Construction.
    2. CISC/CPMA Standard 2-75, Quick-Drying Primer for use on Structural Steel.
    3. Steel Structures Painting Manual, volume 1 – Good Painting Practice.
4. Canadian Standards Association (CSA International)
    1. CSA G40.20/G40.21-13. General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
    2. CAN/CSA-G164-FM92(C2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
    3. CAN/CSA-S16-14, Limit States Design of Steel Structures.
    4. CAN/CSA-S136-12, North American Specifications for the Design of Cold Formed Steel Structural Members.

5. CSA W47.1-F09, Certification of Companies for Fusion Welding of Steel.
6. CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding.
7. CSA W55.3-F08(C2013), Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
8. CSA W59-F13, Welded Steel Construction (Metal Arc Welding).

5. Master Painters Institute
   1. MPI-INT 5.1-08, Structural Steel and Metal Fabrications.
   2. MPI-EXT 5.1-08, Structural Steel and Metal Fabrications.

6. The Society for Protective Coatings (SSPC) and National Association of Corrosion Engineers (NACE) International
   1. NACE No. 3/SSPC SP-6-06, Commercial Blast Cleaning.

1.3 SCOPE OF WORK

1. Provide the labour, equipment and materials required to build all of the structural steel shown on the plans and/or described in these specifications.

2. Paint and spot paint the structural steel as required.

3. Provide anchor bolts, expansive anchors, plates, angles and their anchors (weldable structural steel or other) to be embedded in concrete and required by this specification and/or required in the plans.

4. Hot dip the steel elements that require hot dip galvanization in the plans.

5. Take all of the measurements required to build the structural steel and all of the existing hindrances.

1.4 CONTRACTOR QUALIFICATIONS

1. The General Contractor must qualify based on the provisions of the W47.1 standard "**Certification of companies for fusion welding of steel**". The Contractor, as well as all his staff assigned to the execution of welding work, must be certified with regard to divisions 1 or 2 of the Canadian Welding Bureau.

1.5 INSPECTION CERTIFICATE

1. Upon request from the Departmental Representative, submit two (2) certified copies of steel inspection reports pertaining to the chemical and physical characteristics of the steel to be used in the execution of the project.

2. Also provide an affidavit from the steel shaping company confirming that the material used for this project complies with the relevant standards pertaining to products and materials specified.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

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

2. Shop drawings :
    1. Provide drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec of Canada.
    2. On each detailed drawing for a given element, specify the location of the item and identify the plan number, as well as the reference axis adjacent to the item.
    3. Shop drawings must include all of the details pertaining to shaping and assembly, including cross-sections, notches, assemblies, perforations, threaded anchors and welds. Use the symbols of the Canadian Welding Bureau to show welds.
    4. The control procedure for shop drawings merely aims to allow the Departmental Representative to familiarize himself with the general conformity of the structure *versus* the contractual provisions. The comments and/or corrections made to the drawings do not relieve the Contractor from his obligation to comply with all of the contractual requirements, nor do they constitute a commitment or approval should there be a deviation to the requirements.
    5. Submit the welding procedures in the following cases:
        a. Continuous weld;
        b. Track welding.

3. Installation drawings :
    1. Submitted fabrication drawings must include the details and information required for the fabrication and assembly of the elements, specifically:
        a. Working methods;
        b. The assembly sequence;
        c. The type of material to use for assembly;
        d. The temporary bracing devices.
    2. At all times, the Contractor remains solely responsible for the construction methods, equipment and work execution mode.

4. Fabrication drawings :
    1. Submit fabrication drawings showing designed assemblies, components and connections are stamped and signed by qualified professional engineer licensed in the Province of Quebec of Canada.

5. Samples :
    1. Furnish samples as specified in the Part 4 in this section.

6. Fabricator Reports :
    1. Provide structural steel fabricator's affidavit stating that materials and products used in fabrication conform to applicable material and products standards specified and indicated.

7. Certificates of Conformity – CSST
    1. The Contractor will provide the “Commission de santé et sécurité du travail du Québec” or CSST all of the certificates required by the latter as specified in the “Code de sécurité pour les travaux de construction” (safety code for construction work) or in the “Loi sur la santé et la sécurité du travail” (law on health and safety in the workplace), including the documents requiring the signature and

seal of an engineer certified by the "Ordre des Ingénieurs du Québec", specifically regarding the anchoring of struts with less than four (4) anchor bars (ref.: Articles 3.24.11 and 3.24.12 of the "**Modifications réglementaires au Code de sécurité pour les travaux de construction et Règlement sur la santé et la sécurité du travail**" (regulatory modifications to the safety code for construction work and the regulation on health and safety in the workplace).

1.7 DESIGN REQUIREMENTS AND ASSEMBLY DESIGN

1. N/A.

1.8 DELIVERY, STORAGE AND HANDLING

1. N/A.

PART 2 - PRODUCTS

2.1 MATERIALS

1. Structural steel: Unless otherwise indicated on the plans, comply with the G40.21 standard, nuance 350W for regular "I" shaped sections, 300W for C-shaped reinforcements, angles and plates, 350W class C or ASTM A500 class C for tubular sections and ASTM A-307 for anchor bolts.

2. High strength anchor bolts: to ASTM A 193/A 193M.

3. Bolts, nuts and washers: to ASTM A 325.

4. Welding material : Shall comply with CSA W59 and certified by the Canadian Welding Office.

5. Paint:
    1. Primer for exposed steel:
        a. Shop-applied. Paint spot on site.
        b. A layer of primer must be applied in shop on all steel surfaces, with the exception of those specified in clause 3.5.2 c) in order to delay rust. The primer must also comply with the following requirements:
            1) Aspect: opaque.
            2) Gloss level: matte finish.
            3) Thinner composition: hydrocarbon.
            4) Binding agent composition: alkyd.
            5) Volatile organic compound (ASTM D3960-05): < 400 g/L.
            6) Viscosity: 78 ± 5 Krebs unit.
            7) Density: 1.5 ± 0.1 kg/L.
            8) Volume solids: 51%.
            9) Flash point: 42°C.
            10) Application rate/layer: 20,2m^2/L to 1 mils dry films.

11) Thickness of the minimum wet film: 84 µm / Dry: 84 µm.

12) Drying time before re-coating: 16 hours.

13) Drying time before cleaning: 7 days.

2. Primer for non-exposed steel:

   a. Shop-applied. Paint spot on site: Compliant with the ICCA/AFPC (CISC/CPMA) 1-73a standard. Colour: grey.

6. Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA-G164, minimum zinc coating of 600 g/m².

7. Acceptable materials or products: When materials or products are specified by brand, consult the instructions to the bidders in order to follow procedures regarding requests for the approval of replacement material or products.

PART 3 - EXECUTION

3.1 APPLICATION

1. Manufacturer's instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 GENERAL

1. Structural steel work: in accordance with CAN/CSA-S16-09.

2. Welding: in accordance with CSA W59.

3.3 SHAPING

1. Shape the steel elements in compliance with the S16-09 standard.

2. Punch holes 11 to 27 mm in diameter to connect with other elements. Refer to the drawings for execution details and locations.

3. Reinforce the openings in order to ensure the original strength, if applicable.

4. Cut edges of plates and steel members must be smooth and free of crack or signs of breakage.

5. Joints must be sealed using a continuous weld where indicated. The welds must then be smoothed through grinding.

3.4 CONNECTION TO EXISTING WORK

1. Before beginning the shaping of the elements or the production of shop drawings, verify the dimensions and conditions of the existing structure (including the elevations and dimensions indicated on the plans). Notify the Departmental Representative of any discrepancy in size or eventual connection issue in order to obtain new instructions.

2. The information on the plans regarding existing structures may not be accurate or complete.

3.5 SHOP-APPLIED PAINT

1. N/A.

3.6 MARKING

1. N/A.

3.7 ERECTION

1. Erect structural steel, as indicated and in accordance with CAN/CSA-S16-09 and in accordance with reviewed erection drawings.

2. Field cutting or altering structural members: to approval of Departmental Representative .

3. Clean with mechanical brush and touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection, or scratched or missing, in compliance with Item 3.3. The Contractor must remove grease from the structure's bolts prior to the application of the paint finish.

4. If indicated on the drawings, seal continuously all of the steel members by section, with a continuous weld bead and grind the welds.

5. Holes that have not been shop-perforated but are still required for assembly must be drilled mechanically. Holes must not be made with a torch.

3.8 FIELD QUALITY CONTROL

1. Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Departmental Representative.

2. The Owner will pay for control tests except in case of a second inspection required due to deficient initial work, which will be at the Contractor's expense.

3. Tests will be non-destructive and conducted using one or the other of the following methods and a representative sample determined by the Departmental Representative:
    1. X-ray of the butt welds and groove welds.
    2. Magnetic test for weld bead.
    3. Ultrasonic test for full penetration welds.
        a. The Contractor must collaborate free of charge to the execution of these tests by providing the laboratory with all of the necessary assistance. If a weld is deemed defective by the Departmental Representative, an additional inspection at the expense of the Contractor will be carried out for the welds located on either side of the defective welds executed by the same welder. Any corrective work must be executed to the satisfaction of the Departmental Representative, at no cost to the Owner.

4. Allow and facilitate access to the plant and to the construction site for the Departmental Representative to verify, examine and supervise the quality of the material and execution and to take samples for testing

and analysis purposes. If necessary, provide all of the assistance (labour, equipment and materials) required by the Departmental Representative, free of charge.

5. The laboratory may subject all of the welds to non-destructive tests.

6. Destructive tests may be required by the Departmental Representative with regard to **welder certification** and tension or flexion tests.

7. If requested by the Departmental Representative, any part specified will be kept at the plant until the Departmental Representative authorizes its shipment to the construction site.

8. Before making a new weld, chisel, melt and grind all of the welds deemed defective until all traces of imperfection are removed.

9. The Departmental Representative and/or laboratory may make the verification required in the previous paragraphs again. If the bolt tightening tests have not been conducted as required, the expenses associated with the laboratory's verification will be paid by the General Contractor.

10. In the case of **hot dipped galvanized elements**, the interfaces of the elements in contact must be previously sealed with a continuous weld. In addition, the Contractor must notify the Departmental Representative five (5) days prior to the beginning of galvanization activities.

11. Welds on a galvanized element are prohibited unless expressly authorized by the Departmental Representative.

3.9 FIELD PAINTING

1. N/A.

3.10 CLEANING

1. Clean in accordance with Section 01 74 11 - *Cleaning*.

2. Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - *Construction/Demolition Waste Management and Disposal*.

3.11 OVERLOADS ON THE STRUCTURE

1. The Contractor must ensure that the structures in place or in execution are not overloaded and that the load bearing capacities of the steel installed on site are not exceeded.

PART 4 - ARCHITECTURALLY EXPOSED STRUCTURAL STEEL (AESS)

1. N/A.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

1. N/A.

1.2 REFERENCES

1. American Society for Testing and Materials International (ASTM)
    1. ASTM A 123/A 123M-13, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
    2. ASTM A 653/A 653M-09, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. Canadian Standards Association (CSA International)
    1. CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.
    2. CAN/CSA-G164-FM92(C2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
    3. CSA O141-F05, Softwood Lumber.
    4. CSA O151-F04, Canadian Softwood Plywood.
    5. CSA O153-FM1980 (C2003), Poplar Plywood.
3. Health Canada/Workplace Hazardous Materials Information System (WHMIS)
    1. Material Safety Data Sheets (MSDS).
4. National Lumber Grades Authority (NLGA)
    1. Standard Grading Rules for Canadian Lumber 2005.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

1. Submit Submittal submissions: in accordance with Section 01 33 00 - Submittal Procedures.

1.4 QUALITY ASSURANCE

1. Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
2. Plywood identification: by grade mark in accordance with applicable CSA standards.
3. Plywood, OSB and wood based composite panel construction sheathing identification: by grademark in accordance with applicable CSA standards.

1.5 DELIVERY, STORAGE, AND HANDLING

1. Store the material at temperatures and humidity levels that will ensure the physical and aesthetic integrity of the projects delivered to the construction site.

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

PART 2 - PRODUCTS

2.1 LUMBER MATERIAL

1. Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards.
    1. CAN/CSA-O141.
    2. NLGA Standard Grading Rules for Canadian Lumber.
    3. Forest Stewardship Council (FSC) certified.

2. Furring, blocking, nailing strips, grounds, rough bucks, cants curbs, fascia backing and sleepers.
    1. Post and timbers sizes: "Standard" or better grade for nailing bases that will not be visible.
    2. Board sizes: "Standard" or better grade.
    3. Dimension sizes: "Standard" light framing or better grade.
    4. Post and timbers sizes: "Standard" or better grade.

3. Treated wood will be pressure treated in compliance with the CSA 080.1 standard, using a CCA preservation product so as to obtain a net retention of 6,4 kg/m^2 of wood. Acceptable product: “Preserve” from ACQ or “ProNature” from Goodfellow, without arsenic or equivalent approved.

2.2 PANEL MATERIALS

1. Canadian softwood plywood (CSP): to CSA O151, standard construction.
    1. Urea-formaldehyde free.
    2. Forest Stewardship Council (FSC) certified.

2. Poplar Plywood: to CSA O153, standard construction, urea-formaldehyde free.
    1. Urea-formaldehyde free.
    2. Forest Stewardship Council (FSC) certified.

2.3 ACCESSORIES

1. Nails, spikes and staples: to CSA B111.

2. Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.

2.4 FINISHES

1. Galvanizing: to CAN/CSA-G164, ASTM A 653/A 653M, use galvanized fasteners for exterior work, interior highly humid areas, pressure- preservative, fire-retardant and treated lumber.

PART 3 - EXECUTION

3.1 PREPARATION

1. N/A.

3.2 INSTALLATION

1. Comply with requirements of NBC, supplemented by the following paragraphs.

2. Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding and other work as required. Align and plumb faces of furring and blocking to tolerance of 1:600.

3. Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

4. Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.

5. Install wall plates, strips and furring as specified.

6. Do not work on particle panels without taking the required precautions. Use dust collectors and wear a high-quality breathing apparatus.

7. Install treated plywood nailing strips and bases around the bay windows to ensure that frames and other finishing works around openings are supported, as specified by the manufacturer.

8. Install the nailing beds required to support all of the integrated furniture elements or accessories: window sills, etc.

3.3 ERECTION

1. Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

2. Countersink bolts where necessary to provide clearance for other work.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

1. Section 05 12 23 – Structural Steel for Buildings.

1.2 MEASUREMENT PROCEDURES

1. Non applicable.

1.3 REFERENCES

1. Canadian Standards Association (CSA International)
    1. CSA-G40.20/G40.21-2004, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
    2. CSA W47.1-03, Certification of Companies for Fusion Welding of Steel Structures.
    3. CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding.
    4. CSA W59-03, Welded Steel Construction (Metal Arc Welding) (metric version).

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

2. Product data : submit manufacturer's printed product literature, specifications and datasheet.

3. Submit shop drawings and indicate : piles, calipers, bolts and tips.
    1. Each drawing stamped and signed by professional engineer registered or licensed in Province of Quebec, Canada.

4. Quality Assurance : test reports:
    1. Certificates : submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

5. Submit details of pile stock material to be used.

1.5 DELIVERY, STORAGE AND HANDLING

1. Deliver, store and handle materials in accordance with manufacturer's written instructions.

2. Deliver new, undamaged materials to site, accompanied by certified test reports.

3. Storage and Protection:
    1. Store and handle pipe piling in accordance with manufacturer's written instructions to prevent permanent deflection, distortion or damage to interlocks.

2. Support pipe piling on level blocks or racks spaced not more than [3] m apart and not more than [0.60] m from ends.
3. Store pipe piling to facilitate required inspection activities and prevent damage to coatings and corrosion prior to installation.

4. Waste Management and Disposal:
    1. Separate waste materials for recycling in accordance with Section 01 74 21 – Construction / Demolition Waste Management and Disposal.
    2. Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
    3. Divert unused concrete materials from landfill to local facility as approved by Departmental Representative.
    4. Unused paint or coating material must be disposed of at an official hazardous material collections site as approved by Departmental Representative.
    5. Unused paint material must not be disposed of into sewer system, into streams, lakes, onto ground or in any other location where it will pose a health or environmental hazard.

PART 2 - PRODUCTS

2.1 MATERIALS

1. Steel pipe : seamless, of sizes and wall thicknesses indicated, plain.
2. Pipe material to have following minimum properties :
    1. Yield strength : 350 MPa.
3. Pipe chemical composition : to CSA-Z245.1 ASTM A 252.
4. Pipe allowable tolerances:
    1. Deviation from straight line, specified diameter, wall thickness and out-of-roundness on body of pipe and at pipe ends to conform to API SPEC 5L.
    2. Pipe to be checked for deviations before leaving mill.
5. Pile tip reinforcement : to CSA-G40.20/G40.21, Grade 300.
6. Splices : to CSA-G40.20/G40.21, Grade 300.
7. Welding electrodes : to CSA W48 series.
8. Concrete : in accordance with Section 03 30 00 - Cast-in-Place Concrete.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

1. Compliance : comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 FABRICATION

1. Fabricate full length piles to eliminate splicing during installation wherever possible.
2. Full length piles may be fabricated from piling material by splicing lengths together.
    1. Use splices as indicated.
3. Submit details of planned use of pile material stock to Departmental Representative for approval prior to start of fabrication. Re-use cut-off lengths as directed by Departmental Representative.
4. Allowable tolerance on axial alignment to be 0,25 %.
5. Repair defective welds as approved by Departmental Representative.
    1. Repairs : to CSA W59.
    2. Unauthorized weld repairs may be rejected.

3.3 PAINTING AND COATING

1. Non applicable.

3.4 INSTALLATION

1. Install piling.
2. Splice piles in place during installation, if required, by welding.
3. Perform internal visual inspection of steel pipe, joints and base prior to placing of concrete.
    1. Ensure pipe inside is free from foreign matter.
4. Install concrete in accordance with Section 03 30 00 - Cast-in-Place Concrete.
5. Fill steel pipe pile with concrete using methods to limit free fall and to prevent segregation. Ensure adequate vibration to completely fill cross section of pipe.
    1. Ensure adequate vibration to completely fill cross section of pipe.
6. Install driving shoes as part of field work.

3.5 WELDING

1. Weld to CSA W59.

2. Welding certification of companies: to CSA W47.1.

END OF SECTION

APPENDIX A

Geotechnical Report – Labo S.M. inc.
(# F1313256-006) – September 2014

Travaux publics et Services gouvernementaux Canada

ÉTUDE GÉOTECHNIQUE

Septembre 2014
V/Réf. : R.064816.009

Restauration du bâtiment de l'Atelier
Réserve nationale de faune du Cap-Tourmente
Chemin de la Friponne, Saint-Joachim (Québec)

N/Réf. : F1313256-006

SM^{i} LABO S.M. INC.

1200, av. St-Jean-Baptiste, bureau 116
Québec (Québec) G2E 5E8
Tél. : 418 871.9330 | Téléc. : 418 871.9343

LABO S.M. INC.

Étude géotechnique

Restauration du bâtiment de l'Atelier
Réserve nationale de faune du Cap-Tourmente
Chemin de la Friponne, Saint-Joachim (Québec)

Rapport présenté à :

Madame Claudia Gaudreault
Architecte paysagiste
TRAVAUX PUBLICS ET SERVICES GOUVERNEMENTAUX CANADA
3, Passage du Chien d'Or, 3e étage
Québec (Québec) G1R 3Z8

Marc-André Carrier, ing.
Chargé de projet – Géotechnique

Sonya Graveline, ing.
Directrice – Géotechnique

N/Réf. : F1313256-006
V/Réf. : R.064816.009
11 septembre 2014

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Tableaux

Annexes

1 INTRODUCTION

1.1 MANDAT ET PORTÉE DE L'ÉTUDE

Les services de **Labo S.M. inc.** ont été retenus par **Travaux publics et Services gouvernementaux Canada (TPSGC)** afin d'effectuer une étude géotechnique dans le cadre du projet de restauration du bâtiment de l'Atelier à la Réserve nationale de faune du Cap-Tourmente sur le chemin de la Friponne, à Saint-Joachim, Québec.

Le mandat spécifique de cette étude géotechnique consistait à déterminer la nature et les propriétés des sols en place et les conditions d'eaux souterraines, et ce, dans la mesure où ces caractéristiques affectent la conception et les travaux de restauration du bâtiment à l'étude.

Ce rapport présente une description du site et du projet, la méthodologie utilisée lors des travaux de chantier et en laboratoire, les résultats obtenus, de même que nos conclusions et recommandations concernant :

- la problématique de tassements sous le bâtiment actuel
- la mise en place des fondations profondes
- la réutilisation des matériaux en place
- la supervision durant la construction.

À noter que l'évaluation de la résistance géotechnique sous les fondations était prévue dans le mandat initial. Par contre, compte tenu des méthodes d'investigation et des résultats obtenus lors des travaux, ces informations ne font pas partie du présent rapport.

1.2 ÉTUDES ANTÉRIEURES

Le site a fait l'objet d'une étude géotechnique en février 2013, réalisée par *LVM* (N/Réf. : 126-P-0000066-0-01-04-01-GE-R-0001-00), laquelle a été mise à notre disposition. Dans le cadre de cette étude, des sondages ont été réalisés à environ 50 m à l'ouest du site à l'étude. Les informations contenues dans cette étude ont été considérées dans la rédaction de ce rapport.

1.3 LOCALISATION ET DESCRIPTION DU SITE ET DU PROJET

Le site à l'étude est localisé sur le site de la Réserve Nationale de Faune du Cap-Tourmente sur le chemin de la Friponne à Saint-Joachim, à environ 150 m à l'est de l'intersection avec le chemin du Cap-Tourmente. Le terrain est présentement occupé par cinq (5) bâtiments, dont l'Atelier localisé dans la partie est du site. Ce bâtiment chauffé a été transformé dans les années 80 afin d'y ajouter une annexe. Ses dimensions actuelles sont d'environ 40 m X 10 m.

La nouvelle section aurait été construite directement sur une dalle de béton. La partie ancienne reposerait sur un plancher de bois déposé sur des poutres de béton. Un mouvement différentiel a été observé entre les deux sections du bâtiment. Des fissures ont aussi été observées sur la dalle de la partie récente. Selon les informations fournies par le concepteur, un vide d'environ 75 mm aurait été rencontré sous la dalle lors de travaux de carottage.

Les travaux consistent à la reprise en sous-oeuvre des fondations du bâtiment de l'Atelier. Selon les informations fournies et suite aux constats des concepteurs lors de la réalisation des sondages, ces travaux seront réalisés à l'aide de pieux foncés hydrauliquement et appuyés sur le roc.

2 TRAVAUX RÉALISÉS

2.1 TRAVAUX EN CHANTIER

Les travaux d'investigation sur le terrain ont été effectués le 12 août 2014. Ils ont consisté en la réalisation :

- de deux (2) puits d'exploration avec échantillonnage des sols, identifiés PU-01-14 et PU-02-14 et situés en bordure du bâtiment à l'étude afin de dégager ses fondations
- d'un (1) relevé de localisation et de nivellement des forages.

Tous les travaux de terrain ont été réalisés sous la supervision constante d'un technicien expérimenté. Les renseignements recueillis sont présentés dans les rapports de sondage inclus à l'annexe II.

2.1.1 IMPLANTATION, LOCALISATION ET NIVELLEMENT

L'implantation et le relevé de localisation des points de sondage sur le terrain ont été réalisés par le personnel de **Labo S.M. inc.** à partir des directives du client et du concepteur ainsi que des plans fournis.

Le relevé de nivellement des points de sondage a également été réalisé par le personnel de **Labo S.M. inc**. Le repère de nivellement utilisé, dont l'élévation arbitraire est de 100,00 m, correspond au-dessus de la dalle du plancher de la partie la plus récente du bâtiment à l'étude. Toutes les élévations mentionnées dans ce rapport se réfèrent à ce niveau de base.

La localisation des sondages réalisés est présentée sur la figure jointe à l'annexe I.

2.1.2 PUITS D'EXPLORATION

Les puits d'exploration ont été réalisés à l'aide d'une pelle mécanique sous la supervision constante d'un technicien de **Labo S.M. inc.** Les puits ont été réalisés en bordure du bâtiment à l'étude afin de dégager les fondations du bâtiment existant. Un représentant du concepteur était sur place lors de la réalisation des puits d'exploration.

Les puits ont atteint une profondeur variant entre 1,2 m et 2,1 m et ont été arrêtés volontairement, l'excavation dans les sols naturels devant être limité pour des considérations archéologiques selon les informations fournies. Au cours des travaux, l'identification visuelle des différents matériaux rencontrés a été réalisée, permettant ainsi d'établir la séquence stratigraphique au droit des sondages. Des échantillons représentatifs des sols rencontrés ont été prélevés manuellement.

2.2 TRAVAUX EN LABORATOIRE

Les échantillons de sols récupérés lors des sondages ont été acheminés à notre laboratoire et ont été soumis à une identification visuelle par un ingénieur géotechnicien afin de tracer les profils stratigraphiques présentés dans les rapports de sondage. Afin de préciser la nature et certaines propriétés physiques des sols échantillonnés, les essais donnés au tableau 1 ont été réalisés sur des échantillons représentatifs.

Tableau 1 Essais en laboratoire

Quantité	Analyse	Norme
3	Analyse granulométrique par tamisage	LC 21-040
1	Analyse granulométrique par sédimentométrie	BNQ 2501-025
2	Teneur en eau naturelle (w)	LC 21-201
1	Limites de consistance (Atterberg), 1 point	BNQ 2501-092

Les résultats des essais en laboratoire sont joints à l'annexe III.

Tous les échantillons récupérés lors des sondages et qui n'ont pas été utilisés pour les essais de laboratoire seront conservés jusqu'en février 2015. Après ce délai, ils seront détruits, à moins d'un avis contraire écrit de votre part.

3 NATURE ET PROPRIÉTÉ DES DÉPÔTS

Les informations recueillies lors des investigations sur le terrain et en laboratoire sont présentées dans les paragraphes suivants et résumées dans les tableaux 2 à 4.

- **Remblais**

Des remblais ont été rencontrés immédiatement en surface du terrain. On retrouve d'abord une couche de pierre nette 20 mm sur une épaisseur de 0,35 et 0,20 m, suivis de sable contenant des traces à un peu de silt et des traces de gravier sur une épaisseur de 0,45 m et 0,10 m. Un isolant rigide de 50 mm d'épaisseur a été rencontré dans les sondages à l'intérieur des remblais à une profondeur de 0,55 m et 0,30 m.

Des remblais hétérogènes ont été rencontrés sous les remblais sableux ou sous l'isolant à une profondeur de 0,80 m et 0,35 m. Ils se composent de sable silteux contenant un peu de gravier de couleur gris foncé à noir. Une présence importante de brique et de bois a été observée dans ces remblais ainsi que des cailloux (10% à 15%) dont le diamètre variait entre 150 et 300 mm.

Le sondage PU-01-14 a été interrompu dans les remblais, au contact des sols naturels probables, à une profondeur de 1,20 m.

- **Dépôts naturels**

Les dépôts naturels ont été atteints sous les remblais au sondage PU-02-14 à une profondeur de 1,05 m. Ils sont composés de silt argileux contenant de traces de sable et de gravier.

Le sondage PU-02-14 a été interrompu dans les dépôts naturels à une profondeur de 2,05 m.

Tableau 2 Synthèse de la stratigraphie

Forage n°	Élévation de surface (m)	Remblais*	Sols naturels	
		Épaisseur (m)	Profondeur (m)	Élévation (m)
PU-01-14	99,96	1,20	1,20**	98,76
PU-02-14	99,94	1,05	1,05	98,89

*Présence d'isolant de 50 mm à l'intérieur des remblais à 0,3 et 0,6 m de profondeur.
**Sols naturels probables

Tableau 3 Résultats des analyses en laboratoire sur les sols

Forage n°	n° échantillon	Profondeur (m)	Unité stratigraphique	Teneur en eau (%)	Limite de consistance*			Répartition granulométrique (%)				Classification USCS
					W_L (%)	W_P (%)	I_P (%)	Gravier (Ø > 5 mm)	Sable (0,08-5 mm)	Silt (2 - 80 µm)	Argile (Ø < 2 µm)	
PU-01-14	EM-3	0,60 – 0,80	Remblais	-	-	-	-	5,0	91,4	3,6		SP
PU-01-14	EM-4	0,80 – 1,20	Remblais	24,2	-	-	-	18,0	49,2	32,8		SM ou SC
PU-02-14	EM-4	1,20 – 1,50	Terrain naturel	22,9	24	20	4	1,0	9,3	68,6	21,1	CL-ML

** W_L = limite de liquidité / W_P = limite de plasticité / I_P = Indice de plasticité.*

3.1.1 FONDATIONS EXISTANTES

Les puits d'exploration ont été réalisés en bordure du bâtiment existant dans le but d'identifier le type et la profondeur des fondations supportant le bâtiment. Les photographies prises lors des travaux sont jointes à l'annexe IV. Selon nos observations, les fondations de la partie ancienne du bâtiment seraient constituées de poutres en béton d'environ 600 mm de hauteur et de 250 mm de largeur (photographie n° 2 et 4). Au sondage PU-02-14, ces poutres étaient espacées d'environ 2,0 m (photographie n° 4). Une petite surlargeur de béton a été observée à la base de ces poutres (photographies n° 2 et 5). Un drain de 100 mm de diamètre a été rencontré à une profondeur de 0,15 m dans la couche de pierre concassée 20 mm. Dans la partie la plus récente du bâtiment, seulement une dalle de béton a été observée sous le bâtiment (photographie n° 4) et aucune fondation n'y était apparente. Les poutres ou la dalle de béton semblaient être appuyées sur un remblai de blocs, de briques et de sols sablo-silteux. Des vides étaient présents dans ces matériaux. Des panneaux de bois ont aussi été observés à 1,05 m de profondeur au sondage PU-02-14.

3.1.2 RÉSULTATS DE L'ÉTUDE ANTÉRIEURE

L'étude antérieure (LVM, février 2013, Réf.: 126-P-0000066-0-01-04-01-GE-R-0001-00) a été réalisée dans le secteur du hangar à grain à environ 50 m à l'ouest du bâtiment à l'étude. Selon les résultats de ces sondages, le roc a été rencontré à une profondeur de 2,10 m sous les dépôts naturels composés de silt argileux. Il s'agirait d'un shale gris.

4 EAUX SOUTERRAINES

Des venues d'eau ont été observées à l'intérieur des sondages. Au sondage PU-01-14, la venue d'eau provenait du dessous du bâtiment à 1,15 m de profondeur. Au sondage TF-02-14, une venue d'eau a été observée à travers des panneaux de bois à 1,20 m de profondeur.

Les conditions d'eau souterraine rencontrées dans les forages sondages uniquement aux emplacements et aux dates indiquées et sont données à titre informatif uniquement. Celles-ci sont susceptibles de varier suivant les saisons, l'importance des précipitations locales ou encore par l'intervention humaine sur le site ou les propriétés adjacente. À cet effet, il demeure possible que ces conditions soient différentes lors de la réalisation des travaux de construction.

5 CONCLUSIONS ET RECOMMANDATIONS

5.1 RÉSUMÉ DU PROJET ET DES CONDITIONS DU SITE

La présente étude s'inscrit dans le cadre du projet de stabilisation du bâtiment de l'Atelier à la Réserve nationale de Faune du Cap-Tourmente sur le chemin de la Friponne à Saint-Joachim. Le bâtiment est localisé dans la partie est du site et possède des dimensions d'environ 10 m X 40 m. Une annexe a été ajoutée au bâtiment dans les années 80 dans la partie est du bâtiment. La partie récente reposerait sur une dalle de béton alors que la partie ancienne reposerait sur un plancher de bois déposés sur des poutres de béton. Des tassements différentiels ont été observés entre les deux parties du bâtiment et des fissures seraient apparentes sur la dalle de béton de la partie récente. Selon les informations fournies, la stabilisation du bâtiment sera réalisée à l'aide de pieux foncés hydrauliquement.

Les résultats de la campagne de forages ont révélé la présence de remblai directement en surface du terrain. Une couche de pierre nette 20 mm de ±0,3 m d'épaisseur a été rencontrée en surface dans laquelle un drain de 100 mm était présent. Ils sont suivis d'une couche de sable, traces à un peu de silt et des traces de gravier sur 0,45 et 0,10 m d'épaisseur. Un isolant rigide a aussi été rencontré à ±0,4 m de profondeur. Des remblais hétérogènes de sable silteux sont rencontrés sous l'isolant ou le remblai sableux. De la brique et plusieurs cailloux ont été traversés dans ces remblais. Les dépôts naturels ont été rencontrés à une profondeur de ±1,1 m et se composent de silt argileux contenant des traces de sable et de gravier.

La partie ancienne du bâtiment semble reposer sur des poutres de béton de 600 mm de hauteur et de 250 mm de largeur espacés de ±2,0 m. Aucune fondation n'a été constatée en dessous de la partie ancienne; elle reposerait sur une dalle de béton. Les fondations sont appuyées sur un remblai de blocs, de briques et de sols sablo-silteux.

Des venues d'eau ont été observées dans les sondages à ±1,2 m de profondeur.

5.2 DISCUSSION

Selon les résultats des sondages, le bâtiment à l'étude reposerait sur des remblais hétérogènes composés de blocs, de briques et de sols sablo-silteux. Des vides ont aussi été observés à l'intérieur de ces matériaux. Ces sols ne constituent pas un support adéquat pour les fondations du bâtiment et les tassements observés ont possiblement été causés par la compression de ces sols. Des tassements différentiels sont aussi susceptibles de se produire dans ces matériaux compte tenu de leur hétérogénéité.

5.3 FONDATIONS PROFONDES

Les charges du bâtiment pourront être transmises aux sols à l'aide d'un système de pieux fixés sur la structure du bâtiment existant. Selon les informations fournies, des pieux foncés hydrauliquement sont prévus.

La profondeur d'enfouissement des fondations ne sera pas suffisante pour assurer la protection contre les effets du gel. Les sols sous les fondations et ceux qui recevront les fondations profondes devront être isolés afin de les protéger contre les effets du gel. La mise en place d'isolants rigides disposés à l'horizontal pourra être considérée en lieu et place de l'enfouissement prescrit. La profondeur de gel est évaluée à 1,8 m dans le secteur à l'étude.

5.3.1 CAPACITÉ DES PIEUX

Les pieux devront être foncés jusqu'au roc. La charge ultime devra être suffisante pour offrir un facteur de sécurité acceptable (égal ou supérieur à 2,0) vis-à-vis de la charge utile désirée. Il est à noter que nos travaux d'investigation en chantier n'ont pas permis d'atteindre le roc jusqu'à une profondeur de 2,1 m. Par contre, les sondages réalisés lors de l'étude antérieure à 50 m du bâtiment à l'étude ont permis d'atteindre le roc à ±2,1 m. La présence de cailloux et de débris dans les remblais en place devra être considérée pour la réalisation des travaux. L'excavation préalable de ces matériaux pourrait être nécessaire afin de permettre le fonçage des pieux.

5.3.2 SUIVI DE CONSTRUCTION

Nous recommandons que la mise en place des fondations sur pieux soit étroitement supervisée par un laboratoire de façon à s'assurer de la qualité des matériaux fournis et de la conformité des pieux après leur mise en place (alignement, verticalité, rectilignité, refus, etc.). Une inspection visuelle de tous les pieux devrait être effectuée afin de s'assurer que les pieux sont encore en bon état.

Finalement, nous recommandons également à ce que les services d'un entrepreneur spécialisé en pieux soient retenus afin de garantir que les travaux seront exécutés en respect avec les règles de l'art applicables.

5.4 RÉUTILISATION DES MATÉRIAUX EN PLACE

D'après les résultats des investigations et dans la mesure où des excavations sont réalisées au pourtour du bâtiment lors des travaux, les déblais provenant des remblais en place composée de pierre concassée ou de sable, traces de silt pourront être utilisés en partie sous ou en périphérie immédiate du bâtiment ou pour les ouvrages de drainage connexes, puisqu'ils contiennent moins de 10% de particules fines (Ø < 80µm). Néanmoins, nous recommandons à ce que les matériaux soient vérifiés et approuvés par un laboratoire de contrôle en sols et matériaux, afin de s'assurer qu'ils répondent aux exigences des normes en vigueur. Les matériaux plus silteux pourront être réutilisés comme matériaux d'appoint aux endroits où aucune exigence de compaction ou de drainage n'est requise

Dans tous les cas, la réutilisation des sols de remblai demeure également sujette aux politiques et règlements environnementaux en vigueur auprès du MDDELCC.

6 PERSONNEL

Les travaux en chantier ont été réalisés par monsieur Nicolas Tremblay, ingénieur. Monsieur Marc-André Carrier, ingénieur, a rédigé le présent rapport portant le n° F1313256-006, lequel a été vérifié et approuvé par Madame Sonya Graveline, ingénieure.

7 LIMITATIONS

Les résultats obtenus lors de cette étude géotechnique ne sont applicables qu'en regard des hypothèses et des données utilisées au cours de l'étude et sur les limites et techniques d'exploration. Si des conditions géotechniques différentes de celles décrites dans ce rapport sont rencontrées en cours de travaux, elles devraient faire l'objet d'une vérification de la part d'un ingénieur géotechnicien lequel pourra en déterminer les impacts sur l'ouvrage à construire et si requis, émettre de nouvelles recommandations.

Les conditions d'eau souterraine décrites dans ce rapport se rapportent uniquement à celles observées aux endroits et aux dates indiquées dans ce rapport. Il est important de noter que le niveau de l'eau souterraine peut être influencé par plusieurs facteurs dont, entre autres, les précipitations, la fonte des neiges et les modifications apportées au milieu physique et qu'ainsi, il peut varier avec les saisons et les années.

Toutes les données factuelles, les interprétations et les recommandations émises dans le présent rapport se rapportent uniquement au projet décrit dans ce rapport et ne s'appliquent à aucun autre projet ou site. Ce rapport a été préparé pour le seul bénéfice de notre client. Nous déclinons toute responsabilité ou obligation associée à l'utilisation de ce rapport par une tierce personne, de même que toute décision qui en découle, lui en est strictement imputable.

Advenant que des changements soient apportés à l'élévation, la localisation, la conception et la nature du projet, alors les conclusions et recommandations de notre rapport ne devront pas être considérées valides à moins que l'impact desdits changements ne soit évalué par **Labo S.M. inc.**, et que les conclusions du rapport soient modifiées ou maintenues par écrit. Il pourrait être nécessaire d'effectuer de nouveaux sondages et d'émettre un rapport complémentaire.

Annexe I

LOCALISATION DES FORAGES

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Projet:	Étude géotechnique Restauration de bâtiment de l'Atelier Réserve nationale de faune du Cap-Tourmente Chemin de la Friponne, St-Joachim (Québec)
Titre:	Figure de localisation des sondages

Dessiné par:	S. Bordeleau, tech.	Appr. par:	Marc-André Carrier, ing.	Date:	4 septembre 2014	Discipline:	Géotechnique
Échelle:	1:1000	Client:	Travaux publics et services gouvernementaux Canada	No. Dossier:	F1313256-006	No. Dessin:	F1313256006K001

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Annexe II

RAPPORTS DE FORAGE

Labo S.M. Inc.

RAPPORT DE PUITS D'EXPLORATION

Projet:	Étude géotechnique - Restauration du bâtiment de l'Atelier	Localisation:	Voir figure de localisation	N° sondage:	PU-01-14
Client:	TPSGC	X:		Page:	1 de 1
Site:	Réserve nationale de faune du Cap-Tourmente	Y:		Date début:	2014-08-12
N./réf.:	F1313256006	Type de sondage:	PUITS D'EXPLORATION	Inspecteur:	N. Tremblay, ing.
Figure:	F1313256006K001	Équipement:	Pelle mecanique	Profondeur:	1.20m
		Tubage:	Carottier:	Élévation :	99.96m

TYPE D'ÉCHANTILLON

CF	Cuillière fendue
CFC	Tube d'échantillonage continu
CR	Carottier à diamants
TM	Tube à parois minces
TA	Tarière
TS	Tube shelby
EM	Échantillon manuel

TERMINOLOGIE QUALITATIVE

Argile	< 0,002 mm
Silt	0,002 - 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 200 mm
Blocs	> 200 mm

TERMINOLOGIE QUANTITATIVE

Traces	< 10 %
Un peu	10 - 20 %
Adjectif (...eux)	20 - 35 %
et (ex: et gravier)	> 35 %
mot principal	Fraction dominante

SYMBOLES

N	Indice de pénétration standard (ASTM D 1586)
Nc	Indice de pénétration au cône (BNQ 2501-145)
RQD	Indice de la qualité du roc (%)

EAUX SOUTERRAINES

	Date	Profondeur
Lecture 1		m
Lecture 2		m

Remarque:

ÉTAT DE L'ÉCHANTILLON

- Remanié
- Intact (tube à parois minces)
- Perdu
- Carotté (forage au diamant)

CARACTÉRISTIQUES MÉCANIQUES DES SOLS

COMPACITÉ	INDICE "N"	CONSISTANCE	Cu OU Su (kPa)
Très lâche	0 - 4	Très molle	< 12
Lâche	4 - 10	Molle	12 - 25
Compacte	10 - 30	Ferme	25 - 50
Dense	30 - 50	Raide	50 - 100
Très dense	> 50	Très raide	100 - 200
		Dure	> 200

INDICE DE QUALITÉ DU ROC

QUALIFICATIF	RQD
Très mauvaise	< 25 %
Mauvaise	25 - 50 %
Moyenne	50 - 75 %
Bonne	75 - 90 %
Excellente	90 - 100 %

ESPACEMENT DES DISCONTINUITÉS

Très serré	< 20 mm
Serré	20 - 60 mm
Rapproché	60 - 200 mm
Moyennement espacé	200 - 600 mm
Espacé	600 - 2000 mm
Très espacé	2000 - 6000 mm
Éloigné	> 6000 mm

COUPE STRATIGRAPHIQUE / ÉCHANTILLONS / RÉSULTATS D'ESSAIS

PROFONDEUR (m)	PROFONDEUR (pi)	ÉLÉVATION (m) / PROFONDEUR (m)	DESCRIPTION DES SOLS ET DU ROC	SYMBOLE	ÉTAT	TYPE N°	CAROTTIER - CALIBRE	RECUPÉRATION (%)	Nspt - Nc - RQD	Essai de pénétration standard COUPS/150mm	NIVEAU D'EAU / VENUE D'EAU	ESSAIS	GRAPHIQUE	REMARQUES
		99.96												
		0.00	Remblais: Pierre concassée 20 mm			EM-1								
		99.61												
		0.35	Sable, traces de silt et gravier; brun			EM-2								
		99.41												
		0.55	Isolant											
		99.36												
		0.60	Sable, traces de silt et gravier; brun			EM-3						AG, W		
		99.16												
		0.80	Sable silteux, un peu de gravier; gris et noir Présence importante de briques 15% de cailloux (diamètre entre 150 et 300 mm)			EM-4						AG, W	24.2	
1		98.76												
		1.20	FIN DU SONDAGE SUR LES DÉPÔTS NATURELS											
	5													
2														

ESSAIS

AG : analyse granulo.
S : sédimentométrie
C : consolidation oedo.
W : teneur en eau
WL : limite liquide
Wp : limite plastique
VB : bleu de méthylène
k : perméabilité
f'c : compression simple
MO : Matière organique
LA : los angeles

GRAPHIQUE

× : N (pen. standard)
▽ : Nd (pen. dyn.)
■ : Cu intact
□ : Cu remanié
◆ : Su intact
◇ : Su remanié

Wp W WL

20 40 60 80

Remarques générales:

Vérifié par: M.-A. Carrier, ing.

Date: 2014-09-05

Labo S.M. Inc.

RAPPORT DE PUITS D'EXPLORATION

Projet:	Étude géotechnique - Restauration du bâtiment de l'Atelier	Localisation:	Voir figure de localisation	N° sondage:	PU-02-14
Client:	TPSGC	X:		Page:	1 de 1
Site:	Réserve nationale de faune du Cap-Tourmente	Y:		Date début:	2014-08-12
N./réf.:	F1313256006	Type de sondage:	PUITS D'EXPLORATION	Inspecteur:	N. Tremblay, ing.
Figure:	F1313256006K001	Équipement:	Pelle mecanique	Profondeur:	2.05m
		Tubage:	Carottier:	Élévation :	99.94m

TYPE D'ÉCHANTILLON

CF	Cuillière fendue
CFC	Tube d'échantillonage continu
CR	Carottier à diamants
TM	Tube à parois minces
TA	Tarière
TS	Tube shelby
EM	Échantillon manuel

TERMINOLOGIE QUALITATIVE

Argile	< 0,002 mm
Silt	0,002 - 0,08 mm
Sable	0,08 - 5 mm
Gravier	5 - 80 mm
Cailloux	80 - 200 mm
Blocs	> 200 mm

TERMINOLOGIE QUANTITATIVE

Traces	< 10 %
Un peu	10 - 20 %
Adjectif (...eux)	20 - 35 %
et (ex: et gravier)	> 35 %
mot principal	Fraction dominante

SYMBOLES

N	Indice de pénétration standard (ASTM D 1586)
Nc	Indice de pénétration au cône (BNQ 2501-145)
RQD	Indice de la qualité du roc (%)

EAUX SOUTERRAINES

	Date	Profondeur
Lecture 1		m
Lecture 2		m

Remarque:

ÉTAT DE L'ÉCHANTILLON

- Remanié
- Intact (tube à parois minces)
- Perdu
- Carotté (forage au diamant)

CARACTÉRISTIQUES MÉCANIQUES DES SOLS

COMPACITÉ	INDICE "N"	CONSISTANCE	Cu OU Su (kPa)
Très lâche	0 - 4	Très molle	< 12
Lâche	4 - 10	Molle	12 - 25
Compacte	10 - 30	Ferme	25 - 50
Dense	30 - 50	Raide	50 - 100
Très dense	> 50	Très raide	100 - 200
		Dure	> 200

INDICE DE QUALITÉ DU ROC

QUALIFICATIF	RQD
Très mauvaise	< 25 %
Mauvaise	25 - 50 %
Moyenne	50 - 75 %
Bonne	75 - 90 %
Excellente	90 - 100 %

ESPACEMENT DES DISCONTINUITÉS

Très serré	< 20 mm
Serré	20 - 60 mm
Rapproché	60 - 200 mm
Moyennement espacé	200 - 600 mm
Espacé	600 - 2000 mm
Très espacé	2000 - 6000 mm
Éloigné	> 6000 mm

COUPE STRATIGRAPHIQUE / ÉCHANTILLONS / RÉSULTATS D'ESSAIS

PROFONDEUR (m)	PROFONDEUR (pi)	ÉLÉVATION (m) / PROFONDEUR (m)	DESCRIPTION DES SOLS ET DU ROC	SYMBOLE	ÉTAT	TYPE N°	CAROTTIER - CALIBRE	RECUPÉRATION (%)	Nspt - Nc - RQD	Essai de pénétration standard COUPS/150mm	NIVEAU D'EAU / VENUE D'EAU	ESSAIS	GRAPHIQUE	REMARQUES
		99.94												
		0.00	Remblais: Pierre concassée 20 mm			EM-1								
		99.74												
		0.20	Sable, un peu de silt et traces de gravier; brun			EM-2								
		99.64												
		0.30	Isolant											
		99.59	Sable silteux, un peu de gravier; gris foncé											
		0.35	Présence importante de brique et de bois											
			10% de cailloux (diamètre de 200 à 300 mm)			EM-3								
1		98.89												
		1.05	Terrain naturel:											
			Silt argileux, traces de sable et gravier; gris											
	5					EM-4						AG, W, WL, Wp	22.9	
2		97.89												
		2.05	FIN DU SONDAGE											

ESSAIS

AG	: analyse granulo.
S	: sédimentométrie
C	: consolidation oedo.
W	: teneur en eau
WL	: limite liquide
Wp	: limite plastique
VB	: bleu de méthylène
k	: perméabilité
f'c	: compression simple
MO	: Matière organique
LA	: los angeles

GRAPHIQUE

× : N (pen. standard)
▽ : Nd (pen. dyn.)
■ : Cu intact
□ : Cu remanié
◆ : Su intact
◇ : Su remanié

Wp W WL

20 40 60 80

Remarques générales:

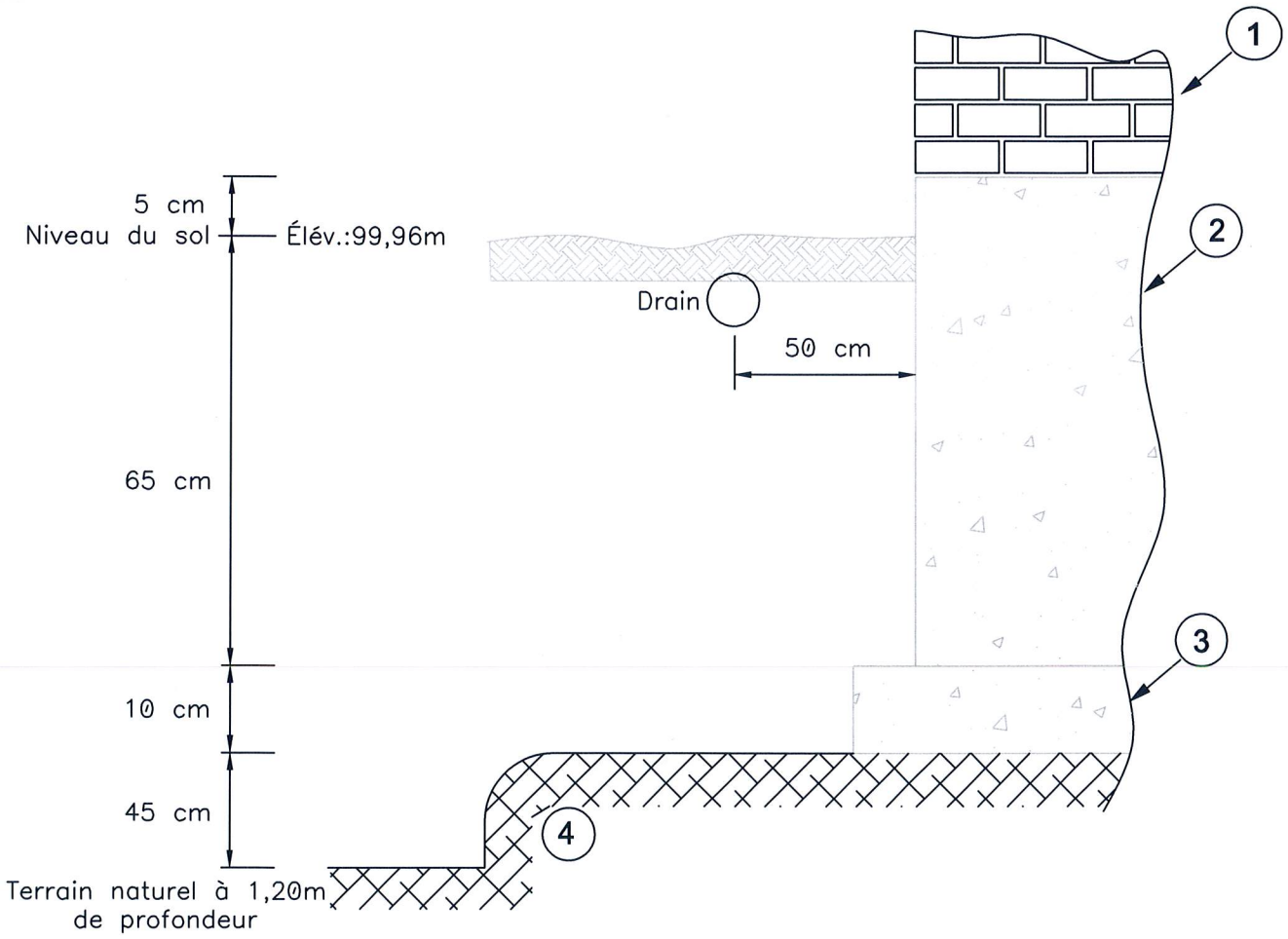
Vérifié par: M.-A. Carrier, ing.

Date: 2014-09-05

SM^i LABO S.M. INC.
1200, av. St-Jean-Baptiste, bur. 116, Québec (Québec) G2E 5E8
Tél.: (418) 871-9330 - Téléc: (418) 871-9343
www.groupesm.com

TRANCHÉE DE RECONNAISSANCE
Exposition du mur de fondation

No. DOSSIER: F1313256-006
CLIENT: Travaux publics et services gouvernementaux Canada
PROJET/SITE: Restauration du bâtiment de l'Atelier – Réserve nationale de faune du Cap-Tourmente
PRÉPARÉ PAR: Nicolas Tremblay, ing. DATE: 12 août 2014
VÉRIFIÉ PAR: Marc-André Carrier, ing. DATE: 27 août 2014
ADRESSE DU BÂTIMENT: Chemin de la Friponne, Saint-Joachim (Québec)
DIMENSION DU CROQUIS: Centimètres PUITS No: PU-01-14



COUPE PROFIL

1. NATURE DU PAREMENT: Bois
2. NATURE DU MUR DE FONDATION: Poutre de béton de ± 25cm de largeur sur le coin du bâtiment
3. NATURE DE LA SEMELLE: Surlargeur de béton à la base des poutres
4. NATURE DU SOL DE FONDATION: Remblais de blocs, briques et sols

PRÉSENCE DE DRAIN: ☒ OUI ☐ NON LOCALISATION: ± 15cm de profondeur
SI OUI, TYPE: Agricole DIAMÈTRE: 10cm ENROBAGE: Pierre nette 20mm

REMARQUES: Venue d'eau provenant de dessous le bâtiment à 1,15m de profondeur

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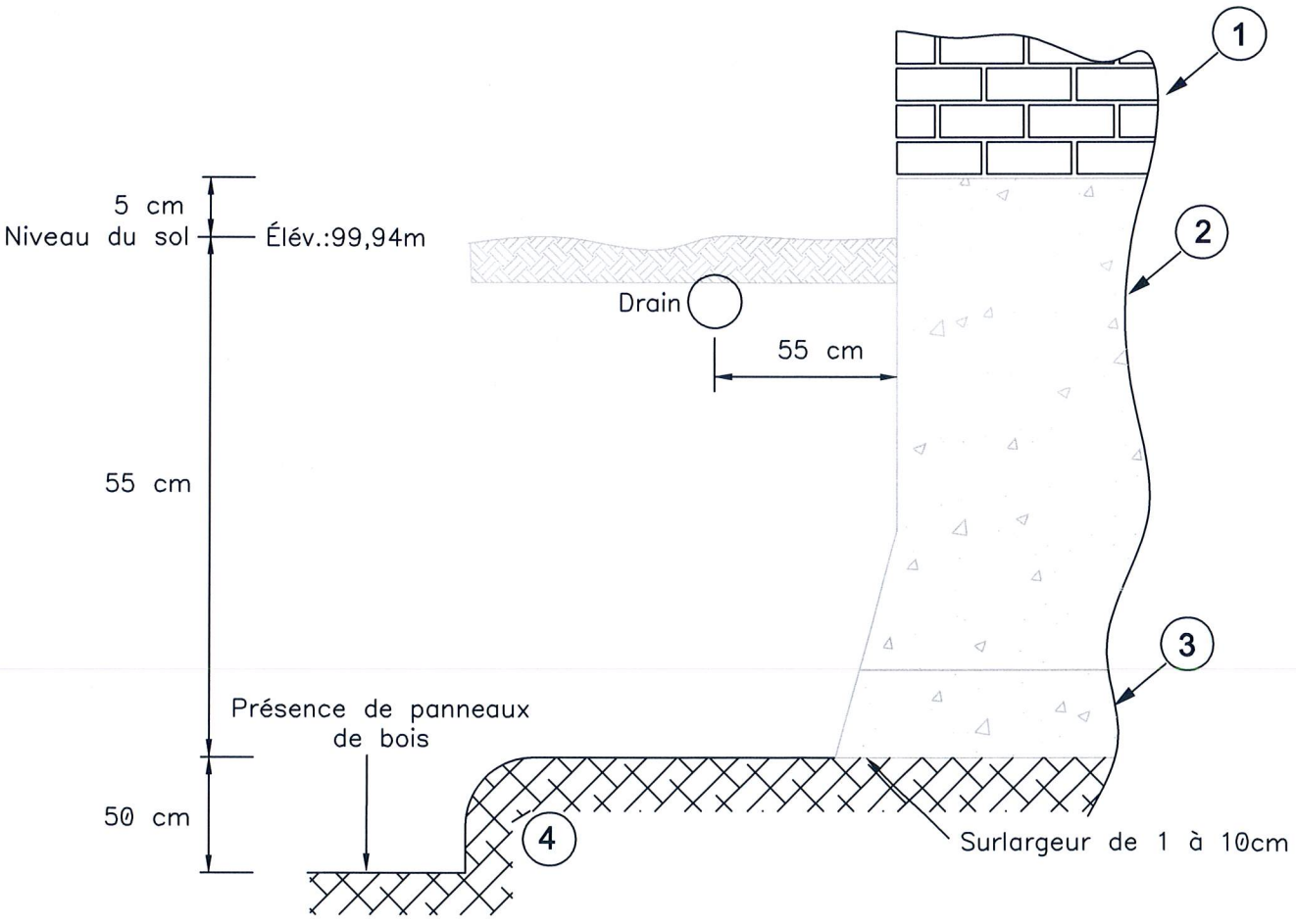
PRÉPARÉ PAR: Nicolas Tremblay, ing. DATE: 12 août 2014
VÉRIFIÉ PAR: Marc-André Carrier, ing. DATE: 27 août 2014
ADRESSE DU BÂTIMENT: Chemin de la Friponne, Saint-Joachim (Québec)
DIMENSION DU CROQUIS: Centimètres PUITS No: PU-02-14



COUPE PROFIL

(1) NATURE DU PAREMENT: Bois
(2) NATURE DU MUR DE FONDATION: Poutre de béton de ± 25cm de largeur esparées de ± 200cm
(3) NATURE DE LA SEMELLE: Béton (surlargeur à la base de la colonne)
(4) NATURE DU SOL DE FONDATION: Remblais de blocs, de bois et sols (présence de vides entre les blocs)
PRÉSENCE DE DRAIN: ☒ OUI ☐ NON LOCALISATION: ± 15cm de profondeur
SI OUI, TYPE: agricole DIAMÈTRE: 10cm ENROBAGE: Pierre nette 20mm

REMARQUES: Venue d'eau à travers les panneaux de bois à 1,2m de profondeur
Présence d'une dalle de béton de 25cm d'epaisseur sous la section récente du bâtiment
Aucune poutre de béton observé sous la partie récente

Annexe III

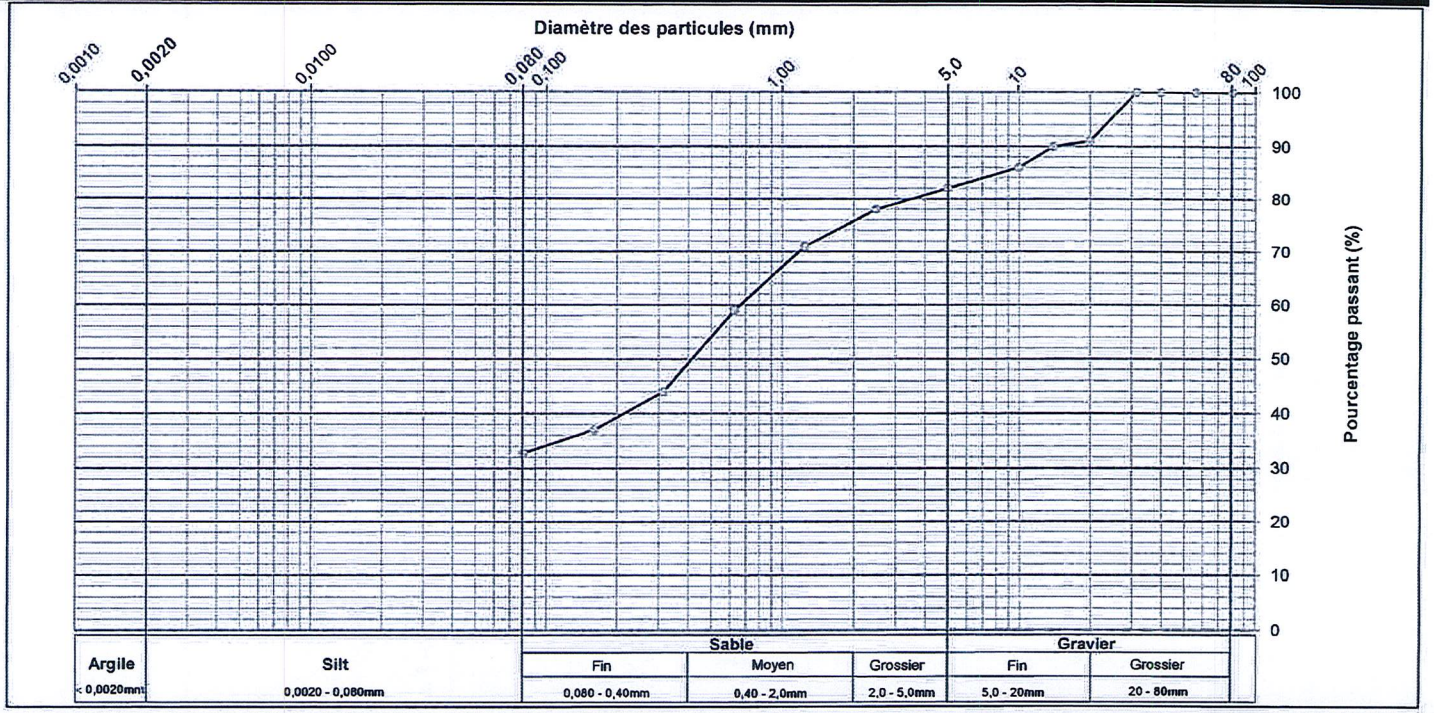
RAPPORTS D'ANALYSES EN LABORATOIRE

LABO S.M. INC.

Rapport no. : ***1403041-2***
Laboratoire no. : ***14-30452***

Analyse granulométrique par tamisage LC 21-040
Analyse granulométrique par sédimentation BNQ 2501-025

Diamètre (mm)	Passant (%)
112	100
80	100
56	100
40	100
31,5	100
20	91
14	90
10	86
5	82
2,5	78
1,25	71
0,630	59
0,315	44
0,160	37
0,080	32,8
% Gravier:	18
% Sable:	49,2
% Silt*:	32,8
% Argile:	
Cu:	
Cc:	
D_{10}:	
D_{15}:	
D_{30}:	
D_{50}:	0,4156
D_{60}:	0,6670
D_{85}:	8,4090



Propriétés physiques et mécaniques

Analyses	Norme	Résultats
Détermination de la teneur en eau (G2A)	LC 21-201	24,19%

N° Dossier:	**F1313256-006**	**Sondage:**	PU-01-14	**Description:**	
Client:	**Travaux publics et Services gouvernementaux**	**Échantillon:**	EM-4		
Projet:	Étude géotechnique - Restauration du bâtiment de l'Atelier	**Profondeur:**	0,80m @ 1,20 m	**Remarques:**	
		Prélevé par:	Nicolas Tremblay, ing. Jr		
Site:	Réserve nationale de la faune du Cap Tourmente	**Prélevé le :**	2014-08-05	*Inclus le pourcentage d'argile lorsque ce dernier n'est pas précisé	

Vérifié par : _____ **Date:** 2014-08-15 **Approuvé par :** _____ **Date:**

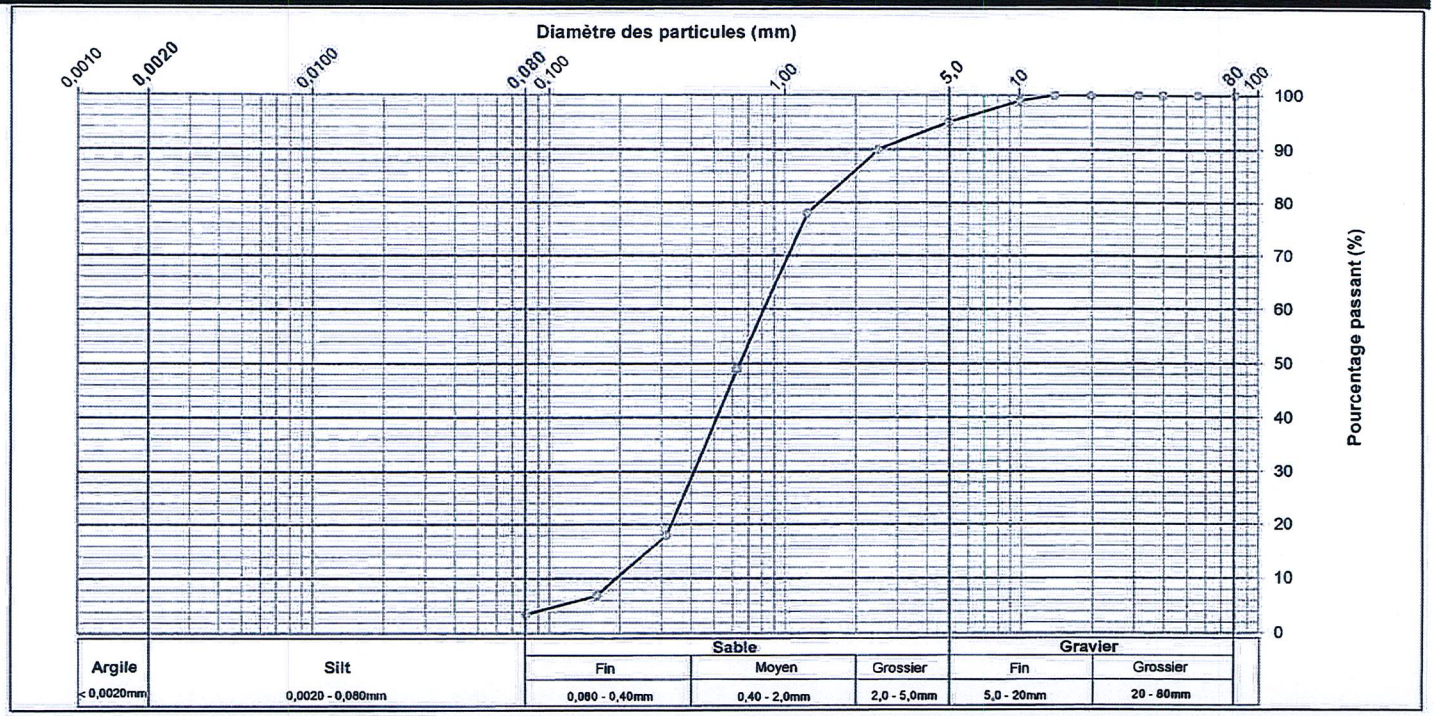
Caroline Desfossés, chef de laboratoire — Marc-André Carrier, ing.

LABO S.M. INC.

Rapport no. : 1403041-1
Laboratoire no. : 14-30451

Analyse granulométrique par tamisage LC 21-040
Analyse granulométrique par sédimentation BNQ 2501-025

Diamètre (mm)	Passant (%)
112	100
80	100
56	100
40	100
31,5	100
20	100
14	100
10	99
5	95
2,5	90
1,25	78
0,630	49
0,315	18
0,160	7
0,080	3,6



% Gravier:	5
% Sable:	91,4
% Silt*:	3,6
% Argile:	
Cu:	4,2
Cc:	1,1
D_{10}:	0,1925
D_{15}:	0,2619
D_{30}:	0,4119
D_{50}:	0,6451
D_{60}:	0,8170
D_{85}:	1,8729

Propriétés physiques et mécaniques

Analyses	Norme	Résultats

N° Dossier:	**F1313256-006**	**Sondage:**	PU-01-14
Client:	**Travaux publics et Services gouvernementaux**	**Échantillon:**	EM-3
Projet:	Étude géotechnique - Restauration du bâtiment de l'Atelier	**Profondeur:**	0,60m @ 0,80m
		Prélevé par:	Nicolas Tremblay, ing. Jr
Site:	Réserve nationale de la faune du Cap Tourmente	**Prélevé le :**	2014-08-05

Description:

Remarques:

*Inclus le pourcentage d'argile lorsque ce dernier n'est pas précisé

Vérifié par : _____ **Date:** 2014-08-15 **Approuvé par :** _____ **Date:**

Caroline Desfossés, chef de laboratoire

Marc-André Carrier, ing.

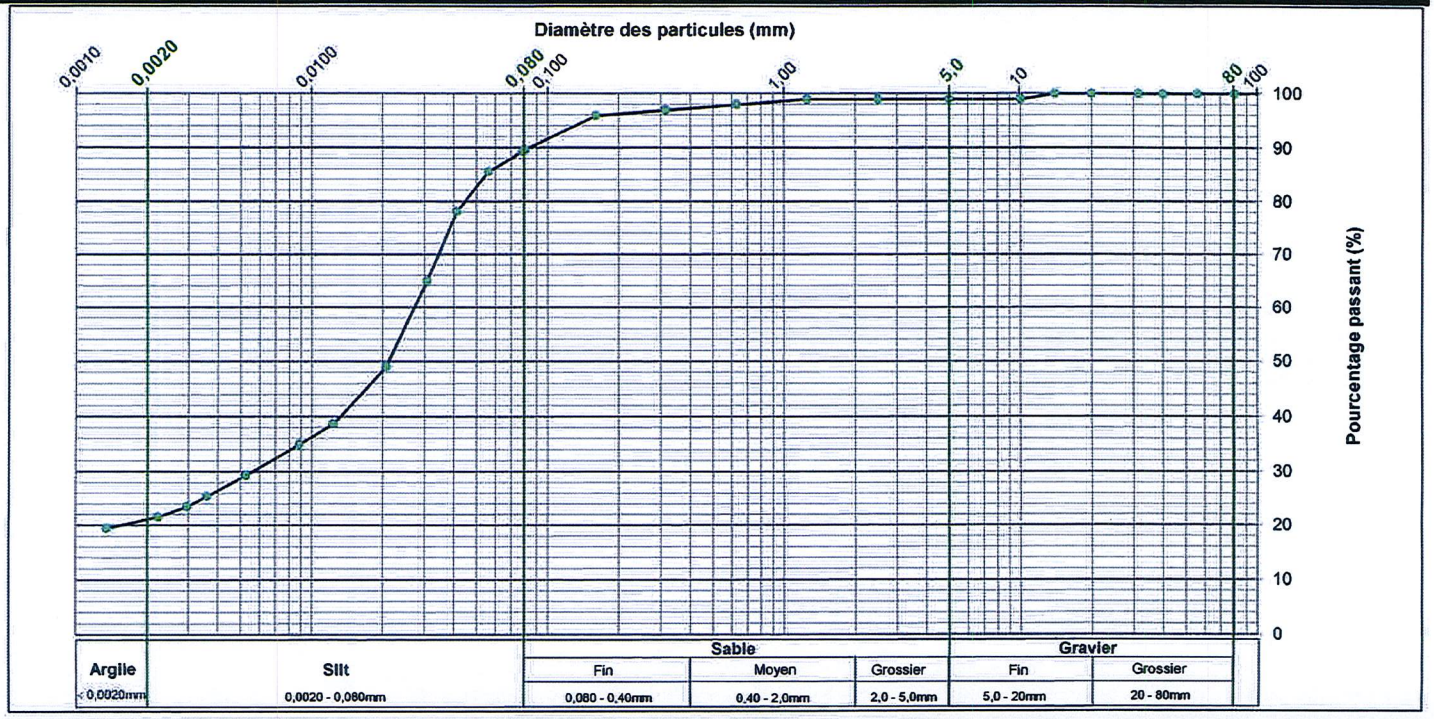
FLG-210 (09-2012) rev.0

LABO S.M. INC.

Rapport no. : 1403041-3
Laboratoire no. : 14-30453

Analyse granulométrique par tamisage LC 21-040
Analyse granulométrique par sédimentation BNQ 2501-025

Diamètre (mm)	Passant (%)
112	100
80	100
56	100
40	100
31,5	100
20	100
14	100
10	99
5	99
2,5	99
1,25	99
0,630	98
0,315	97
0,160	96
0,080	89,7
0,0783	89,4
0,0563	85,6
0,0412	78,1
0,0308	65,0
0,0207	49,1
0,0124	38,8
0,0089	35,0
0,0052	29,3
0,0036	25,5
0,0030	23,5
0,0022	21,6
0,0014	19,5
% Gravier:	1
% Sable:	9,3
% Silt*:	68,6
% Argile:	21,1
Cu:	
Cc:	
D10:	
D15:	
D30:	0,0055
D50:	0,0212
D60:	0,0272
D85:	0,0549



Propriétés physiques et mécaniques

Analyses	Norme	Résultats
Détermination de la teneur en eau (G2A)	LC 21-201	22,86%
Limite de liquidité au pénétromètre à cône (1 point) et limite de plasticité	BNQ 2501-092	Voir rapport no.1403041-4

N° Dossier:	**F1313256-006**	**Sondage:**	PU-02-14
Client:	**Travaux publics et Services gouvernementaux**	**Échantillon:**	EM-4
Projet:	Étude géotechnique - Restauration du bâtiment de l'Atelier	**Profondeur:**	1,20m @ 1,50m
		Prélevé par:	Nicolas Tremblay, ing. Jr
Site:	Réserve nationale de la faune du Cap Tourmente	**Prélevé le :**	2014-08-05

Description: Silt argileux, traces de sable et de gravier

Remarques:

*Inclus le pourcentage d'argile lorsque ce dernier n'est pas précisé

Vérifié par : _____ **Date:** 2014-08-15 **Approuvé par :** _____ **Date:**

Caroline Desfossés, chef de laboratoire

Marc-André Carrier, ing.

LABO S.M. INC.

Rapport no.: 1403041-4

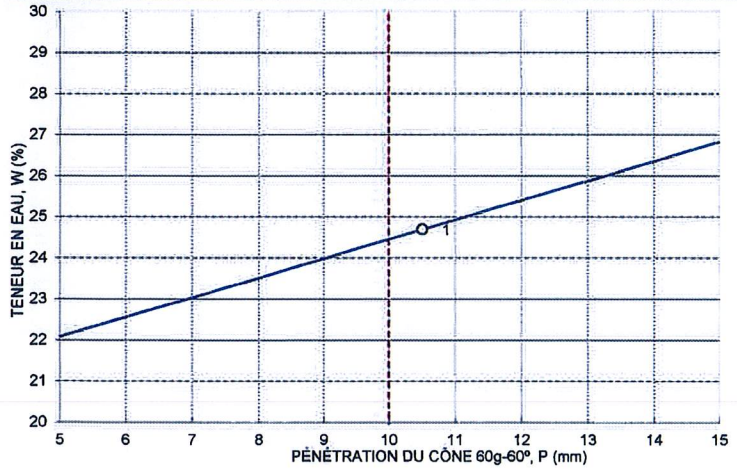
DÉTERMINATION DE LA LIMITE DE LIQUIDITÉ ET DE LA LIMITE DE PLASTICITÉ
BNQ 2501-090 et BNQ 2501-092

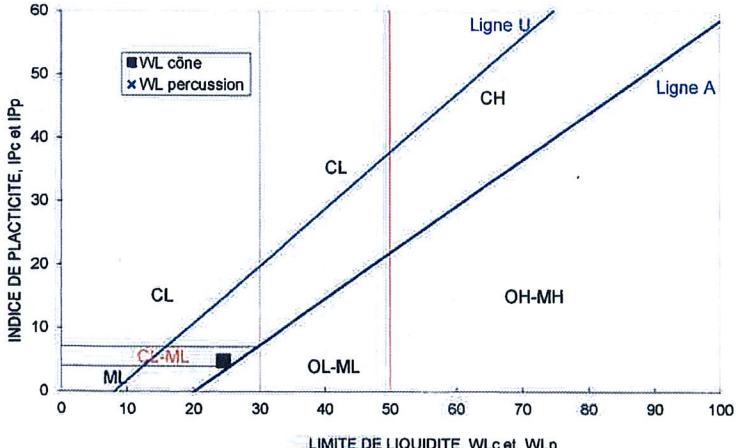
N° Dossier:	F1313256-006	Sondage:	PU-02-14
Client:	**Travaux publics et Services gouvernementaux**	Échantillon:	EM-4
Adresse:	3, Passage du Chien d'Or, C.P. 6060 Haute-Ville	Profondeur(m):	1,20m @ 1,50m
Ville:	Québec	Prélevé par:	Nicolas Tremblay, ing. Jr
Code postal:	G1R 4V7	Prélevé le:	2014-08-05
Projet:	Étude géotechnique - Restauration du bâtiment de l'Atelier	Analysé le:	2014-08-19
No.laboratoire:	14-30453	Analysé par:	Mélanie Tessier, tech.

Norme:	BNQ 2501-092	Teneurs en eau	Naturelle		Limite de plasticité	
Préparation:	Cone					
Séchage:	60°C	Masse totale humide	958,90		12,51	14,39
Tamisage:	400µm	Masse totale sèche	863,60		10,64	12,31
Méthode opér.:	Selon art. 5.4	Tare no	79		149	141
Mode opér.:	Point unique	Masse de la tare	446,80		1,39	1,41
Assèchement ☐		Teneur en eau	22,86		20,22	19,08
Addition d'eau ■		*Valeur moyenne*	*Wn =*	*22,9*	*Wp =*	*19,6*

Limite de liquidité

Point no	1	2	3	4	5	6	7	8
Pénétration cône 60g - 60°	**10,5**							
Nb de percussions								
Masse totale humide	47,82							
Masse totale sèche	38,64							
Tare no	112							
Masse de la tare	1,46							
Teneur en eau	*24,69*							





RÉSULTATS D'ESSAI

Teneur en eau naturelle

Teneur en eau globale — **Wn :** **22,9**

Limite de liquidité

Au cône tombant — **WLc :** **24**

Limite de plasticité — **Wp :** **20**

Indice de plasticité

Au cône tombant — **IPc :** **5**

Indice de liquidité

Au cône tombant — **ILc :** **0,7**

Remarques:

Vérifié par: _____ Date: 2014-08-19 Approuvé par: _____ Date:

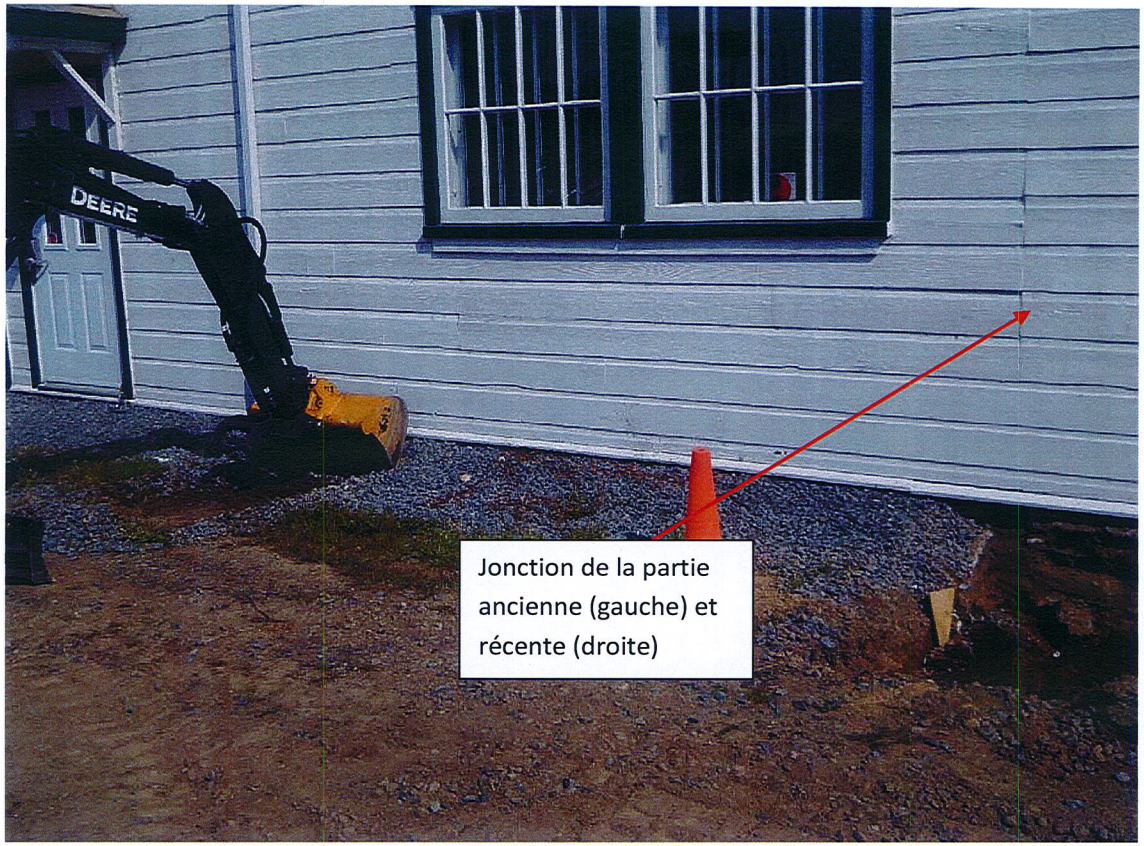
Mélanie Tessier, tech., Chef labo — Marc-André Carrier, ing.

Annexe IV

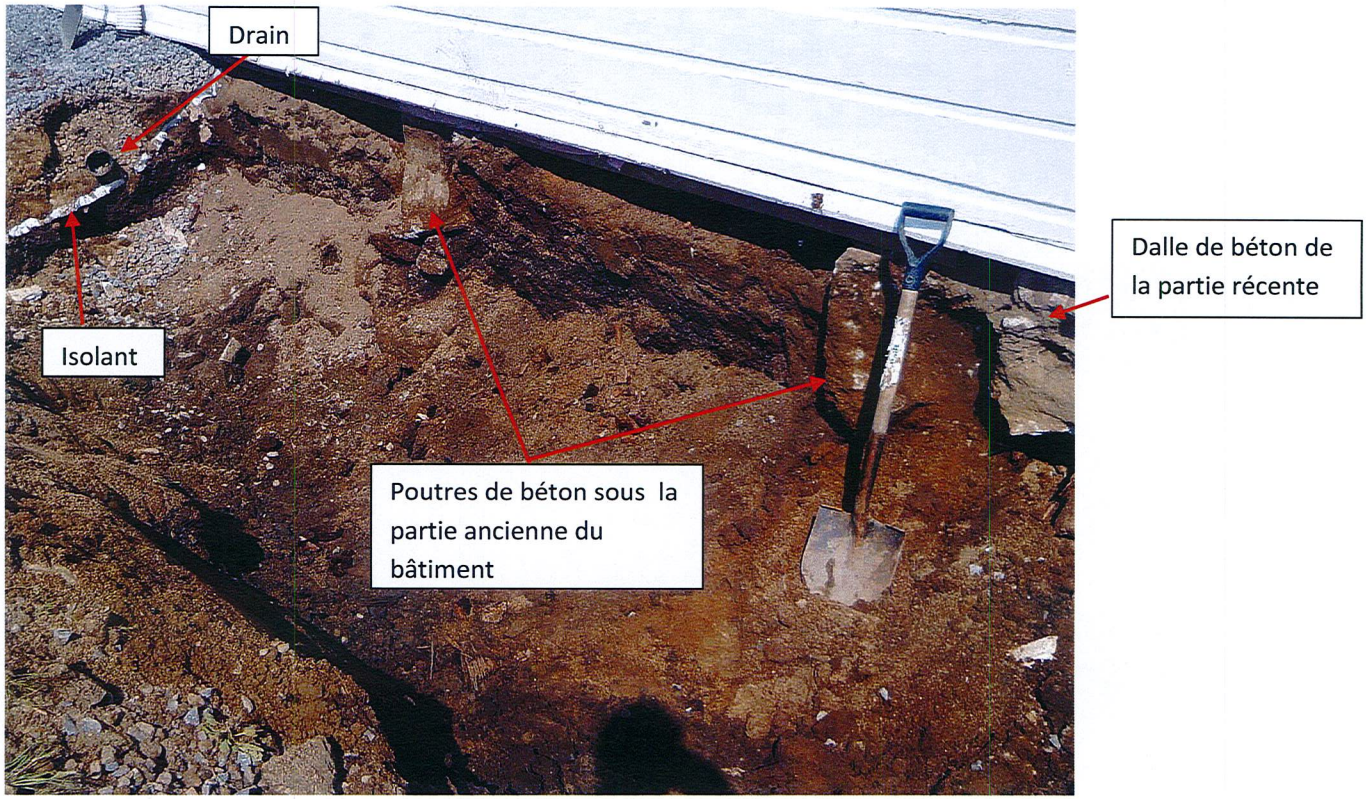
PHOTOGRAPHIES

Photographie n° 1 – Coin sud-ouest du bâtiment de l'Atelier (PU-01-14)

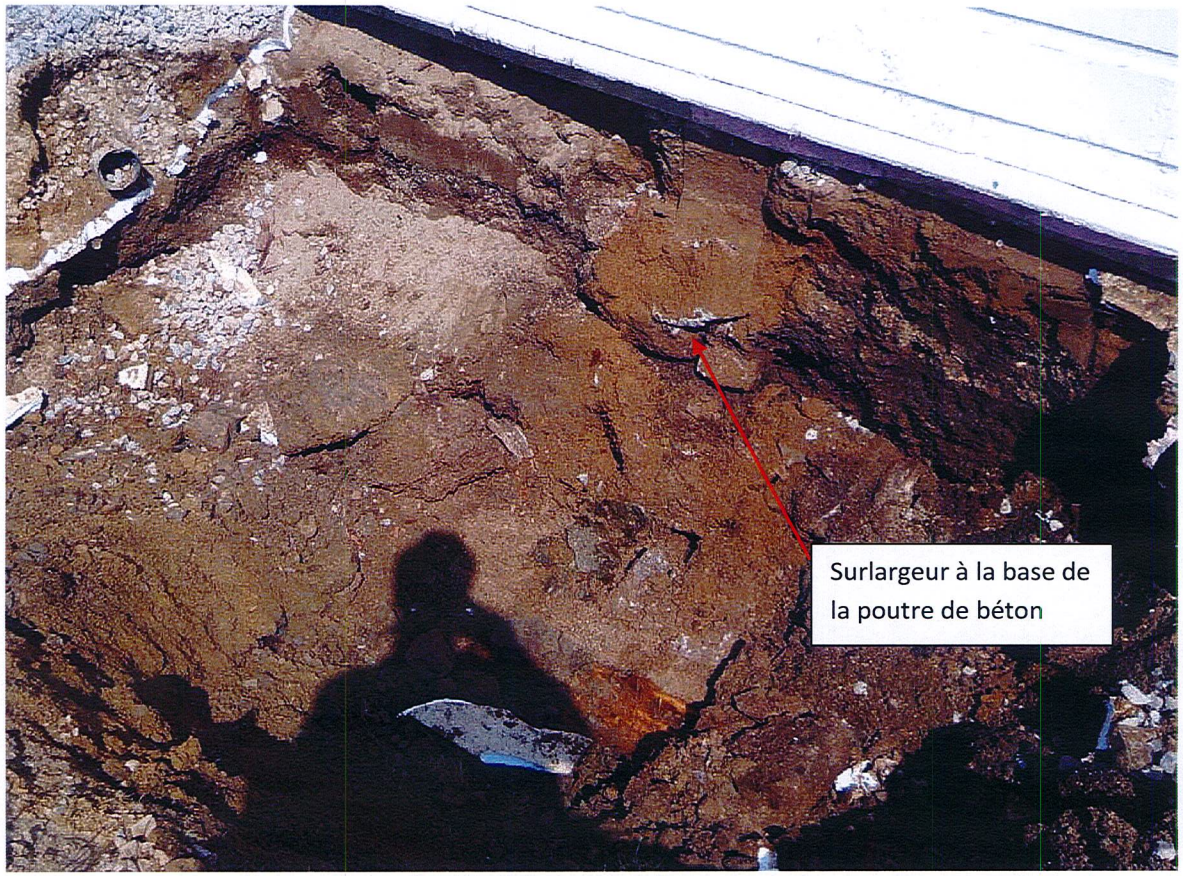
Photographie n° 2 – Sondage PU-01-14



Photographie n° 3 – Jonction entre la partie ancienne et récente (PU-02-14)



Photographie n° 4 – Sondage PU-02-14 (1)



Photographie n° 5 – Sondage PU-02-14 (2)

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