Fisheries and Oceans Canada | Pêches et Océans Canada

Canadian Coast Guard | Garde côtière canadienne

SOW – 15.24 m (50 ft) SELF SUPPORT VHF TOWER

DESIGN & BUILD CONTRACT

HILL ISLAND IRB

Hill Island, Thousand Islands National Park, ON

MARITIME AND CIVIL INFRASTRUCTURE
Prepared by: LL
Approved by: BY
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SECTION: 011100 GENERAL INSTRUCTIONS

PART 1 - GENERAL

1.1 Minimum Standards

.1 Perform work in accordance with National Building Code of Canada (NBCC) and any other code of provincial or local application. In the case of any conflict or discrepancy, the more stringent requirements shall apply.

.1 Meet or exceed requirements of:

.1 Contract documents;

.2 Specified standards, codes and referenced documents.

1.2 Description of Work

.1 Work under this Contract includes but is not limited to the provision of all labour, materials, and equipment required to:

.1 Design, fabricate and install a self-support tower c/w foundation capable of supporting three [3] antennas, associated cabling and all necessary appurtenances;

.2 Remove and dispose of existing antenna and supporting structure.

.3 Install one [1] VHF Antenna at the top of the tower.

.4 Install an antenna support bar 9.15 m [30 ft] above ground level.

.5 Install three [3] cable runs from the antenna levels to the crawlspace under the radio room.

.6 Installation of two CL-810 Steady Burning Low Intensity Lights at top of tower and their required cables.

.2 The following work will be undertaken by others and is hereby excluded:

.1 Supply of one [1] Sinclair SD214-SF2P2SNM(D00), 4 dipole VHF antenna

.2 Supply and installation of:

.1 One [1] Ch. 70 Rx Whip antenna, and

.2 One [1] NX-7H (NAVTEX) antenna.

1.3 Submittals

.1 Mandatory submittals and schedule for submission are detailed below and in Appendix B2. The following identifies general requirements only. The relevant sections must be consulted for a complete listing of mandatory content.

.2 Detailed Schedule:

.1 Deadline:

.1 No later than ten [10] working days following award.

.2 Deliverables:

.1 The contractor shall furnish a high level schedule outlining the major construction milestones. Schedule shall clearly define the anticipated start and finish of the project.

.3 Design Package:

.1 Deadline:

.1 No later than ten [25] working days following award.

.2 Deliverables:

.1 Detailed design drawings of the tower and a reinforced concrete foundation stamped by an Engineer licensed to practice in Ontario (Sections 033000 & 133613).

.2 Proof of welding shop Certification (CWB div 2) for tower fabricator (Section 133613).

.4 Construction Plan:

.1 Deadline:

.1 No less than 10 working days prior to beginning fabrication.

.2 Deliverables:

.1 A Construction Plan of sufficient detail to demonstrate that the Contractor has considered all the challenges of the project and is prepared to undertake the works in a competent and professional manner in accordance with all legislation, including:

.1 Project specific safety program (Section 013530);

.2 Project environmental protection plan (Section 013543);

.3 Detailed demolition plan (Section 024116);

.4 Detailed construction plan (Section 033000 & 133613);

.5 Mill Test Certificates

.1 Deadline:

.1 Upon receipt of metal purchased.

.2 Deliverables:

.1 The contractor shall furnish proof that all metal received for the project is in compliance with CSA and ASTM International standards.

.6 As-built and QA/QC:

.1 Deadline:

.1 No more than ten [28] calendar days after construction.

.2 Deliverables:

.1 The following documents shall be forwarded upon completion of the contract:

.1 Set of red-lined as-built drawings (Section 033000 & 133613);

.2 Confirmation of subgrade verification (Section 033000);

.3 Concrete test results (Section 033000);

1.4 Bidder Qualifications

.1 The work shall be carried out under the supervision and responsibility of a sole specialized Contractor, capable of performing installations of telecommunication towers.

.1 The design work must be completed by an engineer licensed to practice in the province of Ontario.

.2 The fabrication must be completed by a shop certified to DIVISION 2 or greater by the Canadian Welding Bureau (CWB).

.2 The Contractor shall designate the following key project members, including any subcontractors. The project members shall have completed projects of similar scope and complexity to the work described herein.

.1 Project Manager: Contact information for the main point of contact for the project shall be provided by the contractor.

.2 The contractor shall provide a detailed list of all subcontractors being used to complete the work described herein.

.3 Requests to amend the project team, following contract award, must be forwarded in writing. Coast Guard reserves the right to reject any proposal to amend the project team.

1.5 Site Location

.1 The location of the site as follows:

.1 Lat./Long.: 44°21'55.50"N, 75°57'16.50"W

.2 The site located at the North-most point of Hill Island in Thousand Island National Park, Ontario.

1.6 Existing Conditions

.1 Bidders must make their own estimate of the difficulties associated with all phases of the works.

.2 The contractor must include in their costs all expenses related to the difficulties of working at the sites.

.3 Photographs of the existing site are included in Appendix A.

1.7 Contractor's Access to Site

.1 Contractor is responsible for transportation of all labour, materials and equipment to and from the site, including any and all material furnished or itemized for salvage by Coast Guard.

.2 The site is accessible by standard motor vehicle.

1.8 Completion, Scheduling and Planning of the Works

.1 Work may commence as early as practical following Coast Guard's acceptance and approval of mandatory submissions.

.2 Work shall be completed no later than February 28, 2017, unless otherwise negotiated and approved in writing.

.3 The radio equipment will not be in use during the winter months. Construction can be staged at the discretion of the contractor.

1.9 Coast Guard Staging Location

.1 Items itemized as supplied by, or salvaged to Coast Guard shall be collected or delivered by the Contractor to the following staging location. The Contractor shall be responsible for all transportation costs between the project site and the identified staging location. Material drop off or access to stored goods outside of regular operating hours shall be at the discretion of Coast Guard and may be subject to cost recovery:

.1 Staging location: CCG Base – Prescott, 401 King St. W., Prescott, ON K0E 1T0.

.2 Advise Coast Guard at least three [3] working days prior to shipping

.1 For Delivery, contact CCG Base Prescott:

Rich Rudolph – Area Supervisor, (613) 925-2865;

.2 Shipping/Receiving hours: Monday through Friday, 9:00AM to 3:00PM.

1.10 Temporary Facilities

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Arrange, pay for, and maintain temporary electrical power supply as required for construction, and water supply as required, in accordance with governing regulations and ordinances.

.3 Maintain emergency spills kit on-site at all times.

1.11 Fees, Permits, Certificates and Information

.1 Contractor shall provide authorities having jurisdiction with all information requested.

.1 Contractor shall provide copies to Coast Guard of any documentation submitted to other authorities related to the work described in this document.

.2 Contractor shall pay fees and obtain certificates and permits required.

.3 Contractor shall furnish certificates and permits when requested.

1.12 Reference Documents

.1 The most recent publication or edition of any document referenced in this specification should be used unless the referencing clause states that this clause does not apply.

1.13 Required Submissions

.1 A summary of the minimum mandatory submissions required can be found in Appendix B2. This summary is not an exhaustive list of all submissions required for the duration of the project. Additional submissions may be required after award.

PART 2 - PRODUCTS

2.1 Not Used

PART 3 - EXECUTION

3.1 Not Used

SECTION: 013300 SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 General

.1 This section specifies general requirements and procedures for the Contractor's submissions of documents to Coast Guard for review.

.2 Do not proceed with the work until submitted documents or samples have been reviewed by Coast Guard.

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

.4 Contractor's responsibility for errors and omissions in submission is not relieved by Coast Guard's review of the submitted documents.

.5 Notify Coast Guard, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.6 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Coast Guard's review of submission, unless Coast Guard gives written acceptance of specific deviations.

.7 Make any changes to submissions that Coast Guard may require consistent with Contract Documents and resubmit as directed by Coast Guard.

.8 Provide Coast Guard with a written notice, when resubmitting, of any revisions other than those requested by Coast Guard.

1.2 Submission Requirements

.1 Coordinate each submission with requirements of work and Contract Documents. Individual submissions will not be reviewed until all related information is available.

.2 Allow three [3] working days, or as stipulated in the specifications, for Coast Guard to review the submission.

.3 The Contractor's Engineer shall stamp and sign any submissions requiring a Professional Engineer's seal certifying his approval of samples, verification of field measurements, and compliance with Contract Documents.

SECTION: 013530 HEALTH AND SAFETY REQUIREMENTS

PART 1 - GENERAL

1.1 Scope

.1 The Contractor shall be responsible to develop, implement and enforce a safety program which addresses all elements of the work.

1.2 References

.1 Work under this section shall be undertaken in strict conformance with all listed references, In the case of any conflict or discrepancy the more stringent requirements shall apply.

.1 Canada Labour Code Part II - January 2008

.2 NRC-CNRC National Building Code of Canada

.3 Ontario Occupational Health and Safety Act and Regulations, 2009.

.4 Any and all other Provincial/Territorial Regulations and Policies; Worker's Compensation Board Policies; Local municipal regulations; pertaining to safety of the contractors workers

1.3 Submittals

.1 Project Specific Safety Program

.1 Deadline:

.1 With Construction Plan

.2 Deliverables:

.1 Safety Program Document, include:

.1 A listing of all activities specific to this phase of the project and their Health & Safety risks or hazards.

.2 Detailed descriptions of how the activities are to be carried out as well as methods for mitigating hazards and risks.

.3 A listing of personnel responsible for health and safety measures, and Emergency procedures.

.4 Material Safety Data Sheets for hazardous products to be utilized in the execution of the works.

SECTION: 013543 ENVIRONMENTAL PROCEDURES

PART 1 - GENERAL

1.1 Scope of Work

.1 The contractor must implement and enforce the following procedures throughout the duration of the work to mitigate potential negative impacts on the surrounding environment.

1.2 References

.1 Work under this section shall be undertaken in strict conformance with all listed references, In the case of any conflict or discrepancy the more stringent requirements shall apply.

.1 Canadian Environmental Protection Act

1.3 Submittals

.1 Contractor shall submit an environmental protection plan

.1 Deadline:

.1 With Construction Plan

.2 Deliverables:

.1 Submit a plan addressing procedures to be implemented to mitigate any negative impact on the environment. Detail:

.1 Equipment features (age, spill containment);

.2 Staging, refueling, and cleaning areas;

.3 Clean-up and/or containment procedures (including concrete/grout);

.4 Waste disposal methods and sites;

.5 De-watering plan.

PART 2 - PRODUCTS

2.1 General

.1 Avoid use of hazardous products. Use environmentally friendly products where practical.

PART 3 - EXECUTION

3.1 Construction Area

.1 Confine construction activities to as small an area as practical.

.2 Establish material storage, cleaning, and refueling areas where impacts to the surrounding environment will be negligible or readily mitigated.

3.2 Stockpiling of materials

.1 Materials must be stockpiled as far from the shoreline as practical. Tarps must be used to control dust and run-off.

.2 Stockpiled excavated materials shall be skirted using filter fabric to control run-off of fines during rain and to prevent excavation of soils below stockpiles.

.3 If possible, stockpiles should be placed on the gravel driveway or parking area.

3.3 Disposal of Wastes

.1 Clean-up the site at the end of each working day.

.2 All waste material to be disposed of in a legal manner at a site approved by local authorities. Transporter/hauler must be appropriately licensed.

.1 Recycle or reuse materials where possible.

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

.4 Do not bury rubbish and waste materials on site.

3.4 Clearing and Grubbing

.1 Only clear vegetation that interferes with construction once approved to do so by Coast Guard.

3.5 Drainage

.1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.

.1 Suspend works during periods of heavy rainfall and add temporary covers to discourage run-off.

.2 Water pumped from excavation shall be adequately treated to ensure that water returning to the watercourse contains minimal fines. Procedures anticipated for preventing the pumping of fines shall be identified in the environmental protection plan, and may include the

following:

.1 The use of filter bags;

.2 Straw bale check dams or silt fence;

.3 Discharge through naturally occurring vegetation.

.3 The means for controlling silt run-off shall be dependent on the site and the quantity of water pumped, and shall be to the discretion of the CCG site staff.

.4 Sediment control measures shall be inspected and improved/cleaned/replaced as necessary.

3.6 Pollution Control

.1 Provide methods, means, and facilities to prevent the contamination of soil, water, and atmosphere from the discharge of pollutants produced by construction operations.

.2 Vehicles, machinery, and equipment shall be in good repair, equipped with emission controls as applicable and operated within regulatory requirements.

.3 Abide by local noise by-laws.

.4 Avoid unnecessary idling of vehicles or heavy machinery.

.5 Limit use of equipment around the shoreline where possible.

.6 Implement and maintain dust and particulate control measures in accordance with provincial requirements:

.1 All bulk material haul equipment shall be appropriately tarped. Watertight vehicles shall be used to haul wet materials

.7 Designate a cleaning area for tools to limit water use and runoff. Do not allow deleterious materials to enter waterways. Ensure emptied containers are sealed and stored safely for disposal.

.8 The contractor shall take all necessary precautions to guard against the release of any noxious substance or pollutant to the environment. In the event of any spill the Contractor shall take immediate action to contain the release and mitigate any impact.

.1 Materials and equipment to intercept, contain, and clean-up any spill or other release shall be maintained on site throughout the construction period and must be readily accessible at all times.

.2 Any uncontrolled release of a known contaminant (spills, fire/smoke) shall be reported to

appropriate Provincial Authority and Coast Guard. Spills of deleterious substances to be immediately contained and cleaned up in accordance with provincial regulatory requirements.

.3 Provincial Authority: Ontario Spills Action Centre 1-800-268-6060

3.7 Traffic

.1 Minimize soil compaction by driving, parking vehicles, and walking, etc. on existing paved roadways/laneways. If soil is impacted by compaction, compensate by restoring areas with new soil, as required.

.1 Use tracked construction vehicles to reduce soil compaction, whenever possible.

.2 Avoid the use of heavy machinery in areas of sensitive slopes. Avoid using machinery on land during wet weather.

3.8 Archaeological Features

.1 This site is located on a National Park and there exists a low chance that archaeological features are resting below the surface.

.1 During construction, if significant features (e.g. structural remains and/or high artifact concentrations) are encountered:

.1 Work must stop in the immediate area,

.2 Photographs of the archaeological features and their placement must be taken,

.3 Coast Guard must be informed of the discovery,

.4 Parks Canada's Terrestrial Archaeology section must be contacted for advice,

.5 An assessment of the significance will determine what will be required to mitigate the find.

SECTION: 014500 QUALITY CONTROL

PART 1 - GENERAL

1.1 Inspection

.1 Coast Guard or its representative shall have access to the work at all times. If parts of the work are prepared off-site or in a shop, access shall be given to such work throughout the duration of the project.

.2 In the event the work must be submitted to special testing, inspection or approvals prescribed by Coast Guard in these specifications or provided for in work-site regulations, the request for inspection must be made without unreasonable delay.

.3 The below list identifies key milestones where the Coast Guard will require an opportunity to take samples/inspect:

.1 Location verification: The Coast Guard will confirm correct location for installation upon arrival of the tower at the site. The contractor shall be required to provide access to the site at all times to CCG site staff.

.2 Pre-tensioning: The Coast Guard shall witness the pre-tensioning of the all-thread rods to the prescribed torque values.

.3 Installation of tower: The Coast Guard shall witness the erection of the new nav-aid tower and witness correct operation of the new light.

.4 Installation of transmission lines: The Coast Guard will confirm the termination locations and length of cable provided for each of the cable runs installed on the tower.

1.2 Procedures

.1 Provide Coast Guard with advance notice whenever testing is required in accordance with these specifications, so that all parties involved can be present.

.2 Provide necessary manpower and installations for obtaining and handling samples and material on site.

.3 Provide access to site if the site is of remote nature whereby the contractor is responsible for providing access to the site

1.3 Rejected Work

.1 Remove defective work, whether incorporated into the work or not, which has been rejected by

Coast Guard as failing to comply with the contract documents. Replace or re-execute in accordance with the Contract Documents.

1.4 Tests and Mixture Formulas

.1 Supply test reports and required mixture formulas.

1.5 Factory Tests

.1 Submit test certificates as prescribed in the relevant section of the specifications.

1.6 Acceptance of Work

.1 Coast Guard will make acceptance visits of work executed by the Contractor at critical milestones identified in the following sections.

.2 The Contractor shall inform Coast Guard at least three [3] working days before these inspection visits.

.3 All work shall be completed in compliance with the specifications before requesting the visit for inspection. If the work is not completed or deemed non-compliant, the Contractor shall be responsible for all costs incurred for subsequent inspections.

SECTION: 016100 COMMON PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 General

.1 Secure Coast Guard approval of all products to be incorporated into the works. Work shall not commence until product data and/or samples have received Coast Guard approval.

.2 Supply and/or fabricate material and equipment of prescribed quality, with performance conforming to established standards.

.3 Use new material and equipment unless otherwise specified.

.4 Ensure replacements parts may be readily procured.

.5 Use products from one manufacturer for material and equipment of same type or classification, unless otherwise specified.

1.2 Manufacturer's Instructions

.1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.

.2 Notify Coast Guard in writing of any conflict between these specifications and manufacturer's instructions; Coast Guard will designate which document is to be followed.

1.3 Compliance

.1 When material or equipment is specified by standard or performance specifications, upon request of Coast Guard, obtain an independent testing laboratory report from the manufacturer, stating that material or equipment meets or exceeds specified requirements.

1.4 Substitution

.1 Where specific products have been specified, proposals for substitution may only be submitted after award of contract. Such requests must include statements of respective costs of items originally specified and the proposed substitution.

.2 No substitutions will be permitted without prior written approval of Coast Guard. Substitutions will be considered by Coast Guard only when:

.1 Materials specified in Contract Documents, are not available; or,

.2 Delivery date of materials selected from those materials specified would unduly delay completion of contract; or,

.3 Alternative materials to those specified which are brought to the attention of and considered by Coast Guard as equivalent to the material specified will result in a credit to the Contract amount.

.3 Should the proposed substitution be accepted either in whole or in part, the Contractor must assume full responsibility and costs when such substitution affects other work on the project including any and all design or drawing changes required as a result of substitution.

1.5 Submittals

.1 Provide product specifications and/or samples upon request from Coast Guard.

SECTION: 024116 DEMOLITION OF STRUCTURES

1.1 Demolition

.1 Remove existing antenna and supporting structure, picture in Appendix B1.

.1 Dispose of existing antenna and supporting structure.

.2 Disposal of all waste at a licensed waste disposal facility;

1.2 References

.1 Work under this section shall be undertaken in strict conformance with all listed references, In the case of any conflict or discrepancy the more stringent requirements shall apply.

.1 Canada Labour Code Part II - January 2008.

.2 NRC-CNRC National Building Code of Canada 2005.

.3 Ontario Occupational Health and Safety Act and Regulations, 2009.

.4 CSA S350-[M1980(R1998)], Code of Practice for Safety in Demolition of Structures.

1.3 Submittals

.1 Contractor to provide demolition plan.

.1 Deadline:

.1 With Construction Plan.

.2 Deliverables:

.1 Method of demolition including all associated tasks and schedule;

.2 Methods for protecting the site from demolition debris.

.3 The ultimate disposal location of all waste materials and debris.

.1 Include documentation detailing regulatory approval for waste disposal facility and transporter.

.2 Work under this section shall not proceed until written approval of the demolition plan has been received from the Coast Guard.

.3 Submit copies of certified receipts from the disposal sites for all material removed from the work site upon request.

1.4 Existing Conditions

.1 Photos of the existing tower are included in Appendix B1.

PART 2 - PART 2 - PRODUCTS

2.1 Not used.

PART 3 - PART 3 - EXECUTION

3.1 General

.1 Work under this section shall be continuous and proceed without interruption unless otherwise approved by Coast Guard.

.2 Radio equipment is not operational. Demolition may be staged at the contractor's discretion.

3.2 Protection

.1 Implement effective controls to catch/collect all tower debris during demolition, specifically paint.

.2 Implement effective controls to prevent injury to workers, property, and local traffic.

3.3 Preparation

.1 Erect warning signs and barricades.

.2 Ensure all environmental protection/mitigation measures are in place.

.3 Ensure all items identified for salvage have been removed and stored.

3.4 Demolition

.1 Remove and dispose of existing antenna

.2 Ensure that demolition does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.3 Ensure demolition is undertaken safely. If at any period during demolition the safety of the Contractor's staff cannot be maintained take preventative measures, stop work and immediately notify Coast Guard.

3.5 Disposal

.1 All material is to be disposed of off-site and a licensed disposal/recycling facility.

SECTION: 033000 CONCRETE WORK

PART 1 - GENERAL

1.1 Scope of Work

.1 Work of this section includes the supply of all labour, material, and equipment, necessary to complete the following:

.1 Design and installation of a reinforced concrete foundation to support the tower provided for in section 133613.

.2 Installation of bearing grout between completed foundation and tower base/anchor plate

.3 Any and all provisions necessary to ensure that the anticipated performance of the placed concrete will be obtained if work is undertaken in cold weather.

1.2 References

.1 Work under this section shall be undertaken in strict conformance with all listed references, In the case of any conflict or discrepancy the more stringent requirements shall apply.

.1 Canada Labour Code Part II - January 2008

.2 NRC-CNRC National Building Code of Canada 2010

.3 Ontario Occupational Health and Safety Act and Regulations

.4 CAN/CSA-A23.1-04 Concrete Materials and Methods of Concrete Construction

.5 CAN/CSA A23.2-04 Methods of Test and Standard Practices for Concrete

.6 CAN/CSA-G30.18 Billet Steel Bars for Concrete Reinforcement

.7 CAN/CSA S269.3 Concrete Formwork

.8 ACI Specification 306 Cold Weather Concreting

1.3 Submittals

.1 Submittals shall be forwarded to Coast Guard in accordance with the provisions of section 013300.

.2 Foundation Design:

.1 Deadline: with Design Package

.2 Deliverables:

.1 Stamped geotechnical investigation report adequately describing the existing soil conditions reasonably anticipated to be encountered.

.3 Provide a drawing and associated construction specification stamped by an Engineer licensed to practice in the province of Ontario.

.3 Concrete placement methods and curing procedures and Mix Design

.1 Deadline: with Construction Plan (Section 011100)

.2 Deliverables:

.1 Detailed written description of concrete placement, including:

.1 Mix Design

.2 Mixing plan identifying how and where the mix will be batched;

.3 Anticipated haul routes and distances;

.4 Shop drawings for formwork and false-work;

.5 Placement methods and procedures to control consolidation/segregation;

.6 Location of necessary cold joints;

.7 Finishing procedures;

.8 Curing methods and schedule;

.9 Strength requirements for structural stability (removal of forms);

.10 Clean-up procedures; and,

.11 Mitigation measures to account for hot or cold temperatures where reasonably anticipated during the construction period.

.4 As-built and Quality Control:

.1 Deadline: 28 days following completion of construction activities (Section 011000)

.2 Deliverables:

.1 Red-lined drawings showing all changes from the sealed design drawings (if any).

.2 Confirmation of subgrade verification.

.3 Concrete test results.

1.4 Contractor's Quality Control

.1 The Contractor shall be responsible for retaining the services of a Geotechnical Consultant to:

.1 Verify exposed subgrade

.2 Witness concrete placement, complete sampling of plastic concrete and undertake at least three strength measurements (one [1] at seven [7] and two [2] at 28 days) during the curing process

.2 The results of the Contractor's quality control testing are to be provided to Coast Guard.

1.5 Quality Assurance

.1 Coast Guard's minimum inspection requirements are detailed below. :

.1 Subgrade-verification, upon completion of the excavation and prior to the placement of formwork and reinforcement.

.2 Installation of formwork and falsework

.3 Throughout concrete placement

.4 During execution of concrete placement 3 concrete cylinders shall be cast and tested. Air entrainment and slump shall also be tested.

PART 2 - PRODUCTS

2.1 Formwork

.1 Shall be in accordance with CAN CSA S269.3.

2.2 Concrete

.1 Concrete shall possess the minimum characteristic detailed in the stamped design drawings.

.1 Concrete must be air entrained, class F-1 or better.

2.3 Water

.1 Water utilized for the production of concrete must be potable, unless otherwise approved in writing by Coast Guard.

2.4 Reinforcement

.1 Reinforcing steel must be as mandated in CAN CSA A23.1

PART 3 - EXECUTION

3.1 General

.1 Concrete must be placed, finished, and cured in accordance with the Contractor's submitted construction plan.

.1 Ensure that the top of concrete is no less than 150mm [6 in] above the surrounding grade, unless otherwise approved.

3.2 Preparation

.1 Preparation shall not commence until bearing surfaces have been verified and approved by Geotechnical Engineer.

.2 Remove all loose and deleterious material.

.3 Construct forms as detailed in the submitted construction plan.

.4 Place reinforcement in accordance with Contract Drawings.

.5 Surfaces must be heated as necessary to account for climatic conditions at the time of the pour.

3.3 Placement

.1 Concrete placement shall not commence until formwork and reinforcement have been inspected by Coast Guard.

.2 Contractor shall place, finish and cure concrete as per CAN CSA A23.1 making all adjustments necessary to account for climatic conditions anticipated during the curing period.

.3 Concrete shall be placed in one continuous pour.

.1 The development of cold joints must be previously approved in writing (Construction Plan).

.4 Finish exposed concrete surfaces to provide a lightly brushed non-skid surface if necessary.

.5 The top of concrete shall be graded to ensure that there is a 1% slope and that water does not pond.

.6 Cut control joints where specified.

3.4 Curing

.1 Concrete curing must be undertaken in accordance with CAN CSA A23.1 and the Contractor's approved Construction Plan.

.2 Curing regiment employed must take into account local climatic conditions reasonably

anticipated to occur during the curing period.

3.5 Grout

.1 Supply and install load bearing grout between the top of the completed foundation and the tower base/anchor plate.

.1 Edges of grout shall be chamfered.

SECTION: 133613 STEEL TOWERS

PART 1 - GENERAL

1.1 Scope of Work

.1 Work in this section consists of the following:

.1 Design, supply and installation of a new 15.24 m [50 ft.] self-support tower including all appurtenances. Appurtenances shall include but are not necessarily limited to:

.1 Fall arrest system

.2 Anti climb system (3.0m [10 ft] height)

.3 Grounding system

.4 LED Obstruction lighting system

.2 Install of top mount Coast Guard VHF antenna and associated cabling.

.3 Install support bar for two additional CCG antennas and the associated cabling as per Section 133613 – 2.5.

.2 Work in this section excludes the following:

.1 Supply of two [2] additional antennas by Coast Guard.

1.2 References

.1 CSA S37-13 - Antenna Towers and Antenna Supporting Structures

.2 CAN/CSA-W47.1 - Certification of Companies for Fusion Welding of Steel Structures

.3 CAN/CSA W59 - Welded Steel Construction (Metal-Arc Welding)

.4 CSA Z259.2.5-12 – Fall Arresters and Vertical Lifelines

.5 Canada Labour Code Part II – January 2008

.6 Health and Welfare Canada Limits of Exposure to Radio-Frequency Fields Frequencies from 3KHz – 300GHz, Safety Code 6

.7 Ontario Occupational Health and Safety Act and Regulations for Construction Projects – 2011

.8 National Building Code of Canada – 2010

.9 TC CAR Standard 621.19 - Standards Obstruction Markings

.10 SSPC-SP 1 Solvent Cleaning

.11 SSPC-SP 7/NACE No. 4, Brush-Off Blast Cleaning

.12 Standards and Guidelines for Communication Sites, Motorolla, R-56, recent edition

1.3 Submittals

.1 Submittals shall be forwarded to Coast Guard in accordance with the provisions of section 013300.

.2 Tower Design:

.1 Deadline: furnish with Design Package

.2 Deliverables:

.1 Provide a drawing and associated construction specification stamped by an Engineer licensed to practice in the province of Ontario.

.3 Erection Plan

.1 Deadline: with Construction Plan (Section 011100)

.2 Deliverables:

.1 A construction plan of adequate detail to clearly show Coast Guard that the work will be undertaken in a competent and safe manner.

.1 At minimum, identify hoisting equipment and associated certification.

.4 As-built Drawings / QC Control documentation

.1 Deadline: 28 calendar days following installation (Section 011100)

.2 Deliverables:

.1 Red-lined drawings showing all changes from the sealed design drawings (if any)

.2 Those documents identified within the following section and any additional documents assembled in accordance with the Contractors established quality control program.

1.4 Contractor's Quality Control

.1 The following activities shall be completed by the contractor at the contractor's expense as a demonstration that the delivered product is of the quality prescribed within the specification.

.2 Contractor shall provide Steel Mill Test Certificates as outlined in Section 011100 – 1.3.4 of this specification.

.3 Tests for thickness and uniformity of galvanized coating shall be made as considered necessary

by Coast Guard. Tests shall be conducted in full accordance with the requirements of CSA S37-13. If required, contractor shall pay for testing, all costs to be included in the tender price.

.4 Ground resistance testing

1.5 Quality Assurance

.1 Coast Guards minimum inspection requirements are detailed below. :

.1 Throughout tower erection

.2 Upon completion for the testing of Cables

.1 The Contractor shall inform the Coast Guard at least three days in advance of the installation of the cables and antennas so that Coast Guard can perform quality checks after the connectors and all supports and grounding kits are in place

PART 2 - PRODUCTS

2.1 Structural Steel

.1 Must conform to CSA Standard G40.21, Grade 300W, or better. All materials used in the tower to be new and in conformance with requirements of CSA S37-13.

2.2 Fasteners

.1 Bolts shall be hot-dip galvanized with hexagonal heads and be supplied with hexagonal nuts. The unthreaded part of the bolt shall be long enough for full bearing of the adjoining parts and enough washers shall be placed on each bolt under the nut to prevent the nut from reaching the end of the bolt threads when tightened.

2.3 Steel coatings

.1 Coating System to be water based Acrylic (no Alkyds are acceptable). Suggested methods

.1 Primer: Devflex 4208 Acrylic @ 1.5 – 2.0 mils dft. Finish: Devflex 4208 Acrylic @ 1.5 – 2.0 mils dft. Or,

.2 Single coat: ‘Evotech’ Aqualux 522-121/516, 2.5-3 mils dft.

2.4 Antennas

.1 One [1] antenna will be supplied by Coast Guard.

.1 Sinclair SD214-SF2P2SNM(D00), 4 dipole VHF antenna per data sheet found in Appendix B3

.1 Mounting location: top of tower (15.24 m [50 ft] elevation).

.2 The following work will be undertaken by others and is hereby excluded:

.1 The installation of one [1] ch. 70 Rx Whip antenna

.2 The installation of one [1] NX-7H (NAVTEX) antenna

.3 The successful bidder shall be responsible for picking up the Sinclair antenna from the identified Staging Location

2.5 Mounting hardware

.1 All mounts, mount hardware, and line hangers shall be new (not salvaged) and be heavy-duty hot dip galvanized or stainless steel.

.2 Antenna Support Bar is to be 0.76 m [2.5 ft] in length and capable of supporting one [1] Ch.70 Rx whip antenna in addition to one [1] NX-7H (NAVTEX) antenna, as shown in Figure 8 of Appendix B1.

2.6 Cabling

.1 VHF antenna: LDF4-50.

.1 Cable shall be terminated with an Andrew L4PNF (female type N connector) to mate with the male type N connector that comes with the antenna.

.1 This connection is to be protected with a weatherproof kit.

.2 The free end will extend into the crawl space below the radio room and will be left with 25ft of excess cable.

.3 The cable will be terminated in the radio room by a Coast Guard Production Technician.

.2 Ch.70 Rx whip antenna: RG 213 Coax (to be mounted to support bar by CCG Technician).

.1 The contractor must attach the cable to the tower, beginning at the Antenna Support Bar.

.2 The indoor portion will extend into the crawl space below the radio room and will be left with 25ft of excess cable.

.3 The cable will be terminated at both ends by a Coast Guard Production Technician.

.3 NX-7H (NAVTEX) antenna: RG 213 Coax.

.1 The contractor must attach this antenna's associated cable to the tower, beginning at the Antenna Support Bar.

.2 The indoor portion will extend into the crawl space below the radio room and will be left with 25ft of excess cable.

.3 The cable will be terminated at both ends by a Coast Guard Production Technician.

.4 Conduit shall be approximately 2" to 3" in diameter to allow for future cable installation.

2.7 Fall arrest system

.1 Must be a rail system, cable systems are prohibited.

.2 Rail and trolley must meet all requirements of CSA Z259.2.5-12

.1 TSG, Miller or Tower Specialties Products, or approved equivalent type, complete with trolley.

2.8 Grounding

.1 Rods: Must be 19mm [¾"] copper clad, 3.0m [10'] long ground rods

.2 Conductors: Must be tinned copper, AWG 4/0

.3 Connections: Must be exothermic or irreversible mechanical type

PART 3 - EXECUTION

3.1 Design

.1 The 15.24m (50 ft) tower shall be designed in accordance with CSA S37-13 to support all antennas identified herein.

.2 The Contractor shall design all tower accessories, including new mounts for all antennas, climbing facility with a fall arrest assembly, and anti-climb panels

.3 Tower design shall account for all Transport Canada requirements for obstruction markings.

.4 The tower shall be designed to resist all loads specified in CAN/CSA S37-13 as well as maximum loads caused by all equipment installed in the towers as described in these specifications and plans.

.5 Unless otherwise specified, loads shall be determined in accordance with CAN/CSA S37-13 Antennas, Towers and Antenna Supporting Structures, latest edition; reliability Class I.

.6 Contractor shall submit Engineering Plans outlining materials, dimensions, loading and any other pertinent details for tower construction to Coast Guard for approval prior to fabrication.

.7 Ground System

.1 The tower shall be designed with a ground electrode system compliant with Motorola R56 (Latest edition).

.2 All three tower legs shall be connected to the grounds. Ground must be connected to a tab fabricated as part of the tower leg and not by exothermic welds to legs or drilling which could affect the tower's leg strength.

.3 Conductors shall connect to a buried ground ring compete with ground rods or plates driven to a sufficient depth.

.1 Ground system resistance must be less than 5 ohm.

.8 Climbing Apparatus

.1 The tower shall be equipped with a climbing apparatus complete with a fall arrest system, in compliance with applicable CSA S37-13 requirements.

.2 The climbing apparatus shall provide an unobstructed climbing path and maintain the required climbing clearance radius as per CSA S37-13.

.3 Climbing apparatus configuration, shall comply with CSA S37-13 and Canada Labour Code. Rungs shall be horizontal, have adequate clearance and line up vertically.

.9 Fall Arrest System

.1 The Contractor shall supply a fall arrest system to meet CSA S37-13 requirements.

.2 The fall arrest system shall be free from obstructions for the complete height of the tower.

.3 The fall arrest system shall be supported at spans not more than 1 m, or to meet the manufacturer's instructions.

.4 The fall arrest system shall run up the tower or ladder in a manner to facilitate climbing. The fall arrest rail shall be straight and true to prevent trolley binding.

.5 The extension of the fall arrest system beyond the top of the tower must be structurally supported for the entire height.

.6 Proper manufactured stop hardware is to be installed at the top of the fall arrest rail to prevent accidental dislodging of the trolley from the rail.

.10 Anti-Climb Panels

.1 The tower shall include one [1] sets of anti-climb panels.

.2 Anti-climb panels must fully enclose the perimeter of the tower. Protection of the ladder assembly only is prohibited.

.3 Each panel shall be no less than 3.05m [10 ft] in height.

.4 Anti-climb panels shall be included in the design drawings of the tower and shall be of galvanized steel or stainless.

.5 The anti-climb must be hinged on the climbing face of the tower, and must allow for locking of the panel.

3.2 Fabrication

.1 Each tower segment shall be designated with a number that is easily read after galvanizing. This mark shall be stamped into each piece in such a manner, or in such a place, as will not injure or reduce the strength of the piece. The marks on like pieces shall be in the same relative position on each piece. The markings indicated on each piece shall correspond with that shown on the erection drawings.

.2 All members shall be fabricated in accordance with the Engineering Plans and as per CSA S37-13.

.3 All like parts shall be interchangeable. All like parts shall have the same number.

.4 In any bending or reworking of any material, methods employed shall ensure that the physical properties of the material are not impaired.

.5 All welding shall be performed in accordance with CSA Standard W59 latest revision and shall be undertaken by a fabricator approved by the Canadian Welding Bureau to the requirements to CSA Standard W47, latest revision.

.6 Special mounting arrangements shall be incorporated into the tower sections for the secure mounting of:

.1 All lighting fixtures, junction boxes, and cable supports.

.2 Fall arrest system extension where it extends above the top of the tower;

.3 Ground lugs or grounding attachments.

.7 The Contractor shall ensure that electrical continuity exists between all tower sections.

3.3 Galvanizing

.1 All materials, structural steel, pipe and fittings, including bolts, nuts and washers shall be hot dip galvanized to the requirement of CSA S37-13 and CSA-G164 and as otherwise specified therein.

.2 All materials shall be completely fabricated before galvanizing (except the tapping of nuts).

.3 Before galvanizing, the steel shall be thoroughly cleaned of all paint, grease, rust, scale or

other materials that will interfere with proper binding of the zinc with the steel.

3.4 Painting

.1 Tower painting will be carried out in the factory and shall be applied in 7 equal and alternating bands of International Orange and White according to the requirements of Transport Canada TC CAR Standard 621.19. Painting and proper drying will be done prior to delivery.

.2 Galvanized steel must be cleaned prior to painting in accordance with SSPC –SP-1 – "Solvent Cleaning".

.1 Light Sweep blast all surfaces in accordance with SSPC-SP-7 to remove any chromate treatment, or poorly adhered zinc salts that may be present to increase mechanical bonding through increased roughness.

.1 Care should be taken to remove as little zinc as possible while maintaining desired toughness.

.2 After sweep blasting, the coating system should be applied ideally the same day and a max of one day later.

.3 Grit shall not be recycled.

.3 All paint shall be applied in shop conditions as per manufacturer's instructions, evenly spread and free from all marks, stains, defects and flaws.

.1 All surfaces of the tower are to be painted with the exception of the areas on the mating surfaces of leg splice plates and attachment points for grounding lugs to ensure good electrical connection for grounding purposes.

3.5 Handling of Material and Transportation

.1 The tower and parts are to be built so they may be safely transported to the site from the manufacturer's premises.

.2 Materials shall be handled and stored in the plant and on the job site in such a manner that no damage shall be done to the materials of any existing building or structure.

.3 Tower sections should be stored on the gravel parking pad and not the grass, if possible.

.4 Special care shall be taken to ensure that galvanizing is not damaged during handling and erection of materials.

.5 Storage of materials on the site will be the responsibility of the Contractor.

3.6 Tower Installation

.1 Prior to site mobilization, Contractor shall submit a Construction Plan detailing construction tasks, methods, and equipment required to complete work to Coast Guard for review. Construction Plan should include methods of completing work, equipment required, as well as hazards and mitigation for hazards for each work task.

.2 The contractor shall give Coast Guard a written notice ONE WEEK prior to the commencement of the standing of the tower.

.3 The tower shall be erected in a manner that will not bend, scrape, distort, or injure the component parts of the galvanizing.

.4 The Contractor shall be responsible to ensure that no members of the tower are over stressed during erection.

.5 Every failure of the tower sections to join together properly shall be reported to the Coast Guard.

.6 Upon completion of erection, the tower shall be inspected by the Contractor for damage. Any damaged or missing items, including nuts, bolts, etc., shall be replaced. The tightness of all bolts shall be rechecked at this time.

.1 Any members damaged during erection shall be replaced at the Contractor's cost.

.7 The Contractor shall be responsible for any damages done to the work of others, or to adjoining structures and property during erection.

.8 The Contractor shall touch up in the field all steel members of the tower where the galvanized finish has been scraped or chipped during erection using zinc-enriched or Galvicon paint, or an approved equal.

.9 The Contractor shall field paint all steel members of the tower where the painted finish has been scraped or chipped during erection in the field.

.1 The Contractor shall be responsible for damage done by paint spraying or dripping on the Owner's or other's property.

3.7 Transmission Lines

.1 All lines shall be mounted to mounting plates included in the fabrication of the tower.

.1 The use of wrap lock/tie wrap devices to secure TX lines is not acceptable.

.2 Cables shall be buried from inside of the skirting to the tower base in a conduit 2" to 3" in diameter. Conduit end shall be weatherproofed at the tower end to prevent water entry.

.3 The cable is to run through conduit from the VHF Antenna to the base of the tower, underground to the side of the building, into the building's crawl space and terminate below the radio room with 25ft of surplus cable.

.4 Under the building, cables shall be affixed to the wood joists, and shall enter at a location to be determined by the on-site CCG staff. Cables shall enter through an appropriate weather/vermin proof floor penetration.

.5 Every effort shall be made to ensure that the external connections are made waterproof using the best commercial practice.

3.8 Warranty

.1 Contractor shall warranty all galvanizing work for a period of not less than three [3] years.

.2 Contractor shall warrant all painted items for three [3] years for 90% coverage.

.1 For clarity: for a period of three years following installation any damage to the paint from normal environmental conditions prevalent at the site shall be repaired by the Contractor at no cost to the Owner in a manner approved by the Owner

APPENDIX B1: SITE LOCATION AND PHOTOGRAPHS

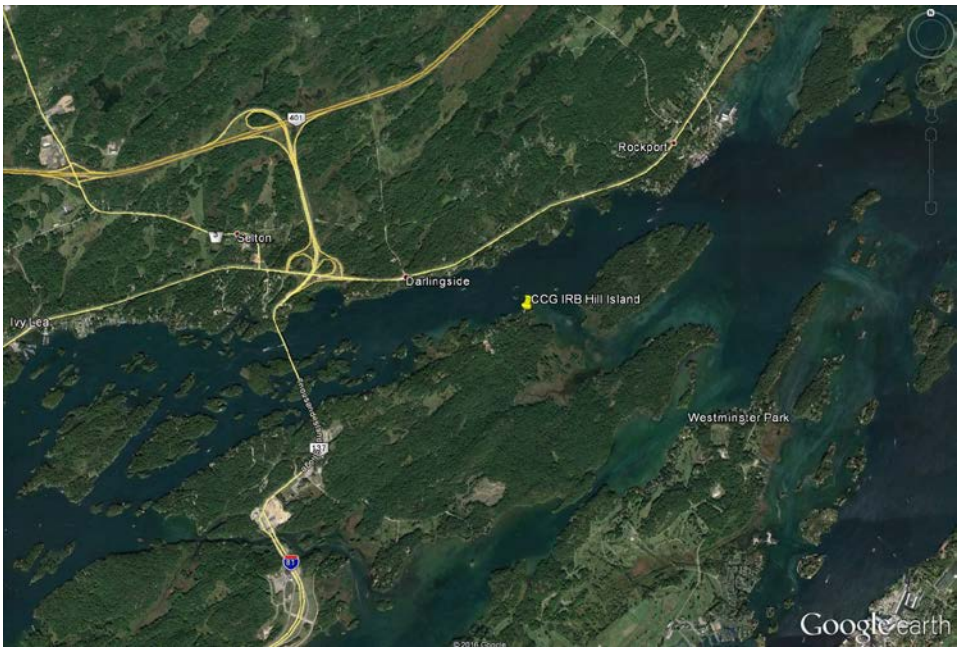

Figure 1: Project Site
Hill Island IRB Station
44°21'55.50"N, 75°57'16.50"W

Figure 2: Project Site

Figure 3: Project Site

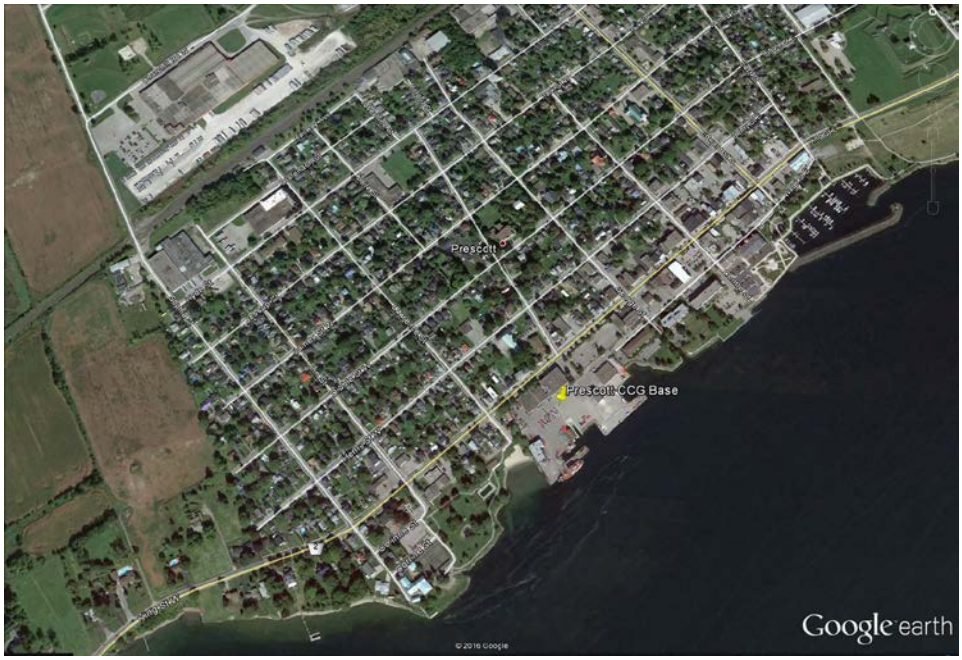

Figure 4: Coast Guard Staging Area

CCG Base – Prescott
401 King St. W.
Prescott, ON K0E 1T0

Figure 5: Coast Guard Staging Area

Figure 6: Hill Island IRB Station and Existing Antenna

Figure 7: Existing Antenna

Figure 8: Example of Antenna Support Bar to be installed 9.15 m [30 ft] above ground level.

APPENDIX B2: SUMMARY OF SUBMITTALS

Following Contract Award

Deadline	Submission Description	*Section(s)*
10 working days following award	Detailed schedule	*011100 – 1.3.2*
25 working days following award	Design Package	*011100 – 1.3.3*
10 working days prior to beginning fabrication	Construction Plan	
	a) Project Specific Safety Program	*013530*
	b) Project Environmental Protection Plan	*013543*
	c) Detailed Demolition Plan	*024116*
	d) Detailed Construction Plan	*033000 & 133613*
	Listing of all subcontractors	*011100 – 1.4.2*
28 calendar days after construction	As-built and QA/QC documents	*011100 – 1.3.6*
Upon receipt of metals purchased	Mill Test Certificates	*011100 – 1.3.5*
Upon request of Coast Guard	Product specifications and/or samples	*016100*
	Copies of certified receipts from the disposal sites	*024116*

APPENDIX B3: DRAWINGS & DATA SHEETS

St. Lawrence River

Pier

≈ 5.5m ≈ 3.5m ≈ 10m

Boardwalk ≈ 16m
(6" ht. from ground)

mowing Extent

12m

Walking Trail to Park Docks

mowing Extent

N

Parks Canada
"Limberlost" Building

CCG IRB - Hill Island

9m

6m

Heavier Vegetation
(Long Grasses, Shrubs, Trees)

7m

4m

1.5m

6m

6m

2m

2m

6m

4.5m

9m

mowing Extent

Extent of Gravel

8m

Gravel Parking Pad
(Boardered by 8" x 8" timbers)

15m

Spruce Tree

Access Driveway

SD214-SF2P2SNM(D00) 4 dipole, 8.0 dBd, bi-directional, N-Male, 138-174 MHz

- Covers the entire 138-174 MHz frequency range
- 8.0 dBd gain with bi-directional pattern
- 300 Watts power handling
- Can be top or side mounted (Universal Mount)

Recommend SMK-125-A3 or SMK-125-A7 for Offset Side Mount.
Available from Sinclair separately.

The SD214 series is a rugged 4-bay exposed dipole antenna designed for applications where moderate gain is required. These premium-quality antennas are well suited to public safety applications.

The design of these antennas provides for coverage between 118 to 225 MHz in 3 sub bands, 118-138 MHz for civil aviation applications, 138-174 MHz for private mobile networks, public safety, and 220-225 MHz for transportation networks.

The standard connector offered is an N-type male.

Region	United States	Europe, Middle East and Africa	Caribbean and Latin America	Canada and rest of the world
Telephone	USA: 1 800 263 3275	International: +44 (0) 1487 84 28 19	International: +1 905 726 7676	Canada: 1 800 263 3275 International: +1 905 727 0165
E-mail	salesusa@sinctech.com	salesuk@sinctech.com	salesla@sinctech.com	salescan@sinctech.com

Electrical Specifications

Frequency Range	MHz	138 to 174
Connector		N-Male
Gain (nominal)	dBd (dBi)	8 (10.1)
Input VSWR (max)		1.5:1
Polarization		vertical
Impedance	Ω	50
Pattern		Bi-directional
Vertical beamwidth (typ)	degrees	17
Average Power Input (max)	W	300
Lightning protection		DC ground
Electrical tilt (available)		0,2,4,6, or 8 degrees

Mechanical Specifications

Depth	in (mm)	4 (102)
Length/ Height	in (mm)	240 (6096)
Width	in (mm)	42.5 (1080)
Base pipe diameter	in (mm)	2.38 (60)
Radiating element material		aluminum
Base pipe material		aluminum
Weight	lbs (kg)	54 (24.52)
Mounting Hardware (Optional)		Clamp005, Clamp015, or Clamp130 *1
Actual Shipping weight	lbs (kg)	93 (42.22)
Shipping dimensions	in (mm)	247x48x6 (6274x1219x152)
Mounting configurations		Universal Mount
Recommended For Offset Side Mount:		SMK-125-A3 or SMK-125-A7

Environmental Specifications

Temperature range	°F (°C)	-40 to +140 (-40 to +60)
Wind Loading Area (Flat Plate Equivalent)	ft² (m²)	3.86 (0.36)
Wind Loading Area (1/2" ice)	ft² (m²)	6.52 (0.61)
Rated wind velocity (no ice)	mph (km/h)	130 (209)
Rated wind velocity (1/2" radial ice)	mph (km/h)	90 (145)
Lateral thrust (100 mph No Ice)	lbs (N)	141 (627.2)
Torsional moment (100 mph No Ice)	ft-lbs (Nm)	172 (232.2)
Bending moment (100 mph No Ice)	ft-lbs (Nm)	811 (1094.9)

Notes
*1 : Qty 2

Ordering Information
Clamps must be ordered separately.