Pêches et Océans Canada
Fisheries and Oceans Canada

Garde côtière canadienne
Canadian Coast Guard

SPECIFICATIONS

REPLACEMENT OF FIXED AIDS TO NAVIGATION

POINTE-DU-LAC

REAR LIGHT (RL) - LLN 2126

CONSTRUCTION OF CONCRETE FOUNDATIONS AND INSTALLATION OF STEEL STRUCTURES, INCLUDING DISMANTLING, DEMOLISHING AND DISPOSING OF EXISTING TOWERS AND FOUNDATIONS

Canadian Coast Guard
Central and Arctic Region
Integrated Technical Services
Marine and Civil Infrastructure

Issued: July 2016

TABLE OF CONTENTS

GENERAL INSTRUCTIONS, SECTION 1000 6

1. Background 6
2. Work Description 6
3. Location and site access 8
4. Request for information during the tender 8
5. Management and coordination during work 9
6. Required documents 9
7. Codes, standards and permits 9
8. Material supplied by the CCG 10
9. Transport provided by the CCG 12
10. Power supply 12
11. Light list number 12
12. Schedule 12
13. Cost breakdown 13
14. Method of payment 13
15. Contractor use of premises 14
16. Staking out the location of the permanent structure to be built 14
17. Existing facilities 15
18. Other documentation 15
19. French and English versions 15
20. Preparatory meeting 16
21. Site visit 16
22. Safety Measures 16
23. Photographs and brief photographic reports 17
24. Geodetic points 17

ERECTING THE STRUCTURE, SECTION 03020 18

1. Description 18

2. Structure assembly....18

DAYMARK INSTALLATION, SECTION 03030 20

1. Description 20

2. Support assembly....20

3. Support installation....21

4. Lath installation....21

QUALITY CONTROL, SECTION 2000 27

1. Procedure....27

2. Mix design....27

3. Sampling....28

4. Rejected constructions or components 28

5. Acceptance of work....28

SAFETY MEASURES, SECTION 3000 29

1. Safety measures to respect for construction work 29

ENVIRONMENTAL PROTECTION, SECTION 4000 30

1. General 30

2. Construction work near shores and natural environments....30

3. Pollution prevention 31

SITE CLEAN-UP AND RESTORATION, SECTION 5000....32

1. General 32

2. Clean-up during construction 32

3. Final cleaning 33

DOCUMENTS IN THE PROJECT FILE, SECTION 6000....34

1. Contractor's plans....34

2. Plans to add to the file 34

STRUCTURES FOR TEMPORARY LIGHTS, SECTION 7000....35

1. General 35

2. Location....35
3. Design....35
4. Assembly....36
5. Power supply....36
6. Removal....36
DISMANTLING, DEMOLITION AND DISPOSAL, SECTION 8000....37
1. Description....37
2. Condition of the works to demolish....37
3. EXECUTION....38
4. Equipment to keep....38
EXCAVATION AND FILLING, SECTION 9000....40
1. Description....40
2. Materials....40
3. Execution....40
FOUNDATIONS, SECTION 10000....42
1. Description....42
2. Materials....42
3. Location and orientation....42
4. Excavation....43
5. Framework....43
6. Steel reinforcement....43
7. Heating shelter....44
8. Concrete pouring, finishing and curing....44
9. Accuracy of foundation positioning....45
CHAIN LINK FENCE, SECTION 0281....46

LIST OF APPENDICES

APPENDIX A - LOCATION AND ACCESS TO SITE

APPENDIX B - LIST OF EXISTING WORKS

APPENDIX C - WORKING CONSTRAINTS

APPENDIX D - EXISTING FACILITIES TO BE DISMANTLED

APPENDIX E - CONSTRUCTION PLANS

APPENDIX F - DAYMARK DIMENSIONS AND ASSEMBLY PLANS

APPENDIX G - DAYMARK ORIENTATION

APPENDIX H - ELECTRICAL INSTALLATION PLAN

APPENDIX I - SUMMARY TABLE

APPENDIX J - GEOTECHNICAL INVESTIGATION REPORT

APPENDIX K - ENVIRONMENTAL IMPACT MITIGATION MEASURES SHEET

APPENDIX L - ENVIRONMENTAL MONITORING FORM

General instructions, section 1000

1. Background

1.1 The current structure at the site of Pointe du Lac RL (LLN 2126) is part of an alignment of Canadian Coast Guard (CCG) aids to navigation that date back to the late 1970s and shows signs of ageing and safety problems during ascent. It was decided to proceed with a full replacement of this structure.

2. Work Description

2.1 The work specified in this contract consists of building one (1) concrete foundation and assembling one (1) new steel structure and accessories. The Contractor shall also dismantle the old steel structure and demolish the old foundation. Everything must be disposed of in an appropriate manner. Lastly, the Contractor shall remove the existing shelter, build a new concrete base for the new shelter as indicated in the plan and then install the new shelter.

2.2 The current structure to be dismantled at Pointe du Lac RL is one hundred and seven feet (107') tall and the new structure is one hundred and fifteen feet (115') tall.

2.3 Specifically, the work to be completed includes but is not limited to the following:

2.3.1 Mobilization, demobilization and support during the work;

2.3.2 Installation, power supply and maintenance of a navigation light on a temporary structure at the option of the Contractor (plans signed and sealed by an engineer who is an OIQ member, and submitted to and approved by the CCG). The temporary light shall remain in place until the new structure has been erected and the permanent light is fully operational. The Department's survey branch will help the Contractor with

the alignment of the temporary light and the light (lantern) will be supplied by the Department.

2.3.3 Installation of temporary protection fences to secure the excavation area (if deemed necessary by the CCG representative);

2.3.4 Disconnection of existing power supplies;

2.3.5 Recovery of existing electrical facilities;

2.3.6 Dismantling, demolition and disposal of the existing tower and reinforced concrete foundation;

2.3.7 Construction of one (1) new reinforced concrete foundation (see plan QE58400-C01-02 in Appendix E). Do everything possible to provide the conditions for installing and curing in accordance with the specifications in plans QE58400-C01 -01 to -08;

2.3.8 Pick up the steel structure and daymark at the Canadian Coast Guard, located at 15 Prince Street in Sorel-Tracy, J3P 4J4;

2.3.9 Assembly and installation of one (1) new steel structure and the required accessories, including installation of a safety rail in accordance with the Department's requirements (a study to determine the type of rail is being conducted by the Department, the recommendations will be made in summer 2016);

2.3.10 Assembly and installation of an aluminium daymark at the top of the new structure;

2.3.11 Installation of the power supply and lantern, including grounding;

2.3.12 Transport and installation of a 3.3 m x 3.3 m shelter and construction of a concrete base for this shelter;

2.3.13 Supply and installation of a site fence;

2.3.14 Cleaning and restoration of site;

2.3.15 Production of “as-built” drawings and a brief photographic report;

2.3.16 Any other work described in these specifications and on the plans.

2.4 The particularities of the work to be performed on this site are described in detail in these specifications and in the plans in appendices E, F and G. A summary appears in Appendix I. The plans for the structures to be dismantled are presented in Appendix D.

3. Location and site access

3.1 The site is located at the following coordinates (NAD 83):

Latitude: 46^0.16’ 46’’ 3469 Longitude: 72^0.40’ 15’’ 43283

3.2 The site is accessible via the highway. On the North Shore of the St. Lawrence, enter the property at civic number 1981 from Hwy 138, East of Pointe du Lac. The structure is on the side of Hwy 138.

4. Request for information <u>during the tender</u>

4.1 Any inquiries, whether administrative or about this contract, shall be addressed to the Ottawa Procurement Hub Contracting Officer, whose contact information is listed in the other call for tender documents.

5. Management and coordination during work

5.1 Once the contract is awarded, the name of the CCG representative, the project engineer for the Marine and Civil Infrastructure division's engineering sector, will be disclosed to the selected Contractor. Frequent phone contact with this representative will be necessary for the duration of the contract. All such communication shall take place in French.

5.2 The Contractor shall provide the name of its project lead when the contract begins, and the CCG project engineer must be able to quickly and easily contact this person during normal business hours.

6. Required documents

6.1 Keep a copy of each of the following documents at the work site:

6.1.1 Contract drawings;

6.1.2 Specifications;

6.1.3 Addendum (if applicable);

6.1.4 Change orders (if applicable);

6.1.5 Codes and standards listed in paragraph 7 herein;

6.1.6 All other documents deemed useful or requested by the project engineer.

7. Codes, standards and permits

Unless otherwise indicated, perform the work in accordance with the codes and standards in effect, namely:

- CAN/CSA –S37-13, CAN/CSA-A23.1-F00, CAN2-138-M80, CSA G164-M1981, ASTM A121-81, ASTM A90-81;
- Canadian Foundation Manual;
- National Building Code of Canada, 2010 Edition;
- Safety Code for the construction industry;
- Canada Labour Code;
- Any other federal, provincial or municipal code, standard or regulation in effect.

8. Material supplied by the CCG

8.1 The steel structure and its accessories, namely:

8.1.1 The daymark;

8.1.2 The safety rail;

8.1.3 The lantern backplate;

8.1.4 The structure anchors;

8.1.5 The padlocks when required;

8.1.6 The aluminium enclosures with supports (for batteries and electrical inlet);

8.1.7 The junction boxes;

8.1.8 Batteries;

8.1.9 Junction boxes (Hammond box);

8.1.10 Solar panel supports;

8.2 The equipment to be recovered and reinstalled on the new structures, namely:

8.2.1 The solar panels;

8.2.2 12-volt voltage regulators;

8.2.3 The lanterns at the top of the structure;

8.2.4 The ID plates;

8.2.5 The antennas and telecommunications equipment.

8.3 The navigation light to be kept temporarily on a structure at the option of the Contractor for the site is also supplied by the CCG. It could be the current light or another light.

8.4 Notify the Department's representative five (5) working days before the planned loading date. Material pick-up must take place during the Department employees' work schedule.

8.5 The structure to be installed is provided in protective metal boxes for transport. The metal boxes must be returned in good condition to the following address: 101 Champlain Blvd., Quebec, G1K 7Y7.

8.6 The Contractor shall check the materials provided by the Department before taking possession of them, using the plans and lists of materials provided. If there are missing or defective parts, the Engineer shall immediately be notified before leaving the Quebec base; otherwise, the materials shall be considered complete and in good condition.

9. Transport provided by the CCG

9.1 The Contractor is responsible for transport, handling and storage of materials provided by the Department, from the time they are loaded in Quebec until the work is completed. Any damage, loss or breakage shall be repaired or replaced to the Engineer's satisfaction.

9.2 No transport will be provided by the CCG. Plan for the appropriate land transportation.

10. Power supply

10.1 Take every step and obtain all the permits necessary to disconnect and reconnect the power supply for each permanent or temporary structure.

10.2 Inform the project engineer at least three (3) working days in advance of the date when the power supply will be interrupted.

11. Light list number

11.1 On the existing structure, a plate with a number or name appears. The light can be identified using this number or name. The Contractor shall transfer the identification plate from the existing structure to the new one. It will be attached in a similar manner to the existing one (**do not pierce the tower**).

12. Schedule

12.1 All work shall be completed by December 30, 2016.

12.2 The invoice for the work shall be received no later than March 4, 2016.

12.3 Within five (5) working days after the contract is awarded, the Contractor shall submit a detailed work schedule, in compliance with Fisheries and Oceans Canada, indicating the various progress phases and the planned completion date.

12.4 Inform the Fisheries and Oceans Canada representative when the work completion date will be delayed due to circumstances beyond the Contractor's control and provide written justification of the delay and a revised calendar.

12.5 If extraordinary circumstances, outside of the Contractor's control, hinder or delay completion of the work, additional costs shall be covered under this contract, on the condition that written notice be given to the Canadian Coast Guard representative as soon as the situation arises. Those costs, and their justification, will be subject to approval.

12.6 All as-built plans and photographic records shall be submitted within fifteen (15) business days after final acceptance of the work.

13. Cost breakdown

The Contractor shall provide a cost breakdown with its bid, as shown in the call for tender documents. The amounts must include administrative costs and profits, as well as costs for mobilization, demobilization, construction site organization, travel, accommodations, and any other incidental expenses.

Fisheries and Oceans Canada reserves the right to **AWARD THE CONTRACT IN WHOLE OR IN PART** with respect for the components specified in the cost breakdown.

14. Method of payment

14.1 The Contractor shall submit a lump sum that the Contractor shall only receive once the work under the contract has been completed to the CCG's satisfaction.

14.2 No payment shall be made before the CCG representative receives and accepts the as-built plans and photographic records. If necessary, CCG shall be within its rights to require the Contractor to make corrections to the plans and records or to take additional photos, if the photos submitted are insufficient and found not to be representative of the work performed.

15. Contractor use of premises

15.1 The Contractor's movements shall be limited to the Department's property on plan QE58400-C01-01 of Appendix E. Under no circumstances must the Contractor leave this area without written permission from the CCG or owners of nearby properties.

15.2 For the duration of the work, the Contractor shall:

15.2.1 Use existing access routes, and set up and maintain access routes to the work site according to the Department's rights of way.

15.2.2 Obtain the necessary authorization to use existing private access routes and private land next to the work site beforehand, and assume the costs; maintain these routes, including snow removal if necessary, while the work is underway and repair any damage that results from use.

15.2.3 Clean up the paths, roads and land used by the Contractor once the work is completed, and return them to their original state, to the satisfaction of the CCG project engineer, as indicated in Section 5000, "Clean-up and restoration."

15.3 Do not accumulate unnecessary materials, equipment or residue on the premises. The site shall be cleaned at the end of each work day.

15.4 The site is accessible by the public. The Contractor shall be responsible for the safety of the site left unsupervised. Temporary fencing should be considered.

16. Staking out the location of the permanent structure to be built

16.1 The permanent foundation to be built will be indicated by stakes implanted by the CCG. The Contractor shall ensure that the stakes are protected while the work is being done.

16.2 Any uncertainty or ambiguity regarding the positioning of a structure on the site shall be immediately reported to the Engineer before work begins.

16.3 The accuracy of building works based on the layout is indispensable. Tolerances are indicated in Section 10000 "*Foundations*."

16.4 The elevation of the top of the foundation to be built is indicated in the foundation plans QE58400-C01-02 in Appendix E.

17. Existing facilities

17.1 Before undertaking the work, identify the placement and extent of existing facilities, under and above ground, which could be damaged or displaced. Take the necessary steps to protect them.

17.2 Should facilities be discovered during the course of the work, immediately notify the project engineer and send him or her a written observation report within twenty-four (24) hours.

17.3 In case of breakage, the Contractor shall repair, at its expense, the damage caused in the performance of its duties.

18. Other documentation

For clarification purposes only, the project engineer can provide the Contractor with additional documents to ensure work is properly carried out. These documents shall have the same significance and scope as if they were part of the contractual documents.

19. French and English versions

In the event of ambiguity or contradictions between the French and English texts in the specifications or on the plans, the French version shall prevail.

20. Preparatory meeting

20.1 A preparatory meeting between the Contractor and the project engineer shall be organized by the project engineer before the work begins.

20.2 The preparatory meeting will be held in Quebec, at the CCG offices (101 Champlain Blvd., G1K 7Y7). The Contractor shall assume its travel expenses.

20.3 The project engineer shall give the Contractor the date and time of the meeting at least two (2) working days in advance.

21. Site visit

21.1 No site visit will be organized by the CCG. Bidders are authorized to go to the site to examine the facilities. Please show respect for private property. All bidders are understood to have visited the premises.

21.2 Recent photographs are attached for information purposes to Appendix B.

22. Safety Measures

22.1 The Contractor shall observe and respect the safety measures for construction and demolition work required by the National Building Code (2010 Edition), the Canada Labour Code, the Commission de la santé et de la sécurité du travail du Québec, the municipal statutes and organizations and any other known organization that governs safety.

22.2 In the event of a conflict between the requirements of the above codes, standards and organizations, the most restrictive requirement shall prevail.

22.3 The CCG representative will make visits to the site to ensure the Contractor's compliance with these directives on safety. In the event of non-compliance, the CCG representative shall issue site instructions. If the Contractor's non-compliance

persists, the representative can temporarily close the site until the situation has been corrected.

22.4 Before starting work, the Contractor must submit its health and safety plan and have it approved by the CCG representative.

23. Photographs and brief photographic reports

23.1 The Contractor shall take photographs at each work phase. A total of about fifty photographs shall be submitted in medium resolution digital format on CD-ROM to the Fisheries and Oceans Canada representative before final acceptance of the work.

23.2 Moreover, a brief photographic report describing the work must be provided in colour paper format for the site. This must include dated photographs with titles related to the work in the photograph, filed in chronological order.

24. Geodetic points

Preserve all geodetic points from Quebec's geodetic service. In the event of damage, the applicable costs incurred will be the responsibility of the Contractor. This does not include the CCG's reference points.

Erecting the structure, Section 03020

1. Description

1.1 This section lists the requirements for assembling and erecting the structure to be installed.

1.2 The plan for erecting the structure to be assembled is included in Appendix E of these specifications (plans QE58400-C01-04 to -06).

2. Structure assembly

2.1 Install the structure in compliance with the requirements of CAN/CSA S37-13 and the requirements of these specifications.

2.2 Assemble and erect the structure according to the instructions in the erection plans provided by the Department. Comply strictly with the part numbers indicated in the drawings and on the components.

2.3 Ensure that the parts are assembled square, straight and aligned, adjusted precisely.

2.4 All joints shall be bolted, unless otherwise indicated. Drilling, welding and heating of parts will not be accepted.

2.5 Repair damaged galvanized surfaces. Clean damaged surfaces with a metal brush, removing loose or cracked zinc layers. Apply two layers of approved zinc-pigmented paint to the damaged surfaces.

2.6 The structure shall be erected so as to prevent members from being bent or overloaded during installation and to avoid damage to the galvanization.

2.7 Place non-shrink concrete between the base plate and the foundation following the upgrade of the structure. The torque and verticality tolerances shall comply with CSA-S37 and be verified by the Department.

2.8 High strength bolts shall be used in all bolted assemblies. The tension that must be applied to the bolts shall not be less than the following values:

Bolt diameter	Minimum bolt tension
½” (12.7 mm)	53 kN
5/8” (15.9 mm)	85 kN
¾” (19.1 mm)	125 kN

Daymark installation, Section 03030

1. Description

1.1 This section lists the requirements for assembling and installing the daymark.

1.2 The geometric dimensions of the daymark are specified in Appendix F of these specifications.

1.3 The plans for assembling the daymark are specified in Appendix F of these specifications.

1.4 The daymark will be supplied by the Department.

2. Support assembly

2.1 Assemble the daymark mount on the ground as detailed in the erection plans.

2.2 For any daymark geometric position, the lath support horizontal shaped conductors must be on top.

2.3 Ensure that all the vertical profiles are positioned as indicated in the sketch in Appendix F. Note that the plans for series 08809 represent daymarks for the front light. Back light daymarks shall be inverted top-down. Holes were aligned for daymark installation in either direction.

3. Support installation

3.1 Secure the daymark mount to the tip of the structure. The daymark and top level floor shall be at same level. The daymark shall be installed on the side with the same azimuth as the side of the existing daymark structure to be dismantled.

3.2 Use the bolting parts supplied by the Department. If additional units are required, supply grade 316 stainless steel parts.

3.3 No drilling in structure members will be accepted without approval from the Engineer.

4. Lath installation

4.1 With the mount secured to the tower, bolt the aluminium laths to the mount as detailed in the drawings.

ELECTRICITY WITH HYDRO-QUÉBEC EASEMENT, SECTION 03050

1. Description

1.1. This section lists the requirements for the power supply and commissioning of the navigational lights at the top of the new structure. Diagram 2 of drawing 08990-E02 indicates the electrical system to be installed in the new tower.

1.2. Work to be completed includes but is not limited to the following:

1.2.1. Provide and install a power supply system, including service mast, meter base (if necessary), panelboard, circuit breakers and plugs, and any other necessary accessories.

1.2.2. Provide and install a power distribution system, including wiring and all the necessary accessories to connect, support and secure it. Ty-rap cable ties, whether plastic, metal or some other tie, such as hose clamps, shall not be used.

1.2.3. Install the complete junction box (provided by the Department) at the top of the structure.

1.2.4. Remove, replace and/or install aluminium enclosures around the panelboard, battery charger (if necessary), voltage regulator (if necessary) and power switches (if necessary) and the contents of the enclosures if required.

1.2.5. Provide and install the supports and accessories to attach the aluminium enclosures for the electrical inlet, batteries and junction box.

1.2.6. Remove and reinstall the navigational light and/or other accessories used as aids to navigation. Before re-commissioning the navigational

light, the Contractor shall inform the Project Engineer so that the alignment of the navigational light can be checked with the front light (FL);

1.2.7. Provide and install grounding, including wire, ground rods, connection to the tower, exothermic welding, protective coating for welds, protective conduits and everything necessary to attach wires and conduits, and other elements, according to the series of plans provided in Annex E (QE58400-C01-07 et -08);

1.2.8. Any equipment that is removed but not reinstalled (lanterns, sensor(s), battery(ies), voltage regulator, enclosures or other) shall be returned in its entirety to the Department.

1.3. The Contractor will be responsible for coordinating the disconnection and connection of the towers with Hydro-Québec.

2. Applicable codes

2.1. All work shall be completed in compliance with the requirements of the following codes and standards:

2.1.1. Canadian Electrical Code, latest version.

2.1.2. Canada Labour Code, latest version.

2.1.3. Regulations of the Commission de la Santé et de la Sécurité du Travail (CSST).

2.1.4. Hydro-Québec.

3. Materials

3.1. Electrical service mast and meter base (if necessary).

3.1.1. Conductors in size 6 AWG, with PVC protective pipe 31.75 mm (1¼") in diameter, with all connectors, conduits, attachments and other required accessories.

3.1.2. Panelboard and circuit breakers: Square D, 60 A, QO type; Power distribution:

3.1.2.1. All cables shall be Teck 90, gauge 10, three conductors (10/3);

3.1.2.2. Service plug, 15 A;

3.1.2.3. All connectors for Teck 90 cables shall be Star Teck or equivalent;

3.1.2.4. Nuts and bolts shall be 316 stainless steel (lanterns, cables, ties, etc.);

3.1.2.5. Fasteners, attachments and supports for Teck cables shall be made of Andrews brand stainless steel;

3.1.2.6. Supports and mounting plates shall be stainless steel.

3.2. Grounding:

3.2.1 In compliance with the Canadian Electrical Code; green insulated or bare tinned 2/0 AWG conductor buried or protected with a PVC pipe where there is a risk of a mechanical break.

3.2.2 Ground rods shall be copper, ¾ in. diameter, 10-foot lengths.

3.2.3 The 2/0 cable and rods shall be welded together using an exothermic Cadweld, or equivalent, with a protective coating recommended by the

manufacturer. The cable shall be fastened to the tower, without any cut or weld, by a Thomas & Betts #10103-TB ground clamp.

3.2.4 The Contractor shall determine and supply the length of wire required for the installation.

4. Power supply

4.1. Install the service mast.

4.2. Install the electrical inlet inside the metal enclosure.

4.3. Unless otherwise indicated, attach the metal electrical inlet enclosure to the new structure in accordance with the plan, without piercing it. In addition, cable entrance and exit openings shall be effectively waterproofed.

5. Solar power (if required)

5.1. Install/connect the support, solar panels, regulator and batteries.

6. Supply and installation of light

6.1. Install the junction box (NEMA 4X Hammond PJ1086H) at the top of the tower.

6.2. Supply the junction box with two separate parallel 120V 15A circuits and one 12V DC circuit from the batteries.

6.3. Install the navigation light and/or other equipment and/or accessories at the top of the structure. Adjust the position of the navigational light so that the beam of light is above and perpendicular to the daymark. The Department will make the final adjustment.

7. Grounding

7.1. Thread the conductor through a protective pipe as stipulated in paragraph 3.2.1 of this section.

7.2. Ensure the protective pipe is solidly attached to the structure and the top and side of the foundation to reduce risk of breakage.

7.3. One of the two (2) groundings shall be attached to the structure along its length with a Thomas & Betts #10103-TB ground clamp.

8. Light commissioning

8.1. Once the electrical installation is complete, before the lantern(s) is(are) commissioned, the Contractor shall notify the Project Manager so they can have Department staff verify the light's alignment.

Quality Control, Section 2000

1. Procedure

1.1 The CCG Representative and/or a laboratory representative shall have access to work at all times. If any work is done off site or in the workshop, it shall be accessible at all stages.

1.2 The Contractor is responsible for providing winter transportation, if required, between the nearest boarding location and the construction site for all acceptance and quality control visits organized by the CCG Representative.

1.3 The Contractor shall provide written notification to the CCG Representative at least 24 hours before any sample must be taken or quality control work performed.

1.4 In the event the Contractor covers any construction or allows it to be covered before it undergoes the prescribed inspection, approvals or trials, the construction in question shall be uncovered, the authorities allowed to inspect it to their satisfaction, and the construction returned to its initial state.

1.5 CCG may order an inspection of any part of the construction that appears not to comply with contract documentation. If, after examination, the construction in question is declared non-compliant with the contractual document requirements, the Contractor shall take all necessary steps to render the construction compliant and cover any inspection and repair costs.

2. Mix design

Provide the concrete mix design and particle-size distribution to the CCG Representative 72 hours before the concrete is poured.

3. Sampling

3.1 Once the concrete has been poured and compacted, at least one sample and one compaction measurement shall be taken by the laboratory mandated by CCG.

3.2 Plastic concrete samples shall be taken at each pouring by this same laboratory.

4. Rejected constructions or components

Remove any defective components deemed non compliant and rejected by CCG, even if they already form part of the construction. Replace or redo such items in keeping with the requirements set out in the contract documents.

5. Acceptance of work

5.1 CCG will perform at least three (3) work acceptance visits. The first series of visits will take place during underground working and will include the inspection of excavations and preparations for the foundation, and the installation of formwork, reinforcement and concreting. The second series of inspections will include provisional acceptance when the formwork is removed. Final acceptance will take place at the very end of the project to verify that construction was correctly carried out according to any list of deficiencies submitted at the provisional acceptance stage.

5.2 The Contractor shall provide at least two (2) business days' notice to CCG so it can hold site inspections for quality control of the foundations and for the provisional and final acceptance.

5.3 All construction shall be completed in its entirety and be compliant with the plans' requirements and specifications before any request for a general inspection visit. In the event construction is not sufficiently advanced or compliant, the Contractor will be responsible for all costs incurred for extra inspection visits.

SAFETY MEASURES, SECTION 3000

1. Safety measures to respect for construction work

1.1 The Contractor is fully responsible for occupational health and safety compliance during construction.

1.2 The Contractor shall take the necessary measures to eliminate the risk of accidents during construction.

1.3 The Contractor must apply the safety measures prescribed by federal, provincial and municipal laws and regulations. In particular, the Canada Labour Code and the Commission de la santé et de la sécurité du travail du Québec. In the case of differences or contradictions, comply with the strictest requirements.

1.4 Heating equipment that produces noxious gases will be located near or inside heating shelters, if required. The Contractor shall ensure the adequate evacuation of these gases.

1.5 Only people who have successfully completed training in “Protection against the risks of falls and high altitude rescue” are authorized to climb up the towers for dismantling, erecting or any other task. Provide proof, competency cards at the time of the bid.

1.6 The Contractor shall have on the worksite at all times a rescue kit and a first-aid kit specialized for steel tower construction. There shall be at least one person certified in first-aid training on staff at the worksite at all times.

Environmental Protection, Section 4000

1. General

1.1. The construction will inevitably have an impact on the environment, including the physical, biological and human environment. However, it is possible to reduce the impact of the work by respecting and applying certain simple measures. Table 2 of the Environmental Assessment Report (Appendix K) presents some simple measures to apply based on the work to be done. The Contractor shall consult and apply the recommendations. Also, environmental monitoring must be done during the work and the Contractor shall update the environmental monitoring form (Appendix L) diligently and regularly.

2. Construction work near shores and natural environments

2.1. If constructing a temporary access route is deemed necessary in the riparian area, the topsoil must be removed and set aside before the route is established. The topsoil must be put back into place after the temporary route is removed.Keep machinery dry at all times. No machinery shall be driven in or encroach upon the aquatic environment.

2.3. Machinery traffic shall be limited to the areas illustrated in Appendix E.

2.4. The machinery used shall limit rutting.

2.5. Send pump water to a sedimentation basin or a filter bed before allowing it to return to the natural environment in order to limit the amount of suspended solids in the water to 25 mg/L.

2.6. Fine material stored on the site shall be located far enough from the shore to limit the migration of this material into the aquatic environment. Protective tarps may be required.

2.7. Protect trees and their roots during construction. No trees may be cut without authorization from the CCG Representative.

3. Pollution prevention

3.1 Provide staff with the necessary sanitary services.

3.2 Have the machinery inspected by a mechanic, who shall provide written certification that the equipment is in good condition and that it poses no risk of leaking oil or other liquids that could harm the environment. If there is a leak, repair it immediately or do not use the machinery on the site.

3.3 Have an environmental response kit on site, including petroleum product absorbents in case of accidental spill.

3.4 If there is a hydrocarbon spill, report it to the Coast Guard alert network (1-800-363-4735) and to the CCG Representative. Immediately clean up the hydrocarbons using the environmental response kit and absorbents.

3.5 Fuel storage and maintenance and fueling of the various equipment shall be done in such a way as to eliminate any risk of contamination of the aquatic environment. These activities shall be kept at least 30 m from shore.

3.6 Cover dry materials and waste so that the wind does not disperse dust or debris.

3.7 Fires and burning of waste on site are not permitted.

3.8 Provide the Project Manager with the landfill sites where excavated material will be taken.

Site clean-up and restoration, Section 5000

1. General

1.1 Clean up the site and remove from it all waste and demolition debris in compliance with local regulations and anti-pollution laws.

1.2 Restore the site by leveling the ground to restore it as close as possible to its natural state before construction.

1.3 All areas used by the Contractor during construction shall be restored to their natural state. This includes work areas and temporary roads.

2. Clean-up during construction

2.1 Keep the construction site clean and adjacent properties free from debris and waste. The site shall be cleaned at the end of each work day. The site and surroundings shall be safe to workers and the public.

2.2 The Contractor shall, at its own cost, remove and deal with waste and debris from the construction site.

2.3 The Contractor shall, at its own cost, provide land to store this waste and other unnecessary materials and inform CCG of the location of this land.

2.4 The Contractor shall never for any reason dump or allow to accumulate any construction debris or waste outside the boundaries of the site or in the aquatic environment.

2.5 If applicable, the Contractor is responsible for snow removal on access roads and around construction for the entire duration of construction.

3. Final cleaning

3.1 Perform a final clean-up to prepare the site for provisional acceptance of the project or the certificate of final completion of construction.

3.2 Sweep hard surfaces and rake the other surfaces of the site.

3.3 Remove all demolition materials, temporary installations, and equipment not collected by CCG from the site before requesting final inspection.

Documents in the project file, Section 6000

1. Contractor's plans

All engineering plans provided by the Contractor shall be signed and sealed by an engineer who is a member of OIQ and must be approved by CCG.

2. Plans to add to the file

2.1 Submit two (2) paper copies of the shop drawings from the engineering plans.

2.2 At the end of construction, the Contractor shall provide CCG with "as constructed" plans and two (2) copies of the shop drawings annotated in red. This applies to both the engineering plans and the plans submitted with this request for proposal.

2.3 Annotations in red shall:

2.3.1 Indicate the modifications made to the dimensions and execution details on site.

2.3.2 Include the changes made following requested modifications and orders received on site.

Structures for temporary lights, Section 7000

1. General

As mentioned in the specifications, the Contractor shall install, supply power to and maintain a range beacon (lantern provided by CCG) on a temporary structure of its choice. This section gives more details on the requirements for the design, construction and maintenance of such temporary structures.

2. Location

The temporary structure shall be erected inside the work areas defined in Appendix E. The exact position will be supplied and installed by the Department's Geomatics branch staff, who will help the Contractor with the alignment of the temporary lights on the site.

3. Design

3.1 The temporary structure shall be designed by an engineer who is a member of OIQ (signed and sealed plans) and the general concept approved by the CCG Representative.

3.2 It shall be sturdy, fixed securely to the ground and stable enough to prevent the temporary light from oscillating or vibrating.

3.3 It shall respect safety standards so that Departmental and Contractor staff can climb it if needed for maintenance or verification.

3.4 The elevation of the temporary light is the same as that of the existing structure.

4. Assembly

4.1 The temporary structure shall be erected without obstructing the permanent light.

4.2 All other sections of these specifications shall also apply to the erection of the temporary structure.

4.3 Before the light is commissioned, the Contractor shall notify the Engineer so that Departmental staff can verify the alignment. Contact the Engineer seven (7) days in advance for the alignment of the light.

4.4 The Contractor shall install the light at the top of the tower and be able to access it in case of failure.

5. Power supply

Power can be supplied to the temporary light from existing electrical installations on site.

6. Removal

6.1 The temporary light shall remain in place until the new structure has been erected and the permanent light is fully operational.

6.2 The temporary structure shall not be dismantled until then.

6.3 Dismantle the temporary structure in compliance with section 8000, "*Dismantling, demolition and disposal*."

6.4 Remove the temporary structure from the site immediately once the permanent light is in operation.

Dismantling, demolition and disposal, Section 8000

1. Description

1.1 This section lists the requirements for complete or partial demolition, removal and recovery of the various designated works.

1.2 More specifically, dismantling, demolition and disposal including, but not limited to, the following:

- The removal of the daymark attached to the existing structure (recover).
- The complete dismantling of the existing structure.
- The complete demolition of the foundations of the existing structure.
- The removal and transportation off site of all residues, debris and pieces of materials resulting from demolition.
- The Contractor shall remove the existing electrical equipment and the structure identification number, which shall be returned to the Coast Guard.

2. Condition of the works to demolish

2.1 Demolish or remove the works in the condition they are in the day the contract is awarded.

2.2 The structure of Pointe du Lac RL (2126) is a +/- 32.7 m (107') galvanized steel latticework trapezoidal tower.

2.3 The foundation to be demolished (plan 883-2 Appendix D) consists of a footing and 4 pilasters in reinforced concrete. The volume of the footing is estimated at a little under 20 m^3 and the volume of the pilasters is about 1 m^3 each, for a total of 24 m^3 of reinforced concrete. If the difference between the real and estimated amount to

demolish exceeds 10%, the price will be prorated up or down to the real amount. The Contractor is responsible for documenting this work and showing the Project Manager the actual amount.

3. EXECUTION

3.1 Perform the work described in paragraphs 1.1 and 1.2 of this section in compliance with the plans, the CCG Representative's instructions, the standards and related codes, and the safety measures stipulated in Section 3000 of these specifications, "*Safety Measures*."

3.2 No debris or piece of material from dismantling or demolition shall fall freely or be cast to the ground, unless the Project Engineer provides written authorization. If the Contractor wishes to use this method for certain work, it shall provide evidence that this method is appropriate and risk free.

3.3 Unless otherwise instructed, remove all demolition debris from the site in compliance with the requirements of the relevant authorities.

3.4 At the end of each work day, ensure that no structures can collapse or fall.

4. Equipment to keep

Make all necessary precautions to keep and adequately protect the following pieces of equipment for reinstallation:

- The electrical inlet enclosure.
- The battery enclosure and batteries.
- The navigational light at the top of the structure.

- The structure identification plate.

- The daymark.

Excavation and filling, Section 9000

1. Description

This section lists the requirements for excavating, filling and laying a gravel bed for the foundations.

2. Materials

2.1 Class ‘‘A’’ sand with a minimum density of 20 kN/m^3

2.2 Crushed stone 20-0 mm;

2.3 Crushed stone ¼’’ to ¾’’

3. Execution

3.1 The Contractor shall follow the recommendations of the geotechnical investigation reports and the OSHC recommendations for excavation slopes and other elements. The Geotechnical Investigation Report is included in Appendix J.

3.2 The bottom of the trench shall be appropriately cleaned of topsoil, other organic matter and any debris.

3.3 The bottom of the excavated area will have to be checked and approved by a geotechnical engineer.

3.4 Because sensitive and liquefiable soil is present on the site, the bottom of the excavated area where the gravel bed will be laid shall not be touched. No other specific measures apply.

3.5 Keep the bottom of the excavated area dry. Manage pump water in accordance with Section 4000, “*Environmental Protection*.”

3.6 The excavated material can be used to fill trenches where granular or specific materials are not required. This material shall be free from organic matter and be compactable. The minimum compaction required is 90% of M.P.

3.7 Remove all unused excavation materials from the site.

3.8 The granular material shall respect the requirements of the plans for maximum thickness of the layers and compaction.

Foundations, Section 10000

1. Description

1.1 This section lists the requirements for building the structure foundations and the concrete slab on grade to be installed.

1.2 Construction of a foundation includes installing a heating shelter (if required), installing and removing framework, and putting in steel reinforcement, concrete and anchor rods and screws.

1.3 The Contractor shall provide a drainage system on the site if water tends to accumulate and shall comply with the requirements of Section 4000, "*Environmental protection*."

1.4 The dimensions of the foundation and the concrete slab on grade to be built are indicated on the plans in Appendix E.

2. Materials

2.1 All the materials, cement, formwork, steel reinforcement and steel must be in compliance with the standards and specifications in plans QE58400-C01-01 to 08 included in Appendix E.

3. Location and orientation

3.1 Before beginning construction on the foundation of the structure, contact the Project Manager to verify the location and elevation of the centre of the foundation.

3.2 The centre of the foundation shall coincide with the centre of the future tower as located on the site by CCG. The sides of the foundation shall be parallel to those of the future tower.

3.3 The centre coordinates of the tower in NAD 83 are specified in plan QE58400-C01-01, on the installation details.

4. Excavation

4.1 Ensure any existing foundations have been removed in compliance with the requirements of Section 8000 of these specifications, "*Dismantling, demolition and disposal*."

4.2 Excavation shall comply with the requirements of Section 9000 of these specifications, "*Excavation and filling*."

5. Framework

5.1 Build the framework in accordance with the shapes, dimensions and levels indicated in the plans in Appendix E.

5.2 Framework shall be constructed to support the load of the plastic concrete. If the framework breaks during pouring, the Contractor is entirely responsible for and required to deal with the situation. It shall ensure the shape of the foundation respects the requirements of the plans, even if the imperfection is underground.

5.3 No supplement shall be paid to the Contractor for a framework break.

5.4 The interior surfaces of the wood or steel framework shall be oiled before concrete pouring.

6. Steel reinforcement

6.1 Bending of steel bars, if required, shall be cold and mechanical.

6.2 Use clean, rust-free steel reinforcement bars in compliance with the plans and the requirements of the standards set out in the plans.

7. Heating shelter

7.1 A heating shelter must be built, if the temperature demands it.

7.2 It shall be made of strong, waterproof material and secured so that it does not move during concrete pouring and finishing.

7.3 It shall be large enough to cover all work and allow concrete pouring and finishing inside.

7.4 A warm breeze shall circulate inside the shelter. The cement, framework and frames must be kept at a temperature over 10° at all times, according to the specifications in plan QE58400-C01-01 (Concrete work in cold weather).

8. Concrete pouring, finishing and curing

8.1 Pour concrete in compliance with the requirements of CAN/CSA-A23.

8.2 Ensure the reinforcement and tie rods have not moved during pouring.

8.3 Finish the top of the foundation so that the surface drains outwards.

8.4 Once pouring is complete, leave the formwork in place for at least seventy-two (72) hours and apply an appropriate curing agent afterward.

9. Accuracy of foundation positioning

9.1 The maximum acceptable lateral positioning error is 10 mm between the intersection of lines drawn from the stakes in place and the centre of the structure to build.

9.2 The maximum acceptable elevation error is a 10 mm difference from the elevation given in the plan.

9.3 Any error that exceeds this shall mean that the Contractor is required to redo construction.

Chain link fence, Section 0281

1. Description

1.1. The provision of the fence includes all components listed in the plans and specifications, including hardware and accessories. Only the locks shall be provided by the Department.

2. Reference standard

2.1. The fence shall be provided and installed in compliance with the requirements of CAN/CGSB-138.1-96 (Fabric for Chain Link Fence), CAN/CGSB-138.2-96 (Steel Framework for Chain Link Fence), CAN/CGSB-138.3-96 (Installation of Chain Link Fence) and CAN/CGSB-138.4-96 (Gates for Chain Link Fence) and the codes and standards referenced in this section.

3. Type of fence

3.1. The fence will be anchored as specified in plan QE58400-C01-03 in Appendix E.

3.2. The dimensions of the fence are indicated on page 1 of 2 of Appendix I and on plan QE58400-C01-02 of Appendix E.

4. Materials

4.1. Fabric for the chain link fence shall comply with CAN/CGSB-138.1-96.

4.1.1. Standard steel galvanized with zinc.

4.1.2. Fence height: 1.83 metres.

4.1.3. Wire gauge: 4 mm in diameter (9IWG).

4.1.4. Link dimensions: 50 mm.

4.1.5. One edge closed by knuckling, the other by twisting.

4.2. Posts, rails and spacers shall comply with CAN/CGSB-138.2-96. Standard galvanized steel pipes shall be used.

4.3. Tension wire: single strand, galvanized steel, 5 mm diameter (6 IWG).

4.4. Posts: corner and gate posts shall have an exterior diameter of 89 mm and walls 5 mm thick. Line posts shall have an exterior diameter of 60 mm and walls 3 mm thick. The maximum distance between posts shall be 1800 mm.

4.5. Ties: single strand aluminum wire at least 4 mm in diameter (9 IWG), galvanized in compliance with the requirements for fence fabric.

4.6. Tension bar: galvanized steel, minimum cross-section 5 mm x 20 mm

4.7. Tension band: galvanized steel, minimum cross-section 3 mm x 30 mm, or aluminum, minimum cross-section 5 mm x 20 mm.

4.8. Single gate: must comply with CAN/CGSB-138.4-96, standard galvanized steel, outside diameter 42.9 mm for outer frame.

4.9. In each case, the single gate shall be two (2) sections of equal dimension.

4.10. Attach the fence fabric to the gate frame with the twisted edge on top.

4.11. Both sections of the gate shall have hinges and galvanized malleable cast iron finger latches and catches. They shall be lockable and open outwards. The hinges shall allow the gate to rotate 180 degrees to the fence if necessary.

4.12. Unless otherwise indicated, the single gate shall be placed in the centre on the same side of the structure as the ladder.

4.13. Fasteners and hardware: molten aluminum alloy, galvanized steel alloy, malleable cast iron or ductile cast iron. Post caps shall be designed to be waterproof, be securely attached to the posts and hold the top rail.

4.14. Zinc pigmented paint: must comply with CGSB 1-GP-178Ma.

4.15. Overhanging caps: galvanized malleable cast iron.

4.16. Inside the fence: lay down geotextile and MG-20 gravel 150 mm thick on the ground inside the fence perimeter.

5. Finish

5.1. Galvanization

5.1.1. Pipes: 570 g/m^2 or more; must comply with ASTM A90/A90M-01.

5.1.2. Other parts: must comply with CAN/CSA G164-FM92 (c2003).

6. Fence installation

6.1. Install the fences in compliance with CAN/CGSB-138.3-96;

6.2. Dig holes for the posts according to the dimensions and locations indicated in the plan. Round out the bottoms of holes for corner, end, gate and line posts.

6.3. Post foundations shall be cylindrical. Post foundations shall be at least 150 mm deeper than the frost line (provided in the available geotechnical study of the site, the technical specifications or the drawings), and be at least as deep as the minimum depth given on the drawings. The minimum depth in rock shall be 350 mm for line posts and 400 mm for end posts. The foundation depth shall respect the following tolerances: +75 mm, -0 mm, that is, a foundation can be 75 mm deeper than the required depth, but it cannot be less deep. The top 300 mm of the foundations shall be shaped, whether they are buried or above finished ground level, unless in rock or otherwise instructed in the technical specifications or drawings. In frost-susceptible soil, the upper part of the foundations shall not be shaped. Pour the grout and/or concrete in the post holes, then insert the posts to the desired height (1.83 m). Bring the concrete up 25 mm above ground level and finish the surface in a slope to direct water away from the posts. Support the posts to keep them plumb with the prescribed alignment and level until the concrete sets. The Contractor is responsible for the stability of the fence. The alignment of the fence shall not deviate by more than 10 mm from the drawings. The vertical deviation shall be less than 5 mm at the top of the post. The

posts shall be placed in the centre of the foundations with a tolerance of ±10 mm. The tolerance for post spacing shall be ±50 mm. Post summits shall be at the same height.

6.4. Leave a minimum of forty-eight (48) hours for the concrete to set before installing the fence fabric. The Contractor shall check the elevation of the finished ground and obtain Representative's approval before beginning work on installing the fence.

6.5. Install horizontal tubular spacers between the corner posts and the line and gate posts. Place the spacers halfway up the fence, at equal height on each side of the posts.

6.6. Place the top rail between the posts and secure it to the posts using the waterproof caps.

6.7. Place the lower tension wire, stretch it tightly and secure it to the line, corner and gate posts using press-forged turnbuckles and tension bands.

6.8. Place the fence fabric, stretch it tightly and attach it to the corner and gate posts using the tension bar attached to the post with tension bands spaced 450 mm (18") apart. The space between the bottom of the fence fabric and the ground shall be less than 50 mm at all points.

6.9. Attach the fence fabric to the top rails, line posts and lower tension wire using ties spaced 450 mm (18") apart. Make at least two (2) twists in the ties.

6.10. The Contractor shall connect all fence and gate posts to the central ring of the ground radial system. Grounding shall be performed with a bare solid copper wire, 8 AWG.

7. Gate installation

7.1. Install the single gate in two (2) equal sections. The bottom of the fence fabric on the gate shall be at the same level as that of the rest of the fence.

8. Gravel fill

8.1. Inside the perimeter of the newly installed fence, remove the topsoil, then spread and compact a layer of 20 net crushed stone 200 mm deep.

9. Repairs

9.1. Repair damaged galvanized surfaces. Clean any damaged surfaces with a wire brush to remove flaking or cracked layers of zinc. Apply two (2) layers of approved zinc pigmented paint to the damaged surfaces.