

**INFRASTRUCTURE REHABILITATION  
NORTH LAKE, KINGS CO., PE  
PROJECT NO. R.070139.001**

**PREPARED FOR: PUBLIC WORKS/  
GOVERNMENT SERVICES CANADA**

**PREPARED BY: COLES ASSOCIATES LTD.**

**MAY 2014**

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## **2 DRAWINGS**

- M1: Existing Site Plan, Sections & Borehole Records
- M2: New Site Plan and Wharf Elevation
- M3: Wharf Sections and Details
- M4: Wharf Typical Details
- M5: Slab and Cap Sections & Details
- M6: Electrical Layout Pole Work

1.1 SCOPE OF WORK

- .1 The work of this portion of the contract involves reconstruction to the wharf structure 403 & 404, located at North Lake Harbour, Kings County, Prince Edward Island which includes but is not limited to:
- .1 Excavation to allow construction of wharf structure;
  - .2 Removal of existing concrete deck, treated pile caps, fender, wales and other items as indicated, and curbs at location of Work to limits and extents shown on plans;
  - .3 Provision for treated piles, cast-in-place concrete pile caps, precast concrete deck, cross bracing, wales, fender system, ladders, cleats, curbs, blocking and miscellaneous work related to the reconstruction;
  - .4 All related site work including asphalt paving, sandstone fill, imported gravel, imported rip rap, filter fabric and environmental protection;
  - .5 Provision for relocation and reinstatement of site services, including but not limited to water, drain pipes, electrical, hoist, barricades, etc.
- .2 All in accordance with the requirements of these specifications and drawings listed on the Index to Specifications and Drawings, construction schedule and Time and Order of Completion.

1.2 CODES AND STANDARDS

- .1 All work to be performed in conformity with applicable codes and standards.
- .2 Perform work in accordance with the latest editions of the National Building Code of Canada, Canadian Electrical Code, Canadian Standards Association (CSA), P.E.I. Occupational Health and Safety Act, Canada Labour Code Part II, and any other code of provincial or local application

provided that in any case of conflict or discrepancy, the more stringent requirements will apply.

.3 Meet or exceed the requirement of specified Standards, Codes, and referenced documents.

.4 Unless otherwise indicated, the latest editions of referenced Standards, Codes, and Documents will apply.

1.3 DOCUMENTS  
REQUIRED

.1 Maintain one copy of each of the following at the job site:

- .1 Construction Document CCDC2
- .2 Contract drawings
- .3 Project manual
- .4 Addenda
- .5 Reviewed shop drawings
- .6 Change orders
- .7 Test reports
- .8 Copy of updated approved work schedule
- .9 Manufacturers' installation and application instructions
- .10 Health and Safety Plan and related documents
- .11 Permits, Codes and Acts
- .12 Specifications
- .13 Waste Management Plan
- .14 Fire Safety
- .15 Other requested documents.

1.4 SITE  
EXAMINATION

.1 All bidders submitting tenders for this Work shall first examine the site of the Work in its entirety prior to submission of tenders and make themselves acquainted with site conditions, tides and all information necessary for the proper execution of the Work covered by the tender documents. All tenders shall take into consideration all such conditions as may affect the Work under this Contract.

.2 Before visiting the site the bidders **MUST** apply for and receive permission to visit the site from the Departmental Representative.

.3 Must review Section 01 35 29 for potential hazards, wearing safety gear at site, and taking precautionary measures.

.4 No extra payment will be made to the Contractor, above the Contract Price, for costs resultant from failure to determine the conditions that affect the work.

1.5 SITE  
CONDITIONS

.1 Geotechnical Investigation: Borehole logs for this site are indicated on the design drawings.

1.6 CONSTRUCTION  
SCHEDULE AND  
PROGRESS REPORTS

.1 Submit a consolidated schedule in weekly increments within ten (10) days of Contract award.

.2 Discuss work proposed schedule with Departmental Representative to ensure incorporation of any specific scheduling requirements of Departmental Representative related to work being carried out simultaneously by Departmental Representative.

.3 Make allowance in the construction schedule for the following specific activities:

- .1 Deficiency review
- .2 Deficiency clean-up
- .3 Construction close-out
- .4 Substantial completion
- .5 Project Record Drawings (As-built) submission
- .6 Warranties submission

.4 Update and re-issue the work schedule as required to conform to monthly progress reviews.

1.7 COST  
BREAKDOWN

.1 N/A.

1.8 PERMITS

.1 Contractor will apply and pay for any necessary permits/certificates.

.2 Provide notification to inspection authorities.

.3 Compliance certificates.

.4 Submit copies to Departmental Representative.

1.9 CONTRACTOR'S  
USE OF SITE

.1 Do not unreasonably encumber site with materials or equipment.

.2 Move stored products or equipment, which interfere with operations of Departmental Representative or other Contractors.

.3 Obtain and pay for use of additional off-site storage or work areas needed for operations.

.4 Maintain all roads, streets, lanes, walks, driveways free from mud and debris tracked from construction site, on a daily basis.

.5 Wharf face at area of work is not available until October 1, 2014. Thereafter, work may occur until March 31, 2015.

1.10 SECURITY

.1 Watch the site at all times including weekends and holidays. No compensation will be paid by the Departmental Representative for materials of work stolen, lost, damaged, or destroyed.

1.11 PROJECT  
MEETINGS

.1 Hold bi-weekly project meetings at the site and at a time approved by the Departmental Representative and the Departmental Representative. In addition, hold any additional meetings

as the need arises or as directed by the Departmental Representative.

- .2 Notify all parties concerned of such meetings.
- .3 Contractor will record minutes of such meetings and distribute to all parties within three (3) working days of the meetings.

1.12 SETTING OUT  
THE WORK

- .1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.
- .2 Protect and maintain all survey/reference points.
- .3 Provide devices and qualified personnel as required to layout and construct work.
- .4 Supply all stakes and markers required for laying out work.

1.13 FIELD  
DIMENSIONS

- .1 Take all field measurements required to supplement drawing dimensions. The Departmental Representative's review of shop drawings and erection diagrams does not relieve the Contractor of this responsibility.

1.14 LOCATIONS OF  
EQUIPMENT AND  
FIXTURES

- .1 Unless dimensioned, locations of equipment and systems as indicated or specified are to be considered as approximate.
- .2 Inform Departmental Representative of impending installations and obtain Departmental Representative's approval of actual locations.
- .3 When required by the Departmental Representative, submit field drawings to indicate the relative positions of various services and equipment.



1.15 COORDINATION .1  
AND COOPERATION  
WITH OTHER  
CONTRACTS

The construction scheduling for the work of this project necessitates that the Contractors for the work of this Contract should anticipate the requirement to coordinate and cooperate with the Departmental Representative and also with other independent contractors, engaged directly by the Departmental Representative, working simultaneously on other related work as may be required.

- .2 Coordination and cooperation with other contractors under the control and direction of the Departmental Representative, and with independent contractors, electric/telephone utilities and cable companies, will include, **but not be limited to:**

.1 Sharing access to site and various areas of work within and adjacent to the construction site.

.2 Sharing storage of reasonable quantity of materials in areas as directed by the Departmental Representative.

.3 Incorporating flexibility into work schedule as would normally be required to integrate Work with work of other trades working under separate contracts.

.4 Attend coordination meetings called by the Departmental Representative and maintain on-going consultation with on-site superintendents or foremen of other separate contracts, primarily, but not necessarily limited to, activities required to coordinate installation of services or other components proposed or built in, with the work of this Contract.

.5 Directly arrange for work relating to the relocation of electric and/or telephone, and/or cable poles, and/or lines to be carried out by the utility

companies to meet the Contractor's schedule.

- .3 Before starting the Work of this Contract, it is the responsibility of this Contractor to confirm to the satisfaction of this Contractor, that the existing work of other contractors, whether fully completed, or being completed simultaneously with the Work of this Contract, upon which the Work of this Contract will be installed, attached to or abut against, or in any other way be affected by the condition of the existing work, is acceptable to this Contractor for the installation of the work of this Contract. If the existing work is deemed by this Contractor to be unacceptable for the installation of the Work of this Contract, this Contractor shall stop work and notify the Departmental Representative, in writing, stating clearly the conditions, which in the opinion of this Contractor are unacceptable. If written notification of unacceptable conditions has not been received by the Departmental Representative, the commencement or continuation of the Work of this Contract, insofar as it is affected by the work of other contractors shall be considered by the Departmental Representative as an acknowledgement by this Contractor that the existing work of the other contractors is acceptable.
- .4 If required, prepare co-ordination drawings of installation for the efficient use of available space, for proper sequence of installation and to resolve conflicts. Consult with, and obtain the Departmental Representative's approval.

1.16 CUTTING,  
FITTING AND  
PATCHING

- .1 Do all cutting, fitting, boring, and patching as required to complete the work of this Contract.

1.17 EXISTING  
SERVICES

- .1 Where work involves breaking into, re-routing or connecting to existing services, submit work schedule to Departmental Representative sufficiently in advance to allow Departmental Representative to provide Owner with minimum seven (7) days notice of interruption of any active service or facility. Confirm each interruption 24 hours immediately prior to scheduled date of implementation.
- .2 Obtain Departmental Representative and Departmental Representative's approval of schedule of interruptions before proceeding with work and where applicable, coordinate with Local Authority or Public Utility.
- .3 Make all required connections to existing services, carry out such operations at the times directed by governing authorities, and with minimum disturbance to facilities and vehicular traffic.
- .4 Before starting the Work establish the locations and extents of service lines in the area of the Work. Notify Departmental Representative if findings in conflict with information or intent shown on drawings or in specifications.
- .5 Submit schedules to, and obtain approval from the Departmental Representative for any shut-down or closure of active services or facilities. Adhere to approved schedules and provide notice to affected parties.
- .6 Where unknown services are encountered, immediately advise the Departmental

Representative and confirm such findings in writing.

- .7 Record the locations of maintained, re-routed, and abandoned service lines. Include on the record drawings specified in Section 01 78 00 - Closeout Submittals.
- 1.18 ADDITIONAL DRAWINGS
  - .1 The Departmental Representative may furnish additional drawings to assist the proper execution of work. These drawings will be issued for clarification only. Such drawings will have the same meaning and intent as if they were included with plans referred to in the contract documents.
- 1.19 RELICS AND ANTIQUITIES
  - .1 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found during the excavation work, shall remain property of the Government, except when excavation is on private property when items become the property of the property Owner. Protect such articles and request directives from Departmental Representative.
  - .2 Give immediate notice to Departmental Representative if evidence of archaeological finds are encountered during construction, and await Departmental Representative's written instructions before proceeding with work in this area.
- 1.20 TRAFFIC REQUIREMENTS
  - .1 See Section 01 35 29 - Health and Safety Requirements
  - .2 See Section 01 35 14 - Special Procedures for Traffic Control

-----END-----

1.1 GENERAL

- .1 This section specifies general requirements and procedures for contractor's submissions of shop drawings, product data, samples and mock-ups to Departmental Representative for review.
- .2 Do not proceed with work until relevant submissions are reviewed by Departmental Representative.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submissions.
- .5 Notify Departmental Representative 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 Departmental Representative's review of submission, unless Departmental Representative gives written acceptance of specific deviations.
- .7 Make any changes in submissions which Departmental Representative may require consistent with Contract Documents and resubmit as directed by Departmental Representative.
- .8 Notify Departmental Representative, in writing, when resubmitting, of any revisions other than those requested by Departmental Representative.

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 7 working days for Departmental Representatives review of each submission.
- .3 Accompany submissions with transmittal letter, containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
- .4 Submissions shall include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier
    - .3 Manufacturer
  - .4 Contractor's stamp, signed by Contractors authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - .5 Details of appropriate portions of Work as applicable:
    - .1 Fabrication
    - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
    - .3 Setting or erection details.
    - .4 Capacities.
    - .5 Performance characteristics.
    - .6 Standards.
    - .7 Relationship to adjacent work.
- .5 After Departmental Representative's review, distribute copies.

1.3 SHOP DRAWINGS

- .1 Shop drawings: original drawings, or modified standard drawings provided by Contractor, to illustrate details of portions of Work, which are specific to project requirements.
- .2 Maximum sheet size: 850 x 1050mm

- .3 Submit shop drawings as follows:
  - .1 Opaque diazo prints or photocopies of number Contractor requires for distribution plus 4 copies which will be retained by Departmental Representative.
  - .2 Indicate materials, methods of construction, connection details, etc.
- .4 Cross-reference shop drawing information to applicable portions of Contract documents.

1.4 PRODUCT DATA

- .1 Product data: manufacturers catalogue sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products.
- .2 Submit 6 copies of product data.
- .3 Sheet size: 215x280mm, maximum of 3 modules.
- .4 Delete information not applicable to project.
- .5 Supplement standard information to provide details applicable to project.
- .6 Cross-reference product data information to applicable portions of Contract Documents.

1.5 SAMPLES

- .1 Samples: examples of materials, equipment, quality, finishes, workmanship.
- .2 Where colour, pattern or texture is criterion, submit full range of samples.
- .3 Reviewed and accepted samples will become standard of workmanship and material against which installed work will be verified.

1.6 MOCK-UPS

- .1 Mock-ups: field-erected example of work complete with specified materials and workmanship.
- .2 Erect mock-ups at locations acceptable to Departmental Representative.



- .3 Reviewed and accepted mock-ups will become standards of workmanship and material against which installed work will be verified.

1.7 SHOP DRAWINGS  
REVIEW

- .1 The review of shop drawings by Departmental Representative is for the sole purpose of ascertaining conformance with the general concept. This review shall not mean that Departmental Representative approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and contract documents. Without restricting the generality of the foregoing, the Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for coordination of the work of all sub-trades.

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1.1 REFERENCES

- .1 Manual of Uniform Traffic Control Devices for Streets and Highways - 2002.

1.2 PROTECTION OF PUBLIC TRAFFIC

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2 Review with Departmental Representative all precautions to be taken and safety measures to be put in place and obtain acceptance before proceeding with work.
- .3 When working on traveled way:  
.1 Place equipment in position to present minimum of interference and hazard to traveling public.  
.2 Keep equipment units as close together when working conditions permit and preferably on same side of traveled way.  
.3 Do not leave equipment on traveled way overnight.
- .4 Do not close any lanes of road without approval of Departmental Representative. Before re-routing traffic erect suitable signs and devices in accordance with instructions contained in Part D of UTCD.
- .5 Keep traveled way graded, free of pot holes and of sufficient width for required number of lanes of traffic.  
.1 Provide minimum 7m wide temporary roadway for traffic in two-way sections through Work and on detours.  
.2 Provide minimum 5m wide temporary roadway for traffic in one-way sections through Work and on detours.

.6 As indicated, provide graveled detours or temporary roads to facilitate passage of traffic around restricted construction area.

.7 Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, unless other means of road access exist that meet approval of Departmental Representative.

1.3 INFORMATION AND  
WARNING DEVICES

.1 Provide and maintain signs, flashing warning lights and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Work which requires road user response.

.2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in Part D, Temporary Conditions Signs and Devices, of UTCD Manual.

.3 Place signs and other devices in locations recommended in UTCD manual.

.4 Meet with Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of Departmental Representative.

.5 Continually maintain traffic control devices in use by:

.1 Checking signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.

.2 Removing or covering signs which do not apply to conditions existing from day to day.

1.4 CONTROL OF PUBLIC  
TRAFFIC

- .1 Provide competent flag persons, trained in accordance with, and properly equipped as specified in, UTCD manual in following situations:
- .1 When public traffic is required to pass working vehicles or equipment that block all or part of traveled roadway.
- .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
- .3 When workmen or equipment are employed on traveled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
- .4 Where temporary protection is required while other traffic control devices are being erected or taken down.
- .5 Provide full time flag person during daylight hours to control both construction activities and public traffic and to permit pedestrians safe passage.
- .6 For emergency protection when other traffic control devices are not readily available.
- .7 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
- .8 Delays to public traffic due to contractor's operators: maximum 10 minutes.
- .9 Flag person to have two-way radio communications at all times.

-----END-----

- |                                     |    |                                                                                                                                                                    |
|-------------------------------------|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>1.1 RELATED WORK</u>             | .1 | Section 01 35 28 Health and Safety Requirements                                                                                                                    |
| <u>1.2 REFERENCES</u>               | .1 | Fire Protection Standards issued by Fire Protection Services, Labour Program Division of Service Canada:                                                           |
|                                     | .1 | FCC No. 301-June 1982 Standard for Construction Operations.                                                                                                        |
|                                     | .2 | FCC No. 302-June 1982 Standard for Welding and Cutting.                                                                                                            |
|                                     | .2 | FCC standards may be viewed at:                                                                                                                                    |
|                                     | .1 | <a href="http://www.hrsdc.gc.ca/en/lp/lo/fp/standards/commissioner.shtml">http://www.hrsdc.gc.ca/en/lp/lo/fp/standards/commissioner.shtml</a>                      |
|                                     | .2 | Fire Protection Services - Atlantic Region office, Halifax, N.S, Tel. (902) 426-6053.                                                                              |
| <u>1.3 DEFINITIONS</u>              | .1 | Hot Work defined as:                                                                                                                                               |
|                                     | .1 | Welding work                                                                                                                                                       |
|                                     | .2 | Cutting of materials by use of torch or other open flame devices                                                                                                   |
|                                     | .3 | Grinding with equipment which produces sparks.                                                                                                                     |
|                                     | .4 | Use of open flame torches such as for roofing work.                                                                                                                |
| <u>1.4 SUBMITTALS</u>               | .1 | Submit copy of Hot Work Procedures and sample of Hot Work permit to Departmental Representative for review, within 14 calendar days of acceptance of bid.          |
|                                     | .2 | Submit in accordance with section 01 33 00.                                                                                                                        |
| <u>1.5 FIRE SAFETY REQUIREMENTS</u> | .1 | Implement and follow fire safety measures during Work. Comply with following:                                                                                      |
|                                     | .1 | National Fire Code.                                                                                                                                                |
|                                     | .2 | Fire Protection Standards FCC 301 and FCC 302.                                                                                                                     |
|                                     | .3 | Federal and Provincial Occupational Health and Safety Acts and Regulations.                                                                                        |
|                                     | .2 | In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent |

requirement, Departmental Representative will advise on the course of action to be followed.

1.6 HOT WORK  
AUTHORIZATION

- .1 Obtain Departmental Representative's written "Authorization to Proceed" before conducting any form of Hot Work on site.
- .2 To obtain authorization submit to Departmental Representative:
  - .1 Contractor's typewritten Hot Work Procedures to be followed on site as specified below.
  - .2 Description of the type and frequency of Hot Work required.
  - .3 Sample Hot Work Permit to be used.
- .3 Upon review and confirmation that effective fire safety measures will be implemented and followed during performance of hot work, Departmental Representative will give authorization to proceed as follows:
  - .1 Issue one written "Authorization to Proceed" covering the entire project for duration of work or;
  - .2 Subdivide the work into pre-determined, individual activities, each activity requiring a separately written authorization to proceed.
- .4 Requirement for individual authorization will be based on:
  - .1 Nature or phasing of work;
  - .2 Risk to Facility operations;
  - .3 Quantity of various trades needing to perform hot work on project or;
  - .4 Other situation deemed necessary by Departmental Representative to ensure fire safety on premises.
- .5 Do not perform any Hot Work until receipt of Departmental Representative's written "Authorization to Proceed" for that portion of work.
- .6 In tenant occupied Facility, coordinate performance of Hot Work with Facility Manager

through the Departmental Representative. When directed, perform Hot Work only during non-operative hours of the Facility. Follow Departmental Representative's directives in this regard.

1.7 HOT WORK  
PROCEDURES

- .1 Develop and implement safety procedures and work practices to be followed during the performance of Hot Work.
- .2 Hot Work Procedures to include:
  - .1 Requirement to perform hazard assessment of site and immediate work area beforehand for each hot work event in accordance with Safety Plan specified in section 01 35 28.
  - .2 Use of a Hot Work Permit system with individually written permit issued by Contractor's Superintendent to specific worker or subcontractor granting permission to proceed with Hot Work.
  - .3 Permit required for each Hot Work event.
  - .4 Designation of a person on site as a Fire Safety Watcher responsible to conduct a fire safety watch for a minimum duration of 60 minutes immediately following the completion of the Hot Work.
  - .5 Compliance with fire safety codes, standards and occupational health and safety regulations specified.
  - .6 Site specific rules and procedures in force at the site as provided by the Facility Manager.
- .3 Generic procedures, if used, must be edited and supplemented with pertinent information tailored to reflect specific project conditions. Label document as being the Hot Work Procedures for this contract.
- .4 Procedures shall clearly establish responsibilities of:
  - .1 Worker performing hot work,
  - .2 Person issuing the Hot Work Permit,
  - .3 Fire Safety Watcher,
  - .4 Subcontractor(s) and Contractor.

- .5 Brief all workers and subcontractors on Hot Work Procedures and of Permit system. Stringently enforce compliance.
- .6 Failure to comply with fire safety procedures may result in the issue of a Non-Compliance notification as specified in Section 01 35 28.

1.8 HOT WORK  
PERMIT

- .1 Hot Work Permit to include the following:
  - .1 Project name and project number;
  - .2 Date of issue;
  - .3 Description of hot work type needed;
  - .4 Special precautions to be followed, including type of fire extinguisher needed;
  - .5 Name and signature of permit issuer.
  - .6 Name of worker to which the permit is issued.
  - .7 Permit validity period not to exceed 8 hours. Indicate start time/date and termination time/date.
  - .8 Worker's signature with time/date of hot work completion.
  - .9 Stipulated time period of safety watch.
  - .10 Fire Safety Watcher's signature with time/date.
- .2 Permit to be typewritten form. Industry Standard forms shall only be used if all data specified above is included on form.
- .3 Each Hot Work Permit to be completed in full, signed and returned to Contractor's Superintendent for safe keeping on site.

1.9 FIRE PROTECTION  
AND ALARM SYSTEMS

- .1 Fire protection and alarm systems shall not be:
  - .1 Obstructed.
  - .2 Shut-off, unless approved by Departmental Representative.
  - .3 Left inactive at the end of a working day or shift.
- .2 Do not use fire hydrants, standpipes and hose systems for purposes other than fire fighting.



- .3 Costs incurred, from the fire department, and Facility owner, resulting from negligently setting off false alarms will be charged to the Contractor in the form of financial progress payment reductions and holdback assessments against the Contract.

1.10 DOCUMENTS  
ON SITE

- .1 Keep Hot Work Permits and Hazard assessment documentation on site for duration of Work.
- .2 Upon request, make available to Departmental Representative or to authorized safety Representative for inspection.

-----END-----

1.1 RELATED WORK .1 Section 01 35 29: Health and Safety

- 1.2 REFERENCES
- .1 CSA C22.1-06 - Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
  - .2 CAN/CSA C22.3 No.1-06 - Overhead Systems.
  - .3 CSA C22.3 No.7-06 - Underground Systems.
  - .4 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.
  - .5 All standard mentioned above shall be of latest edition.

- 1.3 DEFINITIONS
- .1 Electrical Facility: means any system, equipment, device, apparatus, wiring, conductor, assembly or part thereof that is used for the generation, transformation, transmission, distribution, storage, control, measurement or utilization of electrical energy, and that has an amperage and voltage that is dangerous to persons.
  - .2 Guarantee of Isolation: means a guarantee by a competent person in control or in charge that a particular facility or equipment has been isolated.
  - .3 De-energize: in the electrical sense, that a piece of equipment is isolated and grounded, e.g. if the equipment is not grounded, it cannot be considered de-energized (DEAD).
  - .4 Guarded: means that an equipment or facility is covered, shielded, fenced, enclosed, inaccessible by location, or otherwise protected in a manner that, to the extent that is reasonably practicable, will prevent or reduce danger to any person who might touch or go near such item.
  - .5 Isolate: means that an electrical facility, mechanical equipment or machinery is separated or disconnected from every source

of electrical, mechanical, hydraulic, pneumatic or other kind of energy that is capable of making it dangerous.

- .6 Live/alive: means that an electrical facility produces, contains, stores or is electrically connected to a source of alternating or direct current of an amperage and voltage that is dangerous or contains any hydraulic, pneumatic or other kind of energy that is capable of making the facility dangerous to persons.

#### 1.4 COMPLIANCE REQUIREMENTS

- .1 Comply with the following in regards to isolation and lockout of electrical facilities and equipment:
  - .1 Canadian Electrical Code
  - .2 Federal and Provincial Occupational Health and Safety Acts and Regulations.
  - .3 Regulations and code of practice as applicable to mechanical equipment or other machinery being de-energized.
  - .4 Procedures specified herein.
- .2 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Departmental Representative will advise on the course of action to be followed.

#### 1.5 SUBMITTALS

- .1 Submit copy of proposed lockout procedures and sample of lockout permit or lockout tags to Departmental Representative for review, within 14 calendar days of acceptance of bid.
- .2 Submit in accordance with Section 01 33 00.

#### 1.6 ISOLATION OF EXISTING SERVICES

- .1 Obtain Departmental Representative's written authorization prior to working on existing live or active electrical facilities and equipment and before proceeding with isolation of such item.

- .2 To obtain authorization, submit to Departmental Representative the following documentation:
  - .1 Written request to isolate the particular service or facility and;
  - .2 Copy of Contractor's Lockout Procedures.
- .3 Make a Request for Isolation for each event, unless directed otherwise by Departmental Representative, as follows:
  - .1 Fill-out standard form in current use at the Facility as provided by Departmental Representative or;
  - .2 Where no form exists, make written request indicating:
    - .1 The equipment, system or service to be isolated and their location;
    - .2 Duration of isolation period (i.e.: start time & date and completion time & date).
    - .3 Voltage of service feed to system or equipment being isolated.
    - .4 Name of person making the request.
- .4 Do not proceed with isolation until receipt of written notification from Departmental Representative granting the Isolation Request and authorizing to proceed with the work.
  - .1 Note that Departmental Representative may designate another person at the Facility being authorized to grant the Isolation Request.
- .5 Conduct safe, orderly shutdown of equipment or facility. De-energize, isolate and lockout power and other sources of energy feeding the equipment or facility.
- .6 Determine in advance, as much as possible, in cooperation with the Departmental Representative, the type and frequency of situations which will require isolation of existing services.

- .7 Plan and schedule shut down of existing services in consultation with the Departmental Representative and the Facility Manager. Minimize impact and downtime of Facility operations. Follow Departmental Representative's directives in this regard.
- .8 Conduct hazard assessment as part of the process in accordance with health and safety requirements specified Section 01 35 28.

#### 1.7 LOCKOUTS

- .1 De-energize, isolate and lockout electrical facility, mechanical equipment and machinery from all potential sources of energy prior to working on such items.
- .2 Develop and implement clear and specific lockout procedures to be followed as part of the Work.
- .3 Prepare typed written Lockout Procedures describing safe work practices, procedures, worker responsibilities and sequence of activities to be followed on site by workforce to safely isolate an active piece of equipment or electrical facility and effectively lockout and tagout it's sources of energy.
- .4 Include as part of the Lockout Procedures a system of lockout permits managed by Contractor's Superintendent or other qualified person designated by him/her as being "in-charge" at the site.
  - .1 A lockout permit shall be issued to specific worker providing a Guarantee of Isolation before each event when work must be performed on a live equipment or electrical facility.
  - .2 Duties of person managing the permit system to include:
    - .1 Issuance of permits and lockout tags to workers.
    - .2 Determining permit duration.
    - .3 Maintaining record of permits and tags issued.
    - .4 Making a Request for Isolation to

Departmental Representative when required as specified above.

.5 Designating a Safety Watcher, when one is required based on type of work.

.6 Ensuring equipment or facility has been properly isolated.

.7 Collecting and safekeeping lockout tags returned by workers as a record of the event.

.5 Clearly establish, describe and allocate responsibilities of:

.1 Workers.

.2 Person managing the lockout permit system.

.3 Safety Watcher.

.4 Subcontractor(s) and General Contractor.

.6 Generic procedures, if used, must be edited and supplemented with pertinent information to reflect specific project requirements.

.1 Incorporate site specific rules and procedures in force at site as provided by Facility Manager through the Departmental Representative.

.2 Clearly label the document as being the Lockout procedures applicable to work of this contract.

.7 Use energy isolation lockout devices specifically designed and appropriate for type of facility or equipment being locked out.

.8 Use industry standard lockout tags.

.9 Provide appropriate safety grounding and guards as required.

#### 1.8 CONFORMANCE

.1 Brief all workers and subcontractors on requirements of this section. Stringently enforce use and compliance.

- .2 Failure to follow lockouts procedures specified herein may result in the issuance of a Non-Compliance notification as specified in section 01 35 29.

1.9 DOCUMENTS  
ON SITE

- .1 Post Lockout Procedures on site in common location for viewing by workers.
- .2 Keep copies of Request for Isolation forms and lockout permits and tags issued to workers on site for full duration of Work.
- .3 Upon request, make available to Departmental Representative or to authorized safety Representative for inspection.

-----END-----

1.1 RELATED SECTIONS .1 Section 01 35 25: Special procedures on lockout requirements

1.2 SUBMITTALS .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures and copies of the following documents, including updates:

.1 Submit site-specific Health and Safety Plan;

.2 Building permit, compliance certificate and other permits obtained.

.2 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.

.3 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.4 Submit copies of incident and accident reports.

.5 Submit WHMIS MSDS - Material Safety Data Sheets.

.6 Name of contractor's representative designated to perform full time health and safety supervision on site.

1.3 COMPLIANCE REQUIREMENTS

.1 Comply with Occupational Health and Safety Act, for the Province of PEI, and the Occupational Health and Safety Act Regulations made pursuant to the Act.



- .2 Comply with Canada Labour Code - Part II Canada Occupational Safety and Health Regulations made under part II of the Canada Labour Code.
- .3 Observe and enforce construction safety measures required by:
  - .1 National Building Code of Canada;
  - .2 Provincial Worker's Compensation Board;
  - .2 Municipal statutes and ordinances.
- .4 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Departmental Representative will advise on the course of action to be followed.
- .5 A copy of the Canada Labour Code Part II may be obtained by contacting:  
Canadian Government Publishing  
Public Works & Government Services  
Canada  
Ottawa, Ontario K1A 0S9  
Tel: (819) 956-4800 (1-800-635-7943)  
Publication No. L31-85/2000 E or F
- .6 Maintain Workers Compensation Coverage for duration of Contract. Submit letter of good standing to Departmental Representative upon request.

#### 1.4 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to the site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable

federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.5 SITE CONTROL AND ACCESS

- .1 Control work site and entry points to construction areas.
  - .1 Delineate and isolate construction areas from other areas of site by use of appropriate means.
  - .2 Post notices and signage at entry points and at other strategic locations identifying entrance onto site to be restricted to authorized persons only.
  - .3 Signage must be professionally made, bilingual in both official languages or display internationally understood graphic symbols.
- .2 Approve and grant access to site only to workers and authorized persons.
  - .1 Immediately stop non-authorized persons from circulating in construction areas and remove from site.
  - .2 Provide site safety orientation to all persons before granting access. Advise of site conditions, hazards and mandatory safety rules to be observed on site.
- .3 Secure site at night time to extent required to protect against unauthorized entry. Provide security guard where protection cannot be achieved by other means.
- .4 Ensure persons granted access to site wear appropriate personal protective equipment(PPE)suitable to work and site conditions.
  - .1 Provide such PPE to authorized persons who require access to perform inspections or other approved purposes.

- .5 Ensure persons granted access are familiar with the Health and Safety Plan defined in sub-section 1.2

#### 1.6 PROTECTION

- .1 Carry out work placing emphasis on health and safety of the Public, Facility personnel, construction workers and protection of the environment.
- .2 Erect safety barricades, lights and signage on site to effectively delineate work areas, protect pedestrian and vehicular traffic around and adjacent to work and to create a safe working environment.
  - .1 Erect fences, hoarding, protective barriers and temporary lighting as required. See Section 01 56 00 for minimum acceptable barricades.
- .3 Should unforeseen or peculiar safety related hazard or condition become evident during performance of work, immediately take measures to rectify the situation and prevent damage or harm. Advise Departmental Representative verbally and in writing.

#### 1.7 FILING OF NOTICE

- .1 File Notice of Project and other Notices with Provincial authorities prior to commencement of Work.
  - .1 Departmental Representative will assist in locating address for Filing Notice of Project if needed.

#### 1.8 PERMITS

- .1 Post on site permits, licenses, compliance certificates specified in Section 01 10 10.
- .2 Where particular permit or compliance certificate cannot be obtained at the required stage of work, notify Departmental Representative in writing and obtain his/her approval to proceed

before carrying out that portion of work.

1.9 HAZARD ASSESSMENTS

- .1 Conduct site specific health and safety hazard assessment before commencing project and during course of work identifying risks and hazards resulting from site conditions, weather conditions and work operations.
  - .1 Perform on-going assessments addressing new risks and hazards as work progresses including when new sub trade or sub-contractor arrives on site.
  - .2 Also, conduct assessment when the scope of work has been changed by Change Order and when potential hazard or weakness in current health and safety practices are identified by Departmental Representative or by an authorized safety Representative.
- .2 Record results in writing and address in Health and Safety Plan.
- .3 Keep copy of all assessments on site.

1.10 PROJECT/SITE  
CONDITIONS

- .1 The following are known or potential project related health, environmental and safety hazards at the site which must be properly managed if encountered during course of work:
  - .1 There are no known existing hazardous or contaminated building materials on site.
  - .2 Safety hazards due to existing site conditions and conduct of work are:
    - .1 overhead electrical wires
    - .2 tidal waters
    - .3 winter work, freezing conditions (ice, wind and water)
    - .4 unpredictable marine weather and wave conditions
    - .5 sharp or protruding objects
    - .6 heavy vehicle movement

- .7 loading and unloading materials
- .8 moving and working with large and heavy materials
- .9 creosote timber and jagged wharf materials
- .10 working over, near or on the water
- .11 falling in the water
- .12 uneven and jagged travelling and working surfaces
- .13 slippery surface conditions
- .14 slipping and falling
- .15 falling materials
- .16 unknown load carrying ability of structure and access to site
- .17 structure not posted for loads
- .18 structure partially barricaded
- .19 Harbour users, activities and traffic
- .20 pedestrians, vehicles and Harbour operation traffic

- .2 Above list shall not be construed as being complete and inclusive of potential health, and safety hazards encountered during work. Include above items into hazard assessment process.

1.11 HEALTH AND SAFETY MEETINGS

- .1 Attend pre-construction health and safety meeting, conducted by Departmental Representative. Have following persons in attendance:
  - .1 Site Superintendent
  - .2 Contractor's designated Health and Safety Site Supervisor
  - .3 Departmental Representative will advise of date, time and location.
- .2 Conduct health and safety meetings and tool box briefings on site. Hold on a regular and pre-scheduled basis during entire work in accordance with

requirements and frequency as stipulated in provincial occupational health and safety regulations.

.1 Keep workers informed of potential hazards and provide safe work practices and procedures to be followed.

.2 Take written minutes and post on site.

.3 Conduct formal meetings on a minimum monthly basis.

1.12 HEALTH AND SAFETY  
PLAN

.1 Develop written site-specific Project Health and Safety Plan, based on hazard assessments, prior to commencement of work.

.1 Submit copy to Departmental Representative within 7 calendar days of contract award.

.2 Submit updates as work progresses.

.2 Health and Safety Plan shall contain three (3) parts with following information:

.1 Part 1 - Hazards: List of individual health risks and safety hazards identified by hazard assessment process.

.2 Part 2 - Safety Measures: engineering controls, personal protective equipment and safe work practices used to mitigate hazards and risks listed in Part 1 of Plan.

.3 Part 3a: Emergency Response: standard operating procedures, evacuation measures and emergency response in the occurrence of an accident, incident or emergency

.1 Include response to all hazards listed in Part 1 of Plan.

.2 Evacuation measures.

.3 List names and telephone numbers of officials to contact including:

.1 General Contractor and all Subcontractors.

.2 Federal and Provincial Departments as stipulated by laws and regulations and local emergency resource organizations, as needed based on nature of emergency or accident.

.3 Officials from PWGSC and site facility management. Departmental Representative will provide list.

.3 Part 3b: Site Communications:

.1 Procedures used on site to share work related safety issues between workers, subcontractors, and General Contractor.

.2 List of critical tasks and work activities, to be communicated with the Facility Manager, which has risk of affecting tenant operations, or endangering health and safety of Facility personnel and the general public. Develop list in consultation with the Departmental Representative.

.3 Prepare Health and Safety Plan in a three column format, addressing the three parts specified above, as follows:

Column 1	Column 2	Column 3
Part 1	Part 2	Part 3a/3b
Identified	Safety	Emergency Response
Hazards	Measures	Site Communications

.4 Develop Plan in collaboration with subcontractors. Address work activities of all trades. Revise and update Plan as Sub-Contractors arrive on site.

.5 Implement and enforce compliance with requirements of Plan for full duration of work to final completion and demobilization from site.

- .6 As work progresses, review and update Plan. Address additional health risks and safety hazards identified by on-going hazard assessments.
- .7 Post copy of Plan, and updates, on site.
- .8 Submission of the Health and Safety Plan, and updates, to the Departmental Representative is for review and information purposes only. Departmental Representative's receipt review and any comments made of the Plan shall not be construed to imply approval in part or in whole of such Plan by Departmental Representative and shall not be interpreted as a warranty of being complete and accurate or as a confirmation that all health and safety requirements of the Work have been addressed and that it is legislative compliant. Furthermore, Departmental Representative's review of the Plan shall not relieve the Contractor of any of his legal obligations for Occupational Health and Safety provisions specified as part of the Work and those required by provincial legislation.

1.13 SAFETY SUPERVISION  
AND INSPECTION

- .1 Designate one person to be present on site at all times, responsible for supervising health and safety of the work.
  - .1 Person to be competent in Occupational Health and Construction Safety as defined in the Provincial Occupational Health and Safety Act.
- .2 Assign responsibility, obligation and authority to such designated person to stop work as deemed necessary for reasons of health and safety.



- .3 Conduct regularly scheduled informal safety inspections of work site on a minimum bi-weekly basis.
  - .1 Note deficiencies and remedial action taken in a log book or diary.
- .4 Conduct Formal Inspections on a minimum monthly basis.
  - .1 Use standardized safety checklist forms.
  - .2 Prepare written report of each inspection. Document deficiencies, remedial action needed and assign responsibility for rectification to appropriate subcontractor or worker.
  - .3 Distribute monthly reports to subcontractors for their pursuance.
  - .4 Follow-up and ensure appropriate action and corrective measures are taken.
  - .5 Keep inspection reports on site.

#### 1.14 TRAINING

- .1 Ensure that all workers and other persons granted access to site are competently trained and knowledgeable on:
  - .1 Safe use of tools and equipment.
  - .2 How to wear and use personal protective equipment (PPE).
  - .3 Safe work practices and procedures to be followed in carrying out work.
  - .4 Site conditions and minimum safety rules to be observed on site, as given at site orientation session.
- .2 Maintain evidence and records of worker training.

#### 1.15 MINIMUM SITE SAFETY RULES

- .1 Notwithstanding the requirement to abide by federal and provincial health and safety regulations, the following safety rules shall be considered minimum requirements to be obeyed by all persons granted site access:
  - .1 Wear personal protective equipment (PPE) appropriate to function and task on site; the minimum

requirements being hard hat, safety footwear, and eye protection.

.2 Immediately report unsafe activity or condition at site, near-miss accident, injury and damage.

.3 Maintain site in tidy condition.

.4 Obey warning signs and safety tags.

.2 Brief workers on site safety rules and on disciplinary measures to be taken by Departmental Representative for violation or non compliance of such rules. Post rules on site.

.3 The following actions or conduct by Contractor, workers and sub-contractors will be considered as non conformance with the health and safety requirements of the contract for which a Non-Compliance Notification will be issued to the General Contractor by the Departmental Representative.

.1 Failure to follow the minimum site safety rules specified above.

.2 Negligence resulting in serious injury or major property damage.

.3 Deliberate non-compliance with federal and Provincial Acts and Regulations.

.4 Falsification of information in Workers Compensation Reports, safety reports and other health and safety related documents submitted to Departmental Representative or to Authority having jurisdiction.

.5 Possession of firearms on site.

.6 Possession of non-prescriptive illegal drugs or alcohol.

.7 Action, or lack thereof, resulting in the issuance of Warning, Fines or Stop Work Orders from a Provincial Authority having jurisdiction.

.8 Violation of other specified health and safety rules and requirements as determined by Departmental Representative.

.4 See elsewhere in this section for details on Non-Compliance Notifications and resulting disciplinary measures.

1.16 ACCIDENT REPORTING

.1 Investigate and report the following incidents and accidents:

.1 Those as required by Provincial Occupational Safety and Health Act and Regulations.

.2 Injury requiring medical aid as defined in the Canadian Dictionary of Safety Terms - 1987, published by the Canadian Society of Safety Engineers (C.S.S.E.) as follows:

.1 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by province in which the injury was incurred.

.3 Property damage in excess of \$5,000.00.

.4 Interruption to Facility operations with potential loss to a Federal Department in excess of \$5000.00.

.5 Those which require notification to Workers Compensation Board or other regulatory agencies as stipulated by applicable law or regulations.

.2 Send written report to Departmental Representative for all above cases.

1.17 TOOLS AND EQUIPMENT  
SAFETY

.1 Routinely check and maintain tools, equipment and machinery for safe operation.

- .2 Conduct checks as part of site safety inspections. When requested, submit proof that checks and maintenance have been carried out.
- .3 Tag and immediately remove from site items found faulty or defective.
- 1.18 HAZARDOUS PRODUCTS
  - .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS).
  - .2 Keep MSDS data sheets for all products delivered to site. Post on site. Submit copy to Departmental Representative.
- 1.19 BLASTING
  - .1 Blasting or other use of explosives is not permitted.
- 1.20 POWDER ACTUATED DEVICES
  - .1 Use powder actuated fastening devices only after receipt of written permission from Departmental Representative.
- 1.21 POSTING OF DOCUMENTS
  - .1 Post on site a copy of all health and safety documentation and reports specified to be produced as part of the work and received from authorities having jurisdiction.
- 1.22 SITE RECORDS
  - .1 Maintain on Site a copy of all health and safety related documentation and reports specified to be produced as part of the work and received from authorities having jurisdiction.
  - .2 Upon request, make available to Departmental Representative, or authorized Safety Representative, for review. Provide copy when directed by Departmental Representative.
- 1.23 NON COMPLIANCE AND DISCIPLINARY MEASURES
  - .1 Immediately address and correct health and safety violations and non-compliance issues.

- .2 Negligence or failure to follow occupational health and safety provisions specified in the Contract Documents and of those of applicable laws and regulations could result in disciplinary measure taken by the Departmental Representative against the General Contractor.
- .3 PWGSC uses a system of Non-compliance Notifications and Disciplinary Measures on project as follows:
  - .1 A non-compliance notification is issued to the General Contractor, by the Departmental Representative, whenever there is a violation of non compliance of the project's health and safety requirements and of those of Provincial and Federal regulations by any worker, subcontractor or other person to whom the Contractor has granted access to the work site.
  - .2 Non-Compliance notifications are progressive in nature resulting in disciplinary measures imposed depending on the frequency, nature and severity of the infraction.
  - .3 Disciplinary measures could include:
    - .1 Removal of the offending person or party from site;
    - .2 Financial penalties in the form of progress payment reduction or holdback assessments made against the Contract and;
    - .3 Taking the Work out of Contractor's hands in accordance with the General Conditions.
- .4 Departmental Representative will make final decision as to what constitutes a violation and when to issue a Non-Compliance Notification.
- .5 Non-Compliance Notifications issued by Departmental Representative shall not be construed as to overrule or

disregard warning, orders and fines levied against Contractor by a regulatory agency having jurisdiction.

- .6 Each non-compliance notification issued is given a numerical rating based on a three level numbering system. Each level is progressive in nature to reflect:

.1 The seriousness of the infraction as viewed by the Departmental Representative.

.2 The degree of disciplinary action which will be taken by the Departmental Representative.

- .7 Numerical ratings are as follows:

.1 Non-Compliance Notification - Level No. 1 Rating:

.1 Situation: Occurrence of a first time infraction by a person or party on site.

.2 Action: Verbal warning to general contractor, documented in departmental files and copy sent to the general contractor.

.2 Non-Compliance Notification - Level No. 2 Rating:

.1 Situation:

.1 The second occurrence of a previous infraction by the same person or party on site or;

.2 Accumulation of several level-1 notifications for different infractions by the same person or party on site or;

.3 Non-action on the part of the Contractor or subcontractor to rectify non-compliance infractions previously identified in one or several Level-1 notifications or;

.4 Violation or non observance of a Federal or Provincial Safety law or Regulation by

subcontractor or Contractor or;  
.5 Negligence by a person or party resulting in injury or major property damage.

.2 Action: written notice to General Contractor complete with an order for immediate remedial action to be taken. Depending on the severity of the offense, the order may include request for the immediate removal of the offending person or party from site.

.3 Non-Compliance Notification - Level No. 3 Rating:

.1 Situation:

.1 Continued and repeated non-compliance with health and safety requirements by the General Contractor or by subcontractor(s) or;

.2 The occurrence of a serious accident on site resulting in serious bodily or death.

.2 Action:

.1 Formal letter issued to General Contractor with an order to "Immediately Stop Work" until so notified to proceed.

.2 Review of all non compliance and/or accident occurrences in the project with possible investigation by the Department of PWGSC.

.3 Based on outcome of the review/investigation, work could be suspended or taken out of the Contractor's hands in accordance with the General Conditions.

.3 The term "serious accident" used herein shall have the same meaning as defined in the Canadian Dictionary of Safety Terms - 1987 issue from the Canadian Society of Safety Engineers (C.S.S.E.)

- .8 Decision on which rating level to be placed on any given Non-Compliance Notification will be determined solely by Departmental Representative.
- .9 Be responsible to fully brief workers and subcontractors on the operation and importance of this system.

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- 1.1 RELATED WORK .1 Waste Management and Disposal: Section 01 74 21.
- 1.2 DEFINITIONS .1 Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.
- 1.3 FIRES .1 Fires and burning of rubbish on site not permitted.
- .2 Where fires or burning permitted, prevent staining or smoke damage to structures, materials or vegetation which is to be preserved. Restore, clean and return to new condition stained or damaged work. Be responsible for obtaining all necessary burning permits. Be responsible for any damage which may result from such fires.
- .3 Provide supervision, attendance and fire protection measures as directed.
- 1.4 HAZARDOUS MATERIAL HANDLING .1 Store and handle hazardous materials in accordance with applicable federal and provincial laws, regulations, codes and guidelines. Store in location that will prevent spillage into the environment
- .2 Label containers to WHMIS requirements and keep MSDS data sheets on site for all hazardous materials.
- .3 Maintain inventory of hazardous materials and hazardous waste stored on site. List items by product name, quantity and date when storage began.
- .4 Store and handle flammable and combustible materials in accordance

with National Fire Code.

- .5 Transport hazardous materials in accordance with federal Transportation of Dangerous Goods Regulations and applicable Provincial regulations.

1.5 DISPOSAL OF  
WASTES

- .1 Do not bury rubbish and waste materials on site. Dispose in accordance with project waste management requirements specified in section 01 74 21.
- .2 Do not dispose of hazardous waste or volatile materials, such as mineral spirits, paints, thinners, oil or fuel into waterways, storm or sanitary sewers or waste landfill sites.
- .3 Dispose of hazardous waste in accordance with applicable federal and provincial laws, regulations, codes and guidelines.

1.6 DRAINAGE

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with governing regulations and requirements.
- .4 Provide control devices such as filter fabrics, sediment traps and settling ponds to control drainage and prevent erosion of adjacent lands. Maintain in good order for duration of work.

1.7 SITE AND  
PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties where indicated.

- .2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation.
- .5 Restrict tree removal to areas indicated or designated by Departmental Representative.

1.8 WORK ADJACENT  
TO WATERWAYS

- .1 Do not operate construction equipment in waterways.
- .2 Do not use waterway beds for borrow material.
- .3 Do not dump excavated fill, waste material or debris in waterways.
- .4 At borrow sites, design and construct temporary crossings to minimize erosion to waterways in strict conformance with provincial, federal and environmental regulations.
- .5 Do not skid logs or construction materials across waterways.
- .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.
- .7 Do not blast under water or 100 m of spawning beds.
- .8 Do not refuel any type of equipment within 100 meters of a water body.

Maintain equipment in good working condition with no fluid leaks, loose hoses or fittings.

- .9 Construct, install and maintain in-water silt containment devices (silt booms) around the construction site to prevent sediment laden water from seeping out beyond the silt boom. Provide suitable anchors, chairs, and other devices. Maintain and repair silt boom on a regular basis and in a like new condition.

1.9 POLLUTION  
CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this contract.
- .2 Control emissions from equipment and plant to local authorities emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads and around entire construction site.
- .5 Have appropriate emergency spill response equipment and rapid clean-up kit on site located adjacent to hazardous materials storage area. Provide personal protective equipment required for clean-up.
- .6 Report, spills of petroleum and other hazardous materials as well as accidents having potential of polluting the environment to Federal

and Provincial Department of the Environment.

.1 Notify Departmental Representative and submit a written spill report to Departmental Representative within 24 hours of occurrence.

1.10 WILDLIFE  
PROTECTION

.1 Should nests of migratory birds in wetlands be encountered during work, immediately notify Departmental Representative for directives to be followed.

.1 Do not disturb nest site and neighbouring vegetation until nesting is completed.

.2 Minimize work immediately adjacent to such areas until nesting is completed.

.3 Protect these areas by following recommendations of Canadian Wildlife Service.

-----END-----

1.1 WATER QUALITY .1  
MITIGATION

- .1 Visual monitoring of the turbidity near the work site must be undertaken. If any changes occur in the turbidity of the water produced by this activity, the work must be immediately stopped and Mrs. Delephina Keen, Oceans and Habitat Area Chief, DFO, Charlottetown, PE, must immediately be contacted (902) 566-7823. (NOTE: Ms. Delephina Keen must be notified a minimum of 48 hours prior to the commencement of any project works.)
- .2 The construction material used must be clean and non-toxic (free of fuel, oil, grease, and/or any contaminants).
- .3 Any debris entering the marine environment will be immediately retrieved when it is safe to do so.
- .4 All work equipment shall be free from loose petroleum fluid or lubricants harmful to the marine environment.
- .5 Any equipment that has been in the marine environment will be cleaned of any sediments, plants or animals and pressure washed with freshwater and/or sprayed with undiluted vinegar prior to being mobilized, and prior to leaving, the project site.
- .6 To minimize and control the release or resuspension of sediments or contaminants resulting from in-water activities the following measures shall be implemented:
  - .1 Work is scheduled so as to avoid periods of heavy precipitation.
  - .2 Any disturbed areas along the shoreline are to be stabilized to prevent erosion.
- .7 Machinery must be checked for leakage of lubricants or fuel and must be in good working order. Refuelling must be done at least 30 m from any water body and on an impermeable surface. Basic petroleum spill clean-up equipment must be on-site. All spills or leaks must be promptly contained,

cleaned up and reported to the 24-hour environmental emergencies reporting system (1-800-565-1633).

- .8 Machinery and equipment fuel level must be inspected on a daily basis to ensure there is no leakage to the surrounding environment.
- .9 Storage of fuels and petroleum products shall comply with safe operating procedures, including facilities in case of a spill.
- .10 Careful maintenance and monitoring of all equipment must be carried out to minimize the risk of spills or leaks of petroleum based products.
- .11 Do not use creosote, petroleum and pentachlorophenol timbers. Timber treated with Chromate Copper Arsenate (CCA) or Ammoniac Copper Zinc Arsenate (ACZA) must be CSA or AWPA approved. Freshly treated wood should be seasoned for at least 30 days before they are to be in contact with water. All newly treated wood must be treated in accordance with the methods outlined in the most recent Canadian version of the document entitled 'Best Management Practices for the Use of Treated Wood in Aquatic Environments'.

1.2 WASTE  
MANAGEMENT  
MITIGATION

- .1 Any construction or demolition debris will be disposed of in a Provincially approved manner

1.3 NOISE AND  
DISTURBANCE  
MITIGATION

- .1 All machinery shall be well muffled.
- .2 The contractor must supply adequate signage and safety measures during transportation of materials and equipment to the harbor.

1.4 OTHER  
MITIGATION

- .1 During the proposed project activities, if hydrocarbon fumes are detected as a result of soil disturbance in the vicinity of Structure #403/#404, then PWGSC-ES should be contacted for further advice.

- .2 If any material is excavated (i.e. in the vicinity of Structure #403/#404) then the material shall be tested before it leaves DFO-SCH property.
- .3 Workers who may come in contact with hazardous materials or soil must be provided with and use appropriate personal protective equipment.
- .4 Site access must be restricted to authorized workers only.
- .5 Concentrations of seabirds, waterfowl, or shorebirds shall not be approached when anchoring equipment, accessing wharves, or ferrying supplies.
- .6 Contractors shall ensure that food scraps and garbage are not left at the work site.
- .7 All work to be conducted in accordance with the Migratory Birds Convention Act, which outlines that no migratory bird nests or eggs will be moved or obstructed during the construction or operational phase of the project.
- .8 Project vehicles will keep to Harbour Authority/Departmental Representative designated transportation routes.
- .9 No staging of vehicles or equipment/material storage will take place on any beach or dune.
- .10 Employees will be trained in health and safety protocols (e.g. safe work practices, emergency response).
- .11 Any and all federal, provincial, or municipal legislation and regulations and their authorities or their officers must be strictly followed. Any discrepancies must be successfully resolved before the pertinent work may begin.



- .12 Construction will be carried out during daylight hours unless special arrangements are made with the Harbour Authority/Departmental Representative to facilitate work at night.
- .13 Contractor to co-ordinate construction activities with Harbour Authority/Departmental Representative to mitigate any impact to function of Harbour.

-----END-----

1.1 RELATED WORK

- .1 Special Procedures for Traffic Control: Section 01 35 14
- .2 Health and Safety Requirements: Section 01 35 29

1.2 DESCRIPTION OF WORK

- .1 The work of this Section comprises the supply, installation, maintenance and removal of temporary barricades to isolate the work sites, for the work of this Contract, from both public streets and private property.

1.3 MATERIALS

- .1 Barricades:
  - .1 All pedestrian or vehicular traffic control devices required by Municipal Regulations, as interpreted by the Authority having jurisdiction, to safely direct and/or control all traffic in the areas of construction.
  - .2 All pedestrian or vehicular traffic control devices as required to safely direct and/or control all traffic in the areas of construction on the wharf and as directed by the Departmental Representative.

1.4 INSTALLATION

- .1 Erect temporary barricades as directed and where required before any construction work takes place.
- .2 Barricades to remain in place and be maintained by Contractor during entire construction period, except as noted in Par. 1.5 below.

1.5 REMOVAL

- .1 Barricades may be removed in areas of work where all site work restitution is completed and the area has been accepted by the Departmental Representative.

-----END-----

1.1 GENERAL

- .1 Conduct cleaning, dust control and dirt disposal operations during construction to comply with local ordinances and anti-pollution laws.
- .2 Store volatile wastes in covered metal containers, and remove from premises at end of each working day.
- .3 Prevent accumulation of wastes, which create hazardous conditions.
- .4 Provide adequate ventilation during use of volatile or noxious substances.

1.2 MATERIALS

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

1.3 CLEANING DURING CONSTRUCTION

- .1 Maintain the site free from accumulations of waste materials and debris on a daily basis.
- .2 Provide on-site metal containers for collection of waste materials, and debris.
- .3 Remove waste materials and rubbish from site on a daily basis.
- .4 Wash down new paved surfaces as required or directed by Departmental Representative to remove mud, dirt and other debris and also existing paved surfaces where mud and dirt has been tracked on to existing roads from the construction area.
- .5 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 Construction/Demolition Waste Management and Disposal.

1.4 FINAL CLEANING

- .1 Remove grease, dust, dirt, stains, labels, fingerprints and other foreign materials from exposed finished surfaces.
- .2 Broom clean and wash all paved surfaces, rake clean other areas.
- .3 Clean catch basin sediment traps affected by construction activity.

-----END-----

1.1 DEFINITIONS

- .1 Waste Reduction Workplan (WRW): Written report which addresses opportunities for reduction, reuse, or recycling of materials.
- .2 Materials Source Separation Program (MSSP): Consists of a series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .3 Waste Management Coordinator (WMC): Designate individual who is in attendance on-site, full-time. Designate, or have designated, individuals from each Subcontractor to be responsible for waste management related to their trade and for coordinating activities with WMC.
- .4 Separate Condition: Refers to waste sorted into individual types.

1.2 DOCUMENTS

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

1.3 USE OF WORK SITES  
AND FACILITIES

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

1.4 SUBMITTAL

- .1 Submit requested submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare and submit the following submittals prior to project start-up:
  - .1 Submit 2 copies of completed Waste Reduction Workplan (WRW).

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.2 Submit 2 copies of Materials Source Separation Program description.

1.5 WASTE REDUCTION  
WORKPLAN

- .1 Prepare WRW prior to project start-up.
- .2 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
- .3 Describes management of waste.
- .4 Identify opportunities for reduction, reuse, and/or recycling (3Rs) of materials. Based on information acquired from WA.
- .5 Post workplan or summary where workers at site are able to review its content.

1.6 MATERIALS SOURCE  
SEPARATION PROGRAM

- .1 Prepare MSSP and have ready for use prior to project start-up.
- .2 Implement MSSP for waste generated on project in compliance with approved methods and as approved by Departmental Representative.
- .3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and/or recyclable materials.
- .4 Provide containers to deposit reusable and/or recyclable materials.
- .5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
- .6 Locate separated materials in areas which minimize material damage.
- .7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition. Transport to

approved and authorized recycling facility to users of material for recycling.

- .8 Collect, handle, store on-site, and transport off-site, salvaged materials in combined condition. Ship materials to site operating under Certificate of Approval premises of Departmental Representative. Materials must be immediately separated into required categories for reuse of recycling.

1.7 WASTE PROCESSING  
SITES

- .1 Province of Prince Edward Island
  - .1 Name: Island Waste Management Corporation
  - .2 Telephone: 1-888-280-8111
  - .3 Fax: 1-902-436-8401

- .2 Burning of waste is not permitted.

1.8 DISPOSAL OF WASTES

- .1 Burying of rubbish and waste materials is prohibited unless approved by Departmental Representative.
- .2 Disposal of waste volatile materials mineral spirits oil paint thinner into waterways, storm, or sanitary sewers is prohibited.

1.9 STORAGE, HANDLING  
AND PROTECTION

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.
- .2 Unless specified otherwise, materials for removal do become Contractor's property.
- .3 Protect, stockpile, store and catalogue salvaged items.
- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

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

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

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

#### 1.10 SCHEDULING

.1 Coordinate work with other activities at site to ensure timely and orderly progress of the work.

#### 1.11 APPLICATION

.1 Do work in compliance with WRW.

.2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

#### 1.12 CLEANING

.1 Remove tools and waste materials on completion of work, and leave work area in clean and orderly condition.

.2 Clean-up work areas as work progresses.

.3 Source separate materials to be reused/recycled into specified sort areas.

#### 1.13 DIVERSION OF MATERIALS

.1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, to approval of Departmental Representative, and consistent with applicable fire regulations. Mark containers or stockpile areas. Provide instruction on disposal practices.

.2 On-site sale of salvaged recovered reusable recyclable materials is permitted is not permitted.



.3 Demolition Waste

Material Type	Recommended Diversion%	Actual Diversion%
Metals	100	
Rubble	100	
Wood (treated)	100	
Other		

.4 Construction Waste

Material Type	Recommended Diversion%	Actual Diversion%
Cardboard	100	
Plastic Packaging	100	
Rubble	100	
Steel	100	
Wood (uncontaminated)	100	
Other		

1.14 WASTE REDUCTION  
WORKPLAN

(1) Material Category	(2) Persons Responsible	(3) Total Quantity of Waste (Unit)	(4) Actual Reused Amount (Units)	(5) Actual Recycled Amount (Unit)	(6) Material Destination Projected
Wood and Plastic Material Descrip. Chutes Warped Pallet Forms Plastic Packaging Cardboard Packaging Other					
Doors and Windows Material Descrip. Painted Frames Glass Wood Metal Other					

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1.15 CANADIAN	.1	Province: Prince Edward Island
GOVERNMENT DEPARTMENTS		Department of Fisheries, Aquaculture
CHIEF RESPONSIBILITY		and Environment, 11 Kent Street, PO
<u>FOR THE ENVIRONMENT</u>		Box 2000, Charlottetown, PEI C1A 7N8
		General Inquiries: (902) 368-5000 Fax:
		(902) 368-5830

-----END-----

1.1 RELATED WORK

- .1 Health and Safety Requirements: Section 01 35 29
- .2 Temporary Barriers and Enclosures: Section 01 56 00

1.2 DESCRIPTION OF WORK

- .1 The work of this Section comprises the furnishing of all labour, materials and equipment necessary for all demolition work required to complete the Work of this Contract in accordance with the requirements of this Section and as shown on the Drawings, which includes, but is NOT necessarily limited to:
  - .1 Removal of existing precast concrete wall panels,
  - .2 Removal of existing curb, pile caps, bracing, walls, piles, and other wharf components indicated to be removed on plans.
  - .3 Removal and reinstatement of site services, electrical, derricks, etc. which are located on or behind the existing wharf.

1.3 PROTECTION

- .1 Protect existing items designated to remain. In event of damage, immediately replace such items or make repairs to approval of Departmental Representative and at no additional cost to the Owner.
- .2 Prevent movement, settlement or damage of adjacent utilities and structures. Provide bracing, shoring and underpinning required. Make good damage and be liable for injury caused by demolition.
- .3 If safety of structure being demolished or adjacent structure appear to be endangered, cease operations and notify Departmental Representative. Take precautions to support structures.

1.4 SAFETY CODE

- .1 Carry out demolition work in accordance with ALL applicable codes and regulations and as outlined in Section 01 35 29 Health and Safety Requirements.

- |                                      |    |                                                                                                                                                                                                                                                  |
|--------------------------------------|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>1.5 MEASUREMENT FOR PAYMENT</u>   | .1 | Demolition and removal of all items indicated shall be paid as a lump sum.                                                                                                                                                                       |
| <u>1.6 PREPARATION</u>               | .1 | Inspect site and verify items designated for removal and items to be preserved.                                                                                                                                                                  |
|                                      | .2 | Locate and protect all utility services.                                                                                                                                                                                                         |
|                                      | .3 | Protect and provide temporary shoring to existing wharf structure and adjacent structures prior to and during the execution of work.                                                                                                             |
|                                      | .4 | Any damage to existing structures and utilities and services shall be immediately repaired to the satisfaction of the Departmental Representative and Owner.                                                                                     |
| <u>1.7 REMOVAL OF SALVAGED ITEMS</u> | .1 | Remove items designated for salvage and stockpile on site as designated by Departmental Representative. The Departmental Representative is responsible for the removal of these items off site at its convenience.                               |
|                                      | .2 | Items not designated for salvage and re-use shall be removed and dispose of off-site.                                                                                                                                                            |
| <u>1.8 DISPOSAL OF MATERIAL</u>      | .1 | Dispose of all removed materials off-site.                                                                                                                                                                                                       |
|                                      | .2 | Pay all fees that may be charged to dispose of materials at licensed disposal sites.                                                                                                                                                             |
|                                      | .3 | Remove all soil contaminated with oil, gasoline, calcium chloride or other toxic or dangerous materials and dispose of in manner to minimize danger at site and to a location off site approved by Provincial Authority governing such disposal. |
| <u>1.9 RESTORATION</u>               | .1 | Upon completion of work, remove debris, trim surfaces and leave work site clean.                                                                                                                                                                 |

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- .2 Reinstall areas and existing works  
outside areas of demolition to  
conditions that existed prior to  
commencement of work.

-----END-----

## **PART 1 - GENERAL**

- 1.1 MEASUREMENT FOR PAYMENT .1 No measurement will be made under this Section. Include costs in items of work for which concrete formwork and falsework are required.
- 1.2 RELATED SECTIONS .1 Section 03 20 00 - Concrete Reinforcing.
- .2 Section 03 30 00 - Cast-in-Place Concrete
- 1.3 REFERENCES .1 Canadian Standards Association (CSA)
- .1 CAN/CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
- .2 CAN/CSA-O86.1, Engineering Design in Wood (Limit States Design).
- .3 CSA 0121-M1978, Douglas Fir Plywood.
- .4 CSA 0151-M1978, Canadian Softwood Plywood.
- .5 CSA 0153-M1980, Poplar Plywood.
- .6 CAN3-0188.0-M78, Standard Test Methods for Mat-Formed Wood Particleboards and Waferboard.
- .7 CSA 0437 Series-93, Standards for OSB and Waferboard.
- .8 CSA S269.1-M1975, Falsework for Construction Purposes.
- .9 CAN/CSA-S269.3-M92, Concrete Formwork.
- 1.4 SHOP DRAWINGS .1 Submit shop drawings for formwork and falsework in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings.

.3 Indicate sequence of erection and removal of formwork/falsework as directed by Departmental Representative.

.4 Each shop drawing submission shall bear stamp and signature of qualified professional engineer registered or licensed in Province of PEI, Canada.

#### 1.5 QUALITY CONTROL

.1 Pre-Pour Meeting  
.1 Attend a quality control meeting including all relevant sub-trades to review the quality of the formwork reinforcement installation, exposed concrete finishes, under floor services, pour sequence and related issues.

#### 1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 Waste Management and Disposal.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal.

.4 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

.1 Formwork materials:  
.1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-0121.  
.2 For concrete with special architectural features, use formwork materials to CAN/CSA-A23.1.

- .2 Form ties:
  - .1 High tensile strength fiberglass ties (Guenette) fixed or adjustable length free of devices leaving holes larger than 25mm diameter in concrete surface.
- .3 Form release agent: non-toxic, chemically active release agents containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing concrete from sticking to forms.
- .4 Falsework materials: to CSA-S269.1.

### **PART 3 - EXECUTION**

#### **3.1 FABRICATION AND ERECTION**

- .1 Examine lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Hand trim sides and bottoms of excavation and remove loose earth from earth forms before placing concrete.
- .3 Fabricate and erect falsework in accordance with CSA S269.1 and COFI Exterior Plywood for Concrete Formwork.
- .4 Do not place shores and mud sills on frozen ground.
- .5 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CAN/CSA-A23.1.
- .6 Align form joints and make watertight. Keep form joints to minimum.



- .7 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.
- .8 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .9 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections. Assure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .10 Clean formwork in accordance with CAN/CSA-A23.1, before placing concrete.

### 3.2 REMOVAL AND RESHORING

- .1 Leave formwork in place for following minimum periods of time after placing concrete:
  - .1 3 days for walls and sides of beams.
  - .2 3 days for columns.
  - .3 28 days for beam soffits, slabs, decks and other structural members, or 7 days when replaced immediately with adequate shoring to standard specified for falsework.
  - .4 3 days for footings and abutments.
- .2 Remove formwork when concrete has reached 80% of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.
- .3 Provide all necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.

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

-----END-----

**PART 1 - GENERAL**

1.1 MEASUREMENT FOR  
PAYMENT

- .1 No measurement will be made under this Section. Include costs in items of work for which concrete formwork and falsework are required.

1.2 RELATED SECTIONS

- .1 Section 03 10 00 - Concrete Forming and Accessories.
- .2 Section 03 30 00 - Cast-in-Place Concrete

1.3 REFERENCES

- .1 American Concrete Institute (ACI)
  - .1 ACI 315R-80, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure.
- .2 American National Standards Institute American Concrete Institute (ANSI/ACI)
  - .1 ANSI/ACI 315-80, Details and Detailing of Concrete Reinforcement.
- .3 American Society for Testing and Materials (ASTM)
  - .1 ASTM A775/A775M-91c, Specification for Epoxy-Coated Reinforcing Steel Bars.
- .4 Canadian Standards Association (CSA)
  - .1 CAN/CSA-A23.1-94, Concrete Materials and Methods of Concrete Construction.
  - .2 CAN3-A23.3-94, Design of Concrete Structures for Buildings.
  - .3 CSA G30.3-M1983 (R1991), Cold Drawn Steel Wire for Concrete Reinforcement.
  - .4 CSA G30.5-M1983(R1991), Welded Steel Wire Fabric for Concrete Reinforcement.
  - .5 CSA G30.14-M1983 (R1991), Deformed Steel Wire for Concrete Reinforcement.
  - .6 CSA G30.15-M1983 (R1991), Welded Deformed Steel Wire Fabric for Concrete Reinforcement.

.7 CAN/CSA-G30.18-M92, Billet-Steel Bars for Concrete Reinforcement.

.8 CAN/CSA-G40.21-M92, Structural Quality Steels.

.9 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.

.10 CSA W186-M1990, Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.4 SOURCE QUALITY CONTROL

.1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to commencing reinforcing work.

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

1.5 SHOP DRAWINGS

.1 Submit shop drawings including placing of reinforcement in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings. Indicate sizes, spacings and locations of chairs, spacers and hangers. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada.

.3 Design detail lap lengths and bar development lengths to CAN3-A23.3, unless otherwise indicated. Provide type A tension lap splices where indicated.

- .4 Each drawing shall bear the signature and stamp of qualified professional engineer registered to practice in Prince Edward Island.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Dispose of waste materials in appropriate on-site bins in accordance with Waste Management Plan, Section 01 74 21.

**PART 2 - PRODUCTS**

2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Departmental Representative.
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.
- .3 Cold-drawn annealed steel wire ties: to CSA G30.3.
- .4 Welded steel wire fabric: to CSA G30.5. Provide in flat sheets only.
  - .1 All 152 x 152 MWE x 18.7 x 18.7
- .5 Chairs, bolsters, bar supports, spacers: to CAN/CSA-A23.1. Chairs and bar supports shall be plastic on stainless steel.
- .6 Mechanical splices: subject to approval of Departmental Representative.
- .7 Plain Round Bars: to CAN/CSA-G40.21.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.

- .2 Obtain Departmental Representative's approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

### **PART 3 - EXECUTION**

#### **3.1 FIELD BENDING**

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.
- .2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
- .3 Replace bars which develop cracks or splits.

#### **3.2 PLACING REINFORCEMENT**

- .1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CAN/CSA-A23.1.
- .2 Use plain round bars as slip dowels in concrete. Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint. When paint is dry, apply a thick even film of mineral lubricating grease.
- .3 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .4 Ensure cover to reinforcement is maintained during concrete pour.

- .5 Provide concrete half-bricks to support welded wire mesh in proper position in floor slabs during placing of concrete.

3.3 FIELD TOUCH-UP

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

-----END-----

**PART 1 - GENERAL**

1.1 MEASUREMENT FOR  
PAYMENT

- .1 Cast-in-place concrete supplied and installed under this contract will be measured for payment by the cubic metre. Include costs in items of work for which concrete formwork and falsework, reinforcing rebar, sleeves, and other miscellaneous items are required.

1.2 RELATED SECTIONS

- .1 Section 03 10 00 - Concrete Forming and Accessories
- .2 Section 03 20 00 - Concrete Reinforcing

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
  - .1 ASTM C109/C109M-95, Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 in. or 50mm Cube Specimens).
  - .2 ASTM C 260-94, Specification for Air-Entraining Admixtures for Concrete.
  - .3 ASTM C 309-94, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
  - .4 ASTM C 332-87(1991), Specification for Lightweight Aggregates for Insulating Concrete.
  - .5 ASTM C 494-92, Specification for Chemical Admixtures for Concrete.
  - .6 ASTM C 827-95a, Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures.
  - .7 ASTM C 939-94a, Test Method for Flow of Grout for Preplaced-Aggregate Concrete.
  - .8 ASTM D1751-83(1991), Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).



.9 ASTM D1752-83(1992),  
Specification for Preformed Sponge  
rubber and Cork Expansion Joint  
Fillers for Concrete Paving and  
Structural Construction.

.2 Canadian General Standards Board  
(CGSB):

.1 CAN/CGSB-51.34-M86, Vapour  
Barrier, Polyethylene Sheet for Use in  
Building Construction.

.3 Canadian Standards Association (CSA)

.1 CAN/CSA-A5-93 Portland Cement.

.2 CAN/CSA-A23.1, Concrete Materials  
and Methods of Concrete Construction.

.3 CAN/CSA-A23.2, Methods of Test  
for Concrete.

.4 CAN/CSA-A23.5-M86(R1992),  
Supplementary Cementing Materials.

.5 CAN/CSA A363-M88(R1996),  
Cementitious Hydraulic Slag.

#### 1.4 CERTIFICATES

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

.2 Provide certification that mix  
proportions selected will produce  
concrete of quality, yield and  
strength as specified in concrete  
mixes, and will comply with CAN/CSA-  
A23.1.

.3 Provide certification that plant,  
equipment, and materials to be used in  
concrete comply with requirements of  
CAN/CSA-A23.1.

#### 1.5 TESTING AND INSPECTION

.1 Testing and inspection of concrete and  
concrete materials will be carried out  
by testing laboratory engaged and paid  
by the Contractor. Frequency of tests  
will be determined by the testing  
laboratory

- .2 Remove defective concrete and embedded debris and repair as directed by Departmental Representative.

1.6 QUALITY ASSURANCE

- .1 Pre Pour Meeting:
  - .1 Convene a pre-pour meeting 2 weeks prior to beginning concrete works.
  - .2 Ensure concrete forming, finishing and concrete supplier personnel, attend.
  - .3 Verify project requirements.
  - .4 Review all aspects of the work including construction sequence, access to work by other Trade Contractors, Quality of falsework for trueness to dimensions, quality of finish expected at exposed concrete and all other aspects of the work.
- .2 Submit to Departmental Representative, minimum 4 weeks prior to starting concrete work, valid and recognized certificate from plant delivering concrete.
- .3 Minimum 4 weeks prior to starting concrete work, submit proposed quality control procedures for review by Departmental Representative on following items:
  - .1 Falsework erection
  - .2 Hot weather concrete
  - .3 Cold weather concrete
  - .4 Curing
  - .5 Finishes
  - .6 Formwork removal
  - .7 Joints

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Dispose of waste material in appropriate on-site bins in accordance with Waste Management Plan, Section 01 74 21.
- .2 Designate a cleaning area for tools and concrete trucks to limit water use and runoff.

- .3 Carefully coordinate the specified concrete work with weather conditions.
- .4 Ensure emptied containers are sealed and stored safely for disposal.
- .5 Prevent plasticizers, water-reducing agents and air-entraining agents from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with an inert, noncombustible material and remove for disposal. Dispose of all waste in accordance with applicable local, provincial and national regulations.
- .6 Choose least harmful, appropriate cleaning method which will perform adequately.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- .1 Portland cement: to CAN/CSA-A5.
- .2 Blended hydraulic cement: to CSA A362-98
- .3 Supplementary cementing materials: to CAN/CSA-A23.5.
- .4 Cementitious hydraulic sag: to CAN/CSA-A363.
- .5 Water: to CAN/CSA-A23.1.
- .6 Aggregates: to CAN/CSA-A23.1. Coarse aggregates to be normal density.
- .7 Air entraining admixture: to ASTM C 260.
- .8 Chemical admixtures: to ASTM C 494. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.

- .9 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents.
  - .1 Compressive strength: 50 MPa at 28 days.
  - .2 Consistency:
    - .1 Fluid: to ASTM C 827. Time of efflux through flow cone (ASTM C939), under 30s.
    - .2 Flowable: to ASTM C 827. Flow table, 5 drops in 3s, (ASTM C109, applicable portion) 125 to 145%.
    - .3 Plastic: to ASTM C 827. Flow table, 5 drops in 3 s, (ASTM C109, applicable portions) 100 to 125 %.
    - .4 Dry pack to manufacturer's requirements.
  - .3 Net shrinkage at 28 days: maximum 0%.
- .10 Curing compound: to CAN/CSA-A23.1 white and to ASTM C 309, Type 1-chlorinated rubber.
- .11 Premoulded joint fillers:
  - .1 Bituminous impregnated fiber board: to ASTM D 1751.
- .12 Weep hole tubes: PVC on galvanized steel.
- .13 Dovetail anchor slots: minimum 0.6 mm thick galvanized steel with insulation filled slots.
- .14 Dampproofing:
  - .1 Emulsified asphalt, mineral colloid type, unfilled to: CAN/CGSB-37.2.
- .15 Polyethylene film: 6 mil and 10 mil thickness to CAN/CGSB-51.34.

- .16 Joint Sealer: chemical curing, multi-component, Class B, Type I for horizontal joints, Type II for vertical joints to CAN/CGSB 19.24.

## 2.2 MIXES

- .1 Proportion normal density concrete in accordance with CAN/CSA-A23.1. Alternative 1 to give the following properties:
  - .1 All Concrete:
    - .1 Cement: use Type 10 Portland Cement. M/N cement coated 386 kg/m<sup>3</sup> of concrete.
    - .2 Minimum compressive strength at 28 days: 35 MPa
    - .3 Class of exposure: C-1
    - .4 Nominal size of coarse aggregate: 20mm all except 10mm for concrete mix for longitudinal joints between precast panels and for overlay.
    - .5 Slump at point and time of discharge: Mass Concrete 40mm +/-20 & Structural Concrete 80mm +/-20
    - .6 Air content: 5-8% and to Table 4.
  - .2 Provide certification that plant, equipment, and all materials to be used in concrete comply with the requirements for CAN/CSA-A23.1.
  - .3 Use of calcium chloride not permitted.

## 2.3 ADMIXTURES

- .1 Admixtures will be permitted only to correct deficiency in mixture or to make correct placement requirements as recommended by Testing Laboratory and approved by Departmental Representative.
- .2 Use of accelerating admixtures, if approved by Departmental Representative, will not relax cold

weather placement requirements of  
CAN/CSA-A23.1. Use of calcium  
chloride not permitted.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- .1 Obtain Departmental Representative's approval before placing concrete. Provide 24 hours notice prior to placing of concrete.
- .2 Pumping of concrete will be permitted. Place concrete in accordance with CAN/CSA-A23.1 to meet all requirements of mix design at point of placement.
- .3 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .4 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .5 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .6 In locations where new concrete is dowelled to existing work, drill holes in existing concrete. Place steel dowels of deformed steel reinforcing bars and pack solidly with shrinkage compensating grout to anchor and hold dowels in positions as indicated.
- .7 Do not place load upon new concrete until authorized by Departmental Representative.

#### **3.2 CONSTRUCTION**

- .1 Do cast-in-place concrete work in accordance with CAN/CSA-A23.1.
- .2 Sleeves and inserts.

- .1 No sleeves, ducts, pipes or other openings shall pass through joists, beams, column capitals or columns, except where indicated or approved by Departmental Representative.
- .2 Where approved by Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 x 100 mm not indicated, must be approved by Departmental Representative.
- .3 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of modifications from Departmental Representative before placing of concrete.
- .4 Check locations and sizes of sleeves and openings shown on drawings.
- .3 Anchor bolts.
  - .1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.
- .4 Drainage holes and weep holes:
  - .1 Form weep holes and drainage holes in accordance with Section 03 10 00 - Concrete Forming and Accessories. If wood forms are used, remove them after concrete has set.
  - .2 Install weep hole tubes and drains as indicated.
- .5 Dowels: In locations where new concrete is dowelled to existing concrete drill holes in existing concrete to depths, diameters and spacing indicated and install dowels using natural aggregate grout mixed to flow consistency to suit application, in strict accordance with manufacturers instructions.

- .6 Placing Grout: Place shrinkage compensating grout under base plates for structural steel and other equipment, using procedures in accordance with manufacturer's recommendations which result in 100% contact over grouted area.
- .7 Finishing.
  - .1 Finish concrete in accordance with CAN/CSA-A23.1 with final finishing as follows:
    - .1 Foundation walls: ensure that all form ties, etc are cut back to minimum 15mm below surface and depressions packed with cement mortar. Remove fins and other projections on exterior face to provide smooth surface for installation of membrane waterproofing, dampproofing, insulation or polyethylene slip sheet, as applicable at exterior and insulation on interior.
    - .2 Rub exposed edges of concrete with Carborundum to produce 3mm radius edges unless otherwise detailed:
- .8 Joint Fillers
  - .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Departmental Representative. When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
  - .2 Locate and form isolation joints as indicated. Install joint filler.



3.3 FIELD QUALITY  
CONTROL

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Departmental Representative in accordance with CAN/CSA-A23.1.
- .2 Departmental Representative will pay for costs of tests as specified.
- .3 Departmental Representative will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .4 Non-destructive Methods for Testing Concrete shall be in accordance with CAN/CSA-A23.2.
- .5 Inspection or testing by Departmental Representative will not augment or replace Contractor quality control nor relieve him of his contractual responsibility.

3.4 DEFECTIVE CONCRETE

- .1 Remove defective concrete and repair s directed by Departmental Representative.

3.5 SITE TOLERANCE

- .1 Concrete tolerance in accordance with CAN/CSA-A23.1 straight edge method.

-----END-----

**PART 1 - GENERAL**

- 1.1 RELATED SECTIONS .1 Section 03 30 00 - Cast-in-Place Concrete.
- 1.2 MEASUREMENT FOR PAYMENT .1 Precast elements will be measured in cubic metres place measure for elements incorporated in this Work, and will include cost, supply, delivery, storage and erection of anchorage system, removal and patching of erection devices, transverse connections, and field grouting of grout keys between precast members.
- 1.3 REFERENCES .1 American Society for Testing and Materials International (ASTM):  
.1 ASTM A775/A775M-01, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.  
.2 ASTM C494/C494M-99a, Standard Specification for Chemical Admixtures for Concrete.
- .2 Canadian General Standards Board (CGSB)  
.1 CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.  
.2 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
- .3 Canadian Standards Association (CSA)  
.1 CAN/CSA-A23.1/A23.2-00, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.  
.2 CAN3-A23.3, Design of Concrete Structures.  
.3 CAN/CSA 23.4/A251-00, Precast Concrete - Materials and Construction/Qualification Code for Architectural and Structural Precast Concrete Products.  
.4 CAN/CSA-G30.18-M92 (R1998), Billet-Steel Bars for Concrete Reinforcement.

.5 CAN/CSA-G164-M92 (R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.

40.20/G40.21, General

.6 CSA-G279-M1982 (R1998), Steel for Prestressed Concrete Tendons (Metric Version).

.7 CSA-W59-M1989 (R2001), Welded Steel Construction (Metal Arc Welding (Metric Version)).

.8 CSA-W186-M1990 (R1998), Welding of Reinforcing Bars in Reinforced Concrete Construction.

.4 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S701-01, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

#### 1.4 DESIGN REQUIREMENTS

.1 Design precast elements to CSA A23.3 and to resist handling, stockpiling, shipping and erection stresses.

.2 Design lifting devices and attachments to precast elements to safely carry load/forces specified by Departmental Representative.

.3 Design precast elements to carry loads indicated, in accordance with NBCC. Design shall include resistance to creep, shrinkage and temperature effects, as well as wind and earthquake loads.

#### 1.5 PERFORMANCE REQUIREMENTS

.1 Tolerance of precast elements to CAN/CSA-A23.4/A251.

.2 Length of precast elements not to vary from design length by more than plus or minus 15mm.

#### 1.6 SUBMITTALS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

- .2 Submit Shop Drawings to CAN/CSA-A23.4/A251 and CSA-A23.3. Include the following items:
  - .1 Design calculations for items designed by manufacturer.
  - .2 Tables and bending diagrams of reinforcing steel.
  - .3 Camber.
  - .4 Finishing schedules.
  - .5 Methods of handling and erection.
  - .6 Openings, sleeves, inserts and related reinforcement. Including embedded handling hardware.
- .3 Each drawing submitted shall bear stamp and signature of qualified professional engineer registered or licensed in Province of Prince Edward Island, Canada.

#### 1.7 QUALIFICATIONS

- .1 Provide Departmental Representative with certified copies of quality control tests and inspection related to project as specified in CAN3-A23.4 and CSA G279.
- .2 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel supplied, showing physical and chemical analysis.
- .3 Welding companies certified to CSA-W47.1.

#### 1.8 DELIVERY, STORAGE AND PROTECTION

- .1 Accept full responsibility for delivery, handling and storage of units.
- .2 Deliver, handle, and store precast units in a newar vertical plane at all times, and by methods approved by the manufacturer. Do not permit units to contact earth or staining either stored or in transit or to rest on corners.

1.9 WARRANTY

- .1 The Contractor hereby warrants that the precast architectural elements will not spall or show visible evidence of cracking, except for normal hairline shrinkage cracks, in accordance with General Conditions.

1.10 WASTE MANAGEMENT  
AND DISPOSAL

- .1 Dispose of waste material in appropriate on-site bins in accordance with Waste Management Plan, Section 01 74 21.
- .2 Unused paints, sealers, plasticizers, water-reducing agents and air-entraining agents must be disposed of at an official hazardous material collections site.

**PART 2 - PRODUCTS**

2.1 MATERIALS

- .1 Cement, aggregates, water, admixtures: to CAN/CSA-A23.4/A251 and CAN/CSA-A23.1/A23.2.
- .2 Use same brands and source of cement and aggregate for entire project to ensure uniformity of colouration and other mix characteristics.
- .3 Reinforcing steel: to CAN/CSA-A23.4.
- .4 Prestressing steel: to CAN/CSA-S6 and CSA G279.
- .5 Forms: to CAN/CSA-A23.4/A251.
- .6 Hardware and miscellaneous materials: to CAN/CSA-A23.1/A23.2.
- .7 Anchors and supports: to CAN/CSA G40.20/G40.21, Type 350, primed after fabrication. For connecting double tee flange to flange to be stainless steel type 304L.
- .8 Welding materials: to CSA-W48.

- .9 Galvanizing: hot dipped galvanizing with minimum zinc coating of 610 g/m<sup>2</sup> to CAN/CSA-G164.
- .10 Steel primer: to CAN/CGSB-1.40.
- .11 Air entrainment admixtures: to CSA-A266.4
- .12 Bearing pads: neoprene, 60 durometer hardness to ASTM D2240, and 17 MPa minimum tensile strength to ASTM D412, moulded to size or cut from moulded sheet.
- .13 Shims: hot dripped galvanized steel.
- .14 Zinc-rich primer: to CAN/CGSB-1.181.
- .15 Surface retardent: to ASTM C494/C494M, low VOC, solvent free. Do not allow moisture of any kind to come in contact with the retarder film.
- .16 Weephole tubes: purpose made PVC on galvanized steel
- .17 Use compatible additives and admixtures.

## 2.2 CONCRETE MIXES

- .1 Unless otherwise noted or specified, use concrete mix design to produce a minimum of 35 MPa compressive cylinder strength at 28 days, with a maximum water/cement ratio of 0.4 to CSA A23.4. Minimum cement content of 360 Kg/M<sup>3</sup>.
- .2 Air Entrapment of Concrete Mix: 6.8%, Refer to CSA A23.4.
- .3 Use of calcium chloride not permitted.

## 2.3 GROUT MIXES

- .1 Minimum compressive strength: 50 MPa.

- .2 Shrinkage compensating grout: to  
Section 03 30 00 - Cast-in-Place  
Concrete.

#### 2.4 FABRICATION

- .1 Manufacture units in accordance with  
CAN/CSA-A23.4/A251.
- .2 Mark each precast unit to correspond  
to identification mark on shop  
drawings for location with date cast  
on part of unit which will not be  
exposed.
- .3 Design and attach anchors and inserts  
to precast concrete elements to carry  
design loads.
- .4 Shop prime anchors after fabrication  
and touch up primer on anchors after  
welding. Do not apply primer to  
embedded portion of anchors or  
inserts.
- .5 Galvanize anchors after fabrication  
and touch up with zinc-rich primer  
after welding.

#### 2.5 SOURCE QUALITY CONTROL

- .1 Provide Departmental Representative  
with certified copy of quality control  
tests related to this project as  
specified in CAN3-A23.4.
- .2 Provide records from in-house quality  
control programme based upon plant  
certification requirements to  
Departmental Representative for  
inspection and review.

#### 2.6 CURING

- .1 Cure and protect concrete in  
accordance with the requirements of  
CAN/CSA A23.1-00.  
Standard of Acceptance: Master  
Builders "Master-Kure-1000W" or  
approved equal.
- .2 Apply in strict accordance with  
manufacturer's instructions and at

rate recommended by manufacturer to meet moisture-retention requirements for ASTM C309.

- .3 Use compatible additives, admixtures, curing and sealing compounds.

## 2.7 SEALING

- .1 Seal concrete using:
  - .1 Liquid type, water based silane sealer.  
Standard of Acceptance: ChemRex "Hydrozo"
  - .2 Boiled linseed oil meeting requirements of ASTM D-26-58T cut back with kerosene to form a 50/50 mixture.
- .2 Thirty (30) days after application of the curing compound apply two coats of sealing compound using linseed oil/kerosene mixture. Apply second coat one week after the first application using the same mix.

## PART 3 - EXECUTION

### 3.1 ERECTION

- .1 Erect precast elements within allowable tolerances as specified.
- .2 Non-cumulative erection tolerances in accordance with CAN/CSA-A23.4/A251.
- .3 Set elevations and alignment between units to within allowable tolerances before connecting units.
- .4 Fasten precast panels in place as indicated on reviewed shop drawings.
- .5 Secure bolts with lockwashers.
- .6 Uniformly tighten bolted connections with torque indicated.
- .7 Do not weld or secure bearing plates at sliding joints.



- .8 Set units dry, without mortar, attaining specified joint dimension with plastic shims.
- .9 Clean field welds with wire brush and touch-up shop primer with primer.
- .10 Remove shims and spacers from joints of non-load bearing panels after fastening but before sealant is applied.
- .11 Apply sealers to precast panels to manufacturer's recommendations unless specified otherwise.

### 3.2 WELDING

- .1 Do welding to CSA-W59, for welding to steel structures and CSA-W186, for welding of reinforcement.

### 3.3 CLEANING

- .1 Obtain approval of cleaning methods from Departmental Representative before cleaning soiled precast concrete surfaces.

-----END-----

**PART 1 - GENERAL**

- 1.1 RELATED WORK .1 Submittal Procedures: Section 01 33 00
- .2 Construction/Demolition Waste  
Management and Disposal:  
Section 01 74 21
- 1.2 DESCRIPTION OF WORK .1 The work of this Section comprises the  
furnishing of all labour, materials  
and equipment necessary for the supply  
and installation of items of work  
specifically listed under Part 2 -  
PRODUCTS of this Section, as specified  
in this Section and shown on the  
Drawings.
- 1.3 MEASUREMENT FOR  
PAYMENT .1 Payment for the mooring cleats will be  
measured as individual units for  
elements incorporated into work.
- .2 Measurement for Payment of other items  
indicated shall be paid as a lump sum.

**PART 2 - PRODUCTS**

- 2.1 MOORING CLEATS .1 Size and material as indicated on  
drawings and to Departmental  
Representative's requirement.
- 2.2 MISCELLANEOUS METAL .1 Steel sections and plates: to CAN/CSA  
G40.21, Grade 350W except where  
specified otherwise.
- .2 Steel pipe and handrails: to ASTM  
A53, CSA S16.1, Schedule 40 and as  
indicated on drawings.
- .3 Ladder rungs: to CSA C-40.21 round  
bars to size as indicated.
- .4 Welding materials: to CSA W59.
- .5 Bolts and anchor bolts: to ASTM A307.
- 2.3 GALVANIZING .1 Hot dip galvanize bolts, nuts and  
washers and unless otherwise

specified, staples, cable clamps, pipe sleeves, spikes and nails to CAN/CSA-G164. All steel materials shall be hot dipped galvanized (min. 700gr/m3) suitable for marine environment.

### **PART 3 - EXECUTION**

#### **3.1 CLEATS**

- .1 Install at locations indicated on drawings.

#### **3.2 MISCELLANEOUS METALS**

- .1 Do miscellaneous steel work in accordance with CAN/CSA S16.1.
- .2 Welding in accordance with CSA W59. Install miscellaneous site items as indicated on drawings.

#### **3.3 FABRICATION GENERAL**

- .1 Fabricate steel, as indicated, in accordance with CAN/CSA-S16.1 and in accordance with reviewed shop drawings.
- .2 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .3 Use welded connections for both interior and exterior metal work unless otherwise indicated or approved by Departmental Representative.
- .4 Use self-tapping, shake-proof countersunk flat headed screws on items requiring assembly by screws, or as indicated.
- .5 Where possible, fit and shop assemble work, ready for erection.
- .6 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

- .7 Grind and polish all exposed edges and corners to leave smooth surface free from burrs or other sharp protrusions.
- .8 All holes shall be punched or drilled. Burning holes in any steel member is NOT permitted.

3.4 CONNECTION TO  
EXISTING WORK

- .1 Examine dimensions, alignment, elevations and condition of work before commencing fabrication and report any discrepancies and potential problem areas to Departmental Representative and await instructions.

-----END-----

## **PART 1 - GENERAL**

### **1.1 DESCRIPTION**

- .1 This Section specifies the requirements for the supply and installation of pressure treated timber decking, stringers, pile caps, wales, cross-bracing, fenders, ladders, blocking, and other items as indicated on plans.

### **1.2 MEASUREMENT FOR PAYMENT**

- .1 Dimension Timber  
Pressure treated dimension timber supplied and secured in the work will be measured for payment by the cubic metre. This item includes all timbers for deck, pile caps, wales, fenders, cross-bracing, curbing, together with all bolts, anchor bolts, washers, nuts, and rubberised sealant required to secure the above items to the timber piles and to each other.
- .2 Ladders  
Pressure treated timber ladders supplied and secured in the work will be measured by the unit. This item includes all timber, steel rungs, holdfasts together with all bolts, nuts and washers required to fasten the ladder units to the timber wales.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- .1 Timber: Use timber graded and stamped in accordance with applicable grading rules and standards of associations or agencies approved to grade lumber by Canadian Lumber Standards Administration Board of CSA.
- .2 Species:  
.1 Softwood timber: Coast Douglas Fir, Eastern Hemlock, Eastern Hemlock, Pacific Coast Hemlock, White or Red Pine conforming to CSA 0141-1970 for softwood lumber, Group A, select grade, free from splits, checks and

wane.

.2 Hardwood timber: Birch or Maple to National Hardwood Lumber Association (NHLA) requirements, construction grade.

.3 Preservative Treatment: to CSA 080-Series97 Commodity Standard .18, Table 1 for coastal waters, chromated copper arsenate (CCA) or ammoniacal copper arsenate (ACA). Use of creosote oil NOT permitted.

.4 Miscellaneous steel:  
Bolts, nuts, washers: to ASTM A307-83A. All steel material shall be hot dipped galvanized

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

.1 Construct softwood timber caps, wales and splice blocks to dimensions and configurations indicated on plans and connect to timber piles to the elevation shown on the plans using the wale connection detailed on the plans. Pile caps shall be spliced at a pile location. Splice connections to be 250x250x1200mm long secured with bolts at each end as indicated.

.2 Wale and pile caps timbers will be 250mm x 250mm (unless noted otherwise) in cross-section supplied in approximately 6000mm lengths.

.3 Wale splices will be so arranged such that the splice block is placed at approximately the midpoint of two pile bents and shall be staggered such that the top and bottom wales are not spliced between the same pile bents.

.4 Construct softwood stringers to dimension and configurations indicated on plans. Support and secure stringers to pile caps and wales as indicated.

Stringers shall be full length to dimensions indicated.

- .5 Construct hardwood timber decking to dimensions and configurations indicated on plans and secure to stringers with 2 galvanized spikes at each end of the decking member.
- .6 Construct softwood timber fenders to dimensions and configurations indicated on plans and bolt to timber wales at locations shown on plans using galvanized machine bolts at both the top and bottom wales.
- .7 Construct softwood timber cross bracing to dimensions and configurations indicated on plans and bolt to timber piles at locations shown on plans.
- .8 Construct ladders of softwood timber and galvanized steel to dimensions and configurations indicated on plans and bolt to both timber wales in locations shown on plans.
- .9 All washers and bolt heads will be countersunk such that the bolt heads do not extend past the harbour side plan of the timbers or the contractor may use carriage-head bolts to fasten the fenders and ladders to the timber wales.
- .10 Where it is necessary to cut or countersink pressure treated timber on site treat sawn face with two (2) liberal coats of brush applied copper naphthanate preservative. Allow first coat to fully penetrate wood before applying second coat.
- .11 Curbing & Blocking:
  - .1 The work comprises the furnishing of all equipment, labour and materials

necessary for the provision of all curbing, blocks, etc. and related work as specified herein and indicated on the drawings.

.2 Blocking shall be pressure treated hardwood.

.3 Hardware including pins, bolts, washers, nails and all other items necessary to be incorporated into the work shall be as specified and as indicated.

-----END-----



**1 PART 1 - GENERAL**

**1.1 OPERATION AND  
MAINTENANCE DATA**

- .1 Division 01, General Instructions, is a part of this Section and shall apply as if repeated here.
- .2 This Section 26 05 01 shall apply to and govern the Work of all Sections of this Division 26 Specification.

**1.2 ELECTRICAL WORK  
INCLUDED**

- .1 The specification complements the drawings in describing the supply and installation of a complete electrical system. This system shall include but not necessarily be limited to the following:
  - .1 A power distribution system including 120/208 volt 1 phase 3 wire panel boards, and feeders;
  - .2 Small power system including wiring devices.

**1.3 MEASUREMENT FOR  
PAYMENT**

- .1 All electrical work required for this project, including material, labour, connection to existing and other associated services shall be paid as a lump sum.

**1.4 CONTRACT DRAWINGS**

- .1 The specification together with the drawings are intended to provide a description of a complete electrical system and therefore there shall be no omission of the items necessary or required to make a finished, workmanlike, first class installation, even though each and every item of labour and material may not be mentioned in the specification or shown on the drawings.
- .2 Items indicated on site plans and not on riser diagrams, or vice versa, shall be considered fully covered by both.

- .3 Runs of conduit and outlet locations indicated on the drawings are diagrammatic and exact locations must be determined by this contract as the work proceeds, with due regard to the structure and the work of other trades. This contract shall make any changes dictated by structural requirements, or conflicts with other trades, without charge.
- .4 Apparent errors or omissions shall be referred to the Departmental Representative whose decision shall be final.

1.5 CODES AND STANDARDS

- .1 As a minimum standard perform all work in accordance with the requirements of the Provincial Department of Labour, Canadian Electrical Code C22.1-1998 Part 1, CSA Standards CAN Z32.4 and CAN Z32.2, National Building Code, and ULC-S524-1978. These standards together with all local or municipal rules, regulations, and ordinances shall be considered as the latest approved editions at the time of tender closing. In no instance, shall the standard established in these contract documents, be reduced by any codes.
- .2 Do underground systems in accordance with CSA CAN-C22.3 No. 7-94.
- .3 Abbreviations for electrical terms: to CSA Z85-1983.

1.6 INSPECTIONS, PERMITS  
AND FEES

- .1 Obtain all inspections and permits required by all laws, ordinances, rules and regulations by the public authority having jurisdiction at the place of this building for work of this Contract, and obtain certificates of such inspections and submit same and pay all charges in connection therewith. The final certificate of

inspection shall be obtained before final payment for work shall be considered due.

1.7 SHOP DRAWINGS,  
PRODUCT DATA AND SAMPLES

- .1 Submit shop drawings, product data and samples in accordance with Section 01 33 00. Provide all shop drawings within 30 days after contract has been awarded. Failure to do so will delay progress payments.
- .2 Indicate details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment or material.
- .3 Where applicable, include wiring, single line and schematic diagrams.
- .4 Include wiring drawings or diagrams showing interconnection with work of other Sections.
- .5 Keep one copy of shop drawings and product data on site, available for reference at all times.

1.8 OPERATION AND  
MAINTENANCE DATA

- .1 Provide operation and maintenance data for incorporation into Operation and Maintenance Manuals.
- .2 Include in the operation and maintenance data:
  - .1 Details of design elements, construction features, component function, and maintenance requirements to permit effective start up, operation, maintenance, repair, modification, extension, and expansion of any portion or feature of installation.
  - .2 Technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical description of items and parts lists. Advertising or sales literature not acceptable.

- .3 Wiring and schematic diagrams and performance curves.
- .4 Names and addresses of local suppliers for items included in maintenance manuals.
- .5 Copy of reviewed shop drawings.
- .6 Signed receipt for all spare parts.

.3 Approvals:

- .1 Submit one draft of Operating and Maintenance Manual to Departmental Representative for approval one month prior to estimated substantial completion date. Submission of individual data will not be accepted unless so directed by Departmental Representative.
- .2 Make any changes in submission as may be required and re-submit as directed.
- .3 Failure to do so will result in delay of progress payment.
- .4 Provide two (2) final bound copies of Operation and Maintenance Manuals to Owner and one (1) bound copy to Departmental Representative.

1.9 PROJECT RECORD  
DOCUMENTS

- .1 Provide Project Record Documents in accordance with Section 01 78 00.
- .2 Submit record drawings to Departmental Representative showing changes of wire sizes, circuit numbering and location of raceways, fittings, fixtures, panels and equipment, and their sizes, the location of which has changed or deviated during the work.
- .3 Submit sepia or reproducible of record drawings after record drawings have been approved by the Departmental Representative. Originals shall be made available by the Departmental Representative for the making of sepia or reproducible of the contract drawings. All changes reflected on

record drawings are to be indicated on these sepia or reproducible.

1.10 MAINTENANCE  
MATERIALS

- .1 Provide maintenance materials in accordance with Section 01 33 00.

1.11 CARE, OPERATION AND  
START UP

- .1 Instruct operating personnel in the operation, care and maintenance of the equipment.
- .2 Arrange and pay for services of the manufacturer's service engineer to supervise start-up and to check, adjust, balance and calibrate components.
- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

1.12 VOLTAGE RATINGS

- .1 Operating voltages to meet requirements of CAN3-C235.
- .2 Motors, control and distribution equipment to operate satisfactorily at 60 Hz within normal operating limits established by the above standard. Equipment to operate in extreme operating conditions established in the above standard without damage to the equipment.

1.13 MATERIALS AND  
EQUIPMENT

- .1 Equipment and materials to be C.S.A. certified, and manufactured to standard quoted.
- .2 Where there is no alternative to supplying equipment which is not C.S.A. certified, obtain special approval from C.S.A.
- .3 Factory assemble control panels and component assemblies.

- .4 For the purposes of uniformity similar materials shall be of one manufacturer (i.e. all panels; all motor control equipment; all fixtures in as much as is possible, etc.).
- .5 To avoid the possibility of the work being delayed, order all materials as soon as the shop drawings are reviewed, and report at once to the Departmental Representative any delays in the delivery of materials which would hold up the completion of the job.

1.14 GROUNDING

- .1 All equipment and exposed non-current carrying metal, conduits and parts shall be permanently and effectively grounded to meet minimum requirements of the C.E.C. Section 10, and as indicated on the drawings and further specified. Standards set either by drawings or specifications which are above those covered by C.E.C. Section 10, shall not be reduced under any circumstances.

1.15 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

- .1 Provide final connections to all motors, equipment, controls, etc., indicated on the drawings. These motors, equipment, controls, etc., shall include those supplied under other sections of this specification, as well as Owner supplied items. Ensure that equipment will operate properly (e.g. proper rotation) and report any instance of defective equipment to the Departmental Representative.
- .2 Supplier and installer responsibility is indicated on electrical drawings, and in this specification.
- .3 All electrical equipment, which is supplied and installed by this Contract or other contracts, that

requires wiring at or above 50V, shall be wired by this Contract in accordance with terms and regulations established by this Specification.

- .4 All electrical wiring and connections below 50V related to systems specified under other sections or contracts shall be done by their contractor in accordance with terms and regulations established by this Specification.
- .5 All electrical wiring and connections below 50V related to systems specified by Division 16 shall be done by the Division 16 Contractor.

#### 1.16 FINISHES

- .1 Shop finish metal enclosure surfaces by removal of rust and scale, cleaning, application of rust resistant primer inside and outside, and at least two coats of finish enamel.
  - .1 Paint outdoor electrical equipment, "Equipment Green" finish to EEMAC Y1-1-1955.
  - .2 Paint indoor switchgear and distribution enclosures light grey to EEMAC 2Y-1-1958.
- .2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .3 Clean, prime and paint exposed hangers, racks, and fastenings to prevent rusting.

#### 1.17 EQUIPMENT IDENTIFICATION

- .1 All switchboards, motor control centres, disconnect switches, dry-type transformers starters, pushbuttons, panels, etc., shall have "Lamacoid" nameplates mounted on or adjacent for identification which shall include the panel designation, voltage, phase, wires overcurrent protection, H.P., KW

and amperage as applicable. The nameplates shall be affixed to equipment with permanent adhesive backing.

- .2 Install directories on the back of each door of panel boards, neatly arranged and mounted in frame under transparent cover. Directories shall be typed and shall show system voltage, which outlets are on each circuit and any special information, such as sizes of fuses, etc., necessary for the proper operation and maintenance of the system.
- .3 All sectionalising panels shall have lamacoid plates affixed adjacent to each breaker.
- .4 Size of identification shall be suitable for equipment and importance of information.
- .5 All fused disconnect switches shall have lamacoid plates identifying the equipment they feed and a separate plate indicating maximum fuse size and type.
- .6 Lettering shall be of sufficient size to be readable from normal viewing distance and the information required on the nameplates shall dictate the physical size of plates.
- .7 Nameplates shall have white lettering on black background except for equipment connection to emergency power source, which shall have white lettering on red background.
- .8 All "D" and "E" boxes 200 x 200 x 100" or larger and "C" and "T" cabinets shall have lamacoid plates affixed indicating voltages and/or systems housed within.



- .9 Nameplates:  
.1 Lamicoid  $\frac{1}{8}$ " thick plastic engraving sheet.

NAMEPLATE SIZES

Size 1	10mm x 50mm	1 line	1/8" high letters
Size 2	13mm x 69mm	1 line	1/8" high letters
Size 3	13mm x 69mm	2 lines	1/8" high letters
Size 4	19mm x 91mm	1 line	3/8" high letters
Size 5	19mm x 91mm	2 lines	1/4" high letters
Size 6	25mm x 100mm	1 line	1/2" high letters
Size 7	25mm x 100mm	2 lines	1/4" high letters

- .10 Labels:  
.1 Embossed plastic labels with 6.5mm high letters unless specified otherwise.
- .11 Wording on nameplates and labels to be approved by the Departmental Representative prior to manufacture.
- .12 Allow for average of twenty-five (25) letters per nameplate and label.
- .13 Identification to be English.

1.18 WIRING  
IDENTIFICATION

- .1 Identify wiring with coloured plastic tapes, on both ends of phase conductors for feeders.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour code to meet requirements of CSA C22.1-1998.
- .4 Use color coded wires in branch circuit wiring, systems wiring and communication cables.

1.19 CONDUIT AND CABLE  
IDENTIFICATION

- .1 Identify conduit and metallic sheathed cable runs for the various systems with 25mm coloured bands placed on conduit run every 3 metres of length and at least one should appear in each room and at points where conduit or cable enters wall, ceiling or floor.

	.2	System	Colour
		600/347V Power	Orange
		120/208V Lighting & Power	Yellow
		Telephone	Black
		Grounding	Green
		Fire Alarm	Red
<u>1.20 WIRING TERMINATIONS</u>	.1	Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors as indicated.	
<u>1.21 MANUFACTURERS AND CSA LABELS</u>	.1	Manufacturers and CSA labels shall be visible and legible after equipment is installed.	
<u>1.22 WARNING SIGNS</u>	.1	Provide warning signs, as specified and/or to meet the requirements of the Department of Labour Inspection.	
	.2	Use decal signs, minimum 175mm x 250mm size.	
<u>1.23 SINGLE LINE ELECTRICAL DIAGRAMS</u>	.1	Provide a single line diagram of the fire alarm system under plexiglass at the fire alarm panel and/or annunciator.	
<u>1.24 LOCATION OF OUTLETS</u>	.1	Locate outlets in accordance with Section 26 27 26.	
	.2	Do not install outlets back-to-back in wall; allow minimum 150mm horizontal clearance between boxes.	
	.3	Change location of outlets at no extra cost or credit providing distance does not exceed 3 metres and information is given before installation.	
	.4	Locate light switches on latch side of doors and safety switches in mechanical rooms on latch side of door where possible.	
	.5	Coordinate on site the location of outlets with respect to counters,	

heating cabinets, etc., before work is to start.

1.25 MOUNTING HEIGHTS

- .1 Mounting heights of equipment is from finished floor to centre line of equipment unless specified or indicated otherwise.
- .2 If mounting height of equipment is not indicated verify before proceeding with installation.

1.26 PROTECTION

- .1 Protect exposed live equipment during construction for personnel safety.
- .2 Shield and mark live parts "LIVE 120 VOLTS" or with appropriate voltage in English.

1.27 LOAD BALANCE

- .1 Balance all phase currents of transformers, main switchboard, distribution Panel boards, etc., and where applicable, adjust transformer taps to obtain within 2% of the rated voltage of the load being supplied. Make adjustments and/or increase conductor size so as to limit voltage drops to 3% and make such adjustments under average load conditions in presence of Departmental Representative.
- .2 Submit to Departmental Representative, at completion of work, a report listing the voltage, phase and neutral currents on the switchboard, Panel boards and dry-type transformers, operating under normal load. On the report also state hour and date on which each load was measured.

1.28 CONDUIT AND CABLE  
INSTALLATION

- .1 Install conduit, and sleeves, prior to pouring of concrete. Sleeves through concrete shall be constructed of sheet metal, sized for free passage of conduit, and protruding 50mm.

- .2 Install cables, conduits, and fittings to be embedded neatly and close to building structure so furring can be kept to minimum.

1.29 FIRESTOPPING AND  
SMOKE SEALS

- .1 Not Applicable

1.30 TESTS

- .1 Conduct and pay for tests of the following:
  - .1 Power distribution system including phasing, voltage, grounding and load balancing.
  - .2 Circuits originating from branch distribution panels.
  - .3 Motors and associated control equipment including sequenced operation of systems where applicable.
- .2 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturers instructions.
- .3 Carry out tests in presence of Departmental Representative. Notify Departmental Representative seven (7) days in advance of time testing will take place.
- .4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .5 The Departmental Representative reserves the right to use any piece of electrical equipment, device, or material installed under this contract for such reasonable lengths of time and at such times as he may require to make a complete and thorough test of the same, before the final completion and acceptance of the work.

- .6 Such tests shall not be construed as acceptance of any part of the work.
- .7 Submit test results for Departmental Representative's review.

1.31 INSULATION  
RESISTANCE TESTING

- .1 Test all wiring, included in the work to ensure that there are no shorts and/or grounds are present on phase conductors for feeders or branch circuits and that insulation values are as required by the Canadian Electrical Code.
- .2 All testing of conductors to be done prior to energization of conductors with 600 volt and 1000 volt meggers as required by the Canadian Electrical Code.
- .3 Capacitive leakage testing of all phases and neutral feeder conductors at various systems originating points, are to be recorded for each individual feeder with test results to be submitted to Departmental Representative for approval.
- .4 Systems to be tested for capacitive leakage are as follows:  
120/208V/3PH/4W.
- .5 Check resistance to ground before energizing. Ensure resistance to ground is not less than 50 megohms.
- .6 Submit test results for Departmental Representative's review. Test results shall include time of test, feeder tested, and instrument readings.

1.32 COORDINATION OF  
PROTECTIVE DEVICES

- .1 Ensure circuit protective devices such as over-current trips, relays, fuses, are installed to values and settings as indicated.

1.33 CLEANING

- .1 Do final cleaning in accordance with Section 01 74 11.
- .2 At time of final cleaning, clean lighting reflectors, lenses and other lighting surfaces that have been exposed to construction dust and dirt.
- .3 On completion of work, remove debris resulting from work of this Division and leave the site neat and tidy. Equipment shall be checked for proper fitting and alignment, adjusted, cleaned, repainted where necessary, and left in first class condition.
- .4 This section shall be responsible for the removal of spatters, droppings, soil, labels, and debris from finished surfaces and from surfaces to receive finishes, before the set up. Work and adjacent finished work shall be left in new condition.
- .5 Only cleaning materials which are recommended for the purpose by both the manufacturer of the surface to be cleaned and of the cleaning material shall be used.
- .6 Material at site cannot be burned or buried except where approved by Departmental Representative. Removal shall be as often as required to avoid accumulation in order to ensure site is maintained clean.
- .7 Volatile fluid wastes cannot be disposed of in storm or sanitary sewers or in open drain courses.
- .8 Lowering of materials shall be controlled and shall not be dropped or thrown from stories above grade.

1.34 COORDINATION

- .1 Cooperate and investigate with other trades to make maximum use of the

spaces. Avoid conflicts with pipes, ducts, etc. Prepare shop drawings indicating the route of main conduits and ducts for submission to the Departmental Representative for approval.

- .2 Cooperate with other trades on the site and carry out the work, in such a way, as not to hinder or hold up the work of other trades.
- .3 Consult with other trades, where their respective installations conflict and re-route conduits, ducts, outlets, equipment, etc., as required, subject to the approval of the Departmental Representative.

#### 1.35 SUPERVISION

- .1 Provide supervision and sufficiently qualified foreman for work of this Contract to ensure that the work proceeds in proper and efficient manner to its completion. If in the opinion of the Departmental Representative, such personnel are not competent to carry out the work, replace these men immediately upon written request of the Departmental Representative.

#### 1.36 COMMISSIONING OF ELECTRICAL SYSTEMS

- .1 Upon receipt of written verification from the Contractor that:
  - .1 All systems are complete and operational in all respects.
  - .2 All specified reports and documents have been submitted and approved.
  - .3 All demonstrations have been completed and documented, the Departmental Representative will commence a systems' commissioning period.
- .2 During this period of not more than 20 working days, the Departmental Representative will verify the

operation of all systems. The commissioning process may involve real or simulated conditions to determine the systems full operational capabilities. Copies of all specified reports and documents are to be available on site during the commissioning period.

- .3 During the commissioning process, the on-site foreman of the electrical subtrade involved in the supervision of the work plus one electrician is to be on site providing full-time assistance to the Departmental Representative. In addition, systems' suppliers' representatives are to be available to be on site providing full-time assistance to the Departmental Representative within 48 hour's notice to assist in the verification of their respective systems.
- .4 All necessary equipment such as meters, load banks, et cetera required to fully commission the systems are to be made available to the Departmental Representative.
- .5 Deficiencies or discrepancies discovered during the commissioning process are to be immediately rectified. Exceptional arrangements for labour and materials will be required to correct deficiencies, which prevent the satisfactory completion of the commissioning process.

1.37 ELECTRICAL ROOM  
LAYOUTS

- .1 Not Applicable

1.38 ACCESS DOORS

- .1 Not Applicable

1.39 UTILITY SERVICES

- .1 Division 26 Contractor financially responsible to provide complete



electrical, telephone and computer systems as specified including all necessary equipment and connections to the existing power. Payment of permits and other charges as may be levied by utilities, shall be included in tender price.

1.40 BREAKDOWN OF COSTS

.1 Division 26 Contractor shall have 10 days after award of contract to provide a cost breakdown for the progress claims as follows:

**ELECTRICAL**

- (a) Power panels and wiring
- (b) Trenching and Conduits

1.41 SPRAY FIREPROOFING

.1 Not Applicable

-----END-----

## **1 PART 1 - GENERAL**

- 1.1 REFERENCE STANDARDS .1 CSA C22.2 No. 18 - Clamps and connectors.
- .2 CSA C22.2 No. 65 Wire Connectors.
- 1.2 RELATED WORK .1 Not Applicable
- 1.3 SHOP DRAWINGS AND PRODUCT DATA .1 Not Applicable
- 1.4 OPERATION AND MAINTENANCE DATA .1 Not Applicable

## **2 PART 2 - PRODUCTS**

- 2.1 MATERIALS .1 All connections shall be made electrically and mechanically secure. Sizes of connectors shall be according to manufacturer's recommendations for each size and combination of wires.
- .2 Joints required in branch wiring #10 AWG and smaller shall be made using fixture twist-on type connectors with current carrying parts made of copper.
- .1 Standard of Acceptance: Marrette #31, #33 or #35 as required.
- .3 Joints for wiring #8 AWG and larger shall be made using pressure type colour keyed compression connectors with current carrying parts made of copper using compression tools. A first layer of tape shall be compound type followed by a layer of Scotch #3 vinyl type.
- .1 Standard of Acceptance: 54000 series.
- .4 Bushing stud connectors: As required to suit conductors.
- .5 Clamps or connectors for armoured cable and flexible conduit as required.

**3 PART 3 - EXECUTION**

**3.1 INSTALLATION**

- .1 Remove insulation carefully from ends of conductors and:
  - .1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No. 65.
  - .2 Install fixture type connectors and tighten. Replace insulating cap.
- .2 All connections shall be made electrically and mechanically secure. Sizes of connectors shall be according to manufacturer's recommendations for each wire size and combination of wires. Twist wires together before installing connectors. All stranded conductors shall be twisted together prior to connection around terminal.

-----END-----

## **1 PART 1 - GENERAL**

- 1.1 REFERENCE STANDARDS .1 CSA C22.2 No. 38 - Thermoset insulated Wires and Cables.
- .2 CSA C22.2 No. 51 - Armoured cables.
- .3 Wire and cable shall conform to the latest specification of the Canadian Standards Association (CSA), Electrical and Electronic Manufacturers Association of Canada (EEMAC), the Insulated Power Cable Engineers Association (IPCEA), and the American Society of Testing Materials (ASTM).
- 1.2 RELATED WORK .1 Not Applicable
- 1.3 SHOP DRAWINGS AND PRODUCT DATA .1 Submit product data in accordance with Section 01 33 00.
- 1.4 OPERATION AND MAINTENANCE DATA .1 Not Applicable

## **2 PART 2 - PRODUCTS**

- 2.1 BUILDING WIRES .1 Conductors: Copper, soft drawn stranded, at least 98% conductivity for #10 AWG and larger. Insulation shall be chemically cross-linked thermosetting polyethylene rated 600 volts on all RW90 conductors and 1000 volts for RWU-90 for incoming service. Size as indicated on drawings and schedules. Conductor insulation shall be colour coded as follows:
- |         |   |       |
|---------|---|-------|
| Phase A | - | Red   |
| Phase B | - | Black |
| Neutral | - | White |
| Ground  | - | Green |
- Where extra colours are required for three-way switches, etc., they shall be yellow.
- Approved color coded tape is acceptable for color coding phase conductors #1 AWG and larger and for

neutral and ground conductors #4/0 and larger.

- |                            |    |                                                   |
|----------------------------|----|---------------------------------------------------|
| <u>2.2 CONTROL CABLES</u>  | .1 | Not Applicable                                    |
| <u>2.3 ARMOURED CABLES</u> | .1 | Not Applicable                                    |
| <u>2.4 TECK CABLE</u>      | .1 | Not Applicable                                    |
| <u>2.5 SYSTEM WIRING</u>   | .1 | Not Applicable                                    |
| <u>2.6 MANUFACTURERS</u>   | .1 | Standard of Acceptance: Nexans or approved equal. |

### 3 PART 3 - EXECUTION

- |                                            |    |                                                                                                                                                                                                                                                                                        |
|--------------------------------------------|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>3.1 INSTALLATION OF BUILDING WIRES</u>  | .1 | Install all building wiring as follows:<br>.1 In conduit systems in accordance with Section 26 05 44.                                                                                                                                                                                  |
|                                            | .2 | Terminate wires in accordance with section 26 05 20.                                                                                                                                                                                                                                   |
| <u>3.2 INSTALLATION OF CONTROL CABLES</u>  | .1 | Not Applicable                                                                                                                                                                                                                                                                         |
| <u>3.3 INSTALLATION OF ARMOURED CABLES</u> | .1 | Not Applicable                                                                                                                                                                                                                                                                         |
| <u>3.4 INSTALLATION OF TECK CABLE</u>      | .1 | Not Applicable                                                                                                                                                                                                                                                                         |
| <u>3.5 INSTALLATION - GENERAL</u>          | .1 | Where pulling wires and cables, the use of an approved lubricant only will be permitted. No wires or cables shall be pulled in conduits until such conduits are free from moisture and in no case shall wires be pulled until approval of the Departmental Representative is obtained. |
|                                            | .2 | All stranded conductors prior to terminating under device bolts such as circuit breakers, light switches, receptacles, etc., to be twisted together to form a single conductor to                                                                                                      |

ensure a reliable mechanical connection.

.3 "Labelling" of all branch circuit wiring including phase conductors, neutrals, ground and/or bonding conductors to be done on both ends of all circuit wires plus in any junction and/or pull boxes located in between using "Panduit" write-on, self laminating labels Nos. PDL-1 and PDL-2 as required.

.4 The following wiring methods are designed to enhance the ability to perform capacitive leakage tests:

.1 All circuit conductors are to be individually tie wrapped to their corresponding labelled neutral conductor in all panelboards, pullboxes and junction boxes. Enough slack conductor length should be left to enable the ability to clamp the ground detector around the individually tie-wrapped circuit conductor and its corresponding labelled neutral. This wiring method is to be neat and of good workmanship quality.

.2 The tie wrapping of the neutral with its respective phase conductors is to be made at the closest point of entry into panelboards, pullboxes and junction boxes.

.3 The main switchboard, CDP's, panelboards, MCC's etc, are to have their respective feeder phase and neutral conductors tie-wrapped together and enough slack conductor length to enable the ability to clamp the ground detector around each set of feeders. This wiring method is to be neat and of good workmanship quality.

.4 After all electrical wiring has been completed by the Electrical Sub-Contractor, he is to test the grounded electrical distribution system to

ensure there are not ground shorts and capacitive leakage in the system.

.5 All feeders or branch circuits which do not have neutral conductors are to have their respective phase conductors tie-wrapped together in accordance to the methods described previously.

.6 Run all circuits so that the voltage drop in no case exceeds 3% of the line volts. The neutral wire, wherever it is run, shall be continuous with no fuses, switches, or breaks of any kind.

.7 For 15 amp, 120 volt circuits the following table shall be used to determine the minimum conductor sizes required to compensate for voltage drop.

.8 Find below the branch circuit maximum lengths (120 volt one way length from panelboard to load including vertical drops. Do as to limit voltage drop to 3%.

- |    |                  |          |
|----|------------------|----------|
| .1 | From 0.3m to 24m | #12 Wire |
| .2 | From 24m to 37m  | #10 Wire |
| .3 | From 37m to 55m  | #8 Wire  |

.9 Increased wire sizes where required shall not be decreased in size in any portion of length of run between panelboard and the wiring device itself.

.10 All wire shall be color coded as per Code requirements and/or as specified herein.

-----END-----

## **1 PART 1 - GENERAL**

- |                                           |    |                                                                                                     |
|-------------------------------------------|----|-----------------------------------------------------------------------------------------------------|
| <u>1.1 REFERENCE STANDARDS</u>            | .1 | CSA C22.2 No. 76 - Splitters.                                                                       |
|                                           | .2 | CSA C22.2 No. 40 - Junction and pull boxes.                                                         |
| <u>1.2 RELATED WORK</u>                   | .1 | Not Applicable                                                                                      |
| <u>1.3 SHOP DRAWINGS AND PRODUCT DATA</u> | .1 | Submit shop drawings and products data for splitters and cabinets in accordance with Section 01340. |
|                                           | .2 | Provide list of color-coding for incorporation into operation and maintenance manuals.              |
| <u>1.4 OPERATION AND MAINTENANCE DATA</u> | .1 | Not Applicable                                                                                      |

## **2 PART 2 - PRODUCTS**

- |                                    |    |                                                                                                                       |
|------------------------------------|----|-----------------------------------------------------------------------------------------------------------------------|
| <u>2.1 SPLITTERS</u>               | .1 | Not Applicable                                                                                                        |
| <u>2.2 JUNCTION AND PULL BOXES</u> | .1 | Pull and junction boxes, where larger than standard switch boxes, shall be sized according to C.E.C. Section 12-3038. |
|                                    | .2 | Welded steel construction with screw-on flat covers for surface mounting.                                             |
|                                    | .3 | Covers with 25mm minimum extension all around, for flush-mounted pull and junction boxes.                             |
|                                    | .4 | All boxes shown on poles to be 300x300x100 gasketed PVC boxes.                                                        |
| <u>2.3 CABINETS</u>                | .1 | Not Applicable                                                                                                        |
| <u>2.4 MANUFACTURERS</u>           | .1 | Standard of Acceptance: Bel                                                                                           |
|                                    | .2 | Other approved manufactures: Hammond, Hoffman.                                                                        |



### **3 PART 3 - EXECUTION**

- 3.1 SPLITTER  
INSTALLATION
- .1 Not Applicable
- 3.2 JUNCTION, PULL BOXES  
AND CABINETS INSTALLATION
- .1 Only main junction and pull boxes are indicated. Install pull boxes so as not to exceed 1000 ft. of conduit run between pull boxes.
- .2 All branch conductors to be identified in all junction and/or pull boxes with "Panduit" write-on, self-laminating label Nos. PLD-1 and PLD-2 as required or approved equal by Thomas & Betts.
- .3 All pull and junction boxes 150mm x 150mm and larger having auxiliary systems housed within shall be identified with "Lamicoid" nameplates permanently affixed.
- 3.3 IDENTIFICATION
- .1 Provide equipment identification in accordance with Section 26 05 01.
- .2 Install size 2 identification labels indicating system name, voltage, and phase.

-----END-----

## **1 PART 1 - GENERAL**

- |                                     |    |                                                                                                                                                                                                                 |
|-------------------------------------|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>1.1 REFERENCE STANDARDS</u>      | .1 | Direct buried rigid PVC conduit to CSA C22.2 No. 211.1-M1984.                                                                                                                                                   |
| <u>1.2 RELATED WORK</u>             | .1 | Installation of cables in ducts: Section 26 05 44.                                                                                                                                                              |
| <u>1.3 FINANCIAL RESPONSIBILITY</u> | .1 | Financial responsibility for the supply and installation of the direct buried underground cable ducts as outlined in this specification and the electrical drawings shall rest with the Division 16 contractor. |

## **2 PART 2 - PRODUCTS**

- |                                    |    |                                                                                                                    |
|------------------------------------|----|--------------------------------------------------------------------------------------------------------------------|
| <u>2.1 PVC DUCTS</u>               | .1 | Rigid PVC conduits: size as indicated, nominal length of 3 metres.                                                 |
|                                    | .2 | Rigid PVC couplings, reducers, bell end fittings, plugs, caps, adaptors as required to make complete installation. |
|                                    | .3 | Rigid PVC 90 and 45 bends as required.                                                                             |
|                                    | .4 | Rigid PVC 5 angle couplings as required.                                                                           |
|                                    | .5 | All direct buried conduit to be rigid PVC conduit. All aboveground to be rigid PVC conduit.                        |
|                                    | .6 | Expansion joints as required.                                                                                      |
| <u>2.2 SOLVENT WELD COMPOUND</u>   | .1 | Solvent weld compound for PVC duct joints.                                                                         |
| <u>2.3 CABLE PULLING EQUIPMENT</u> | .1 | 6.5mm stranded nylon pull rope tensile strength 5 kN.                                                              |
| <u>2.4 MARKING TAPE</u>            | .1 | 150mm wide, red, polyethylene marked "Buried Electric Line"                                                        |
|                                    | .1 | Standard of Acceptance: Thomas and Betts NA type.                                                                  |

2.5 MANUFACTURERS

- .1 Standard of Acceptance: IPEX
- .2 Other approved Manufacturer: Canron

3 PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install PVC conduit as indicated and in accordance with manufacturer's instructions.
- .2 Clean inside of ducts before laying.
- .3 Ensure full, even support every 1500mm throughout duct length.
- .4 Slope ducts away from building and pole with 1 to 400 minimum slope. Punch a small hole in bottom of ducts at low point.
- .5 Provide sleeve for ducts passing through footings.
- .6 During construction, cap ends of ducts to prevent entrance of foreign materials.
- .7 Pull through each duct a steel mandrel not less than 300mm long and of a diameter 65mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign matter. Pull stiff bristle brush through each duct immediately before pulling-in cables.
- .8 In each duct install pull rope continuous throughout each duct run with 3 metres of spare rope at each end.
- .9 Install marking tape 150mm below finished grade along the complete length of buried duct as indicated.

-----END-----

**1 PART 1 - GENERAL**

**1.1 RELATED WORK**

- .1 Direct buried underground cable ducts:  
Section 26 05 42

**2 PART 2 - PRODUCTS**

- .1 Not Applicable

**3 PART 3 - EXECUTION**

**3.1 CABLE INSTALLATION  
IN DUCTS**

- .1 Install cables as indicated, in ducts.
- .2 Do not pull spliced cables inside ducts.
- .3 Install multiple cables in duct simultaneously.
- .4 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.
- .5 To facilitate matching of colour coded multi conductor control cables reel off in same direction during installation.
- .6 Before pulling cable into ducts and until cables are properly terminated seal ends of non-leaded cables with moisture seal tape.
- .7 After installation of cables, seal duct ends with duct sealing compound.

**3.2 TESTING**

- .1 Perform tests in accordance with Section 26 05 01.
- .2 Perform tests using qualified personnel. Provide necessary instruments and equipment.
- .3 Check phase rotation and identify each phase conductor of each feeder.

- .4 Check each feeder for continuity, short circuits and grounds. Ensure resistance to ground of circuits is not less than 50 megohms.
- .5 Pre-acceptance tests.
  - .1 After installing cable but before splicing and terminating, perform insulation resistance test with 600 V megger on each phase conductor.
  - .2 Check insulation resistance after each splice and/or termination to ensure that cable system is ready for acceptance testing.
- .6 Acceptance Tests
  - .1 Ensure that terminations and accessory equipment are disconnected.
  - .2 Ground shields, ground wires, metallic armour and conductors not under test.
- .7 Provide Departmental Representative with list of test results showing location at which each test was made, circuit tested and result of each test.
- .8 Remove and replace entire length of cable if cable fails to meet any of the test criteria.
- .9 Failure to provide test results will delay progress billing.

-----END-----

## **1 PART 1 - GENERAL**

- 1.1 REFERENCE STANDARDS .1 CSA C22.2 No. 29-M1983 - Panelboards and panelboard enclosures.
- 1.2 RELATED WORK .1 Electrical General Instructions: Section 26 05 01.
- .2 Moulded Case Circuit Breakers: Section 26 28 21.
- 1.3 SHOP DRAWINGS AND PRODUCT DATA .1 Submit shop drawings and product data in accordance with Section 01 33 00.
- .2 Drawings to include electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension.
- 1.4 OPERATION AND MAINTENANCE DATA .1 Not Applicable

## **2 PART 2 - PRODUCTS**

- 2.1 PANELBOARDS .1 Panelboards: product of one manufacturer.
- .2 Type: 250V LT, 1 phase, 3 wire, as indicated.
- .3 Cabinets for panelboards shall be minimum number 14 gauge galvanized steel, minimum of 508mm wide and 147mm deep, of dead front construction, and doors shall be single type, 120 degree door swing, with spring latch and lock. Two keys shall be supplied with each panelboard and all shall be keyed alike. Surface mounted panelboards shall be finished in ASA61 baked enamel. Panel bus bars shall be of aluminum with lugs suitable for copper conductor connections.
- .4 All panel boards to be NEMA Type 3R.

- .5 All panelboards rated at 225 amperes or less with voltages and phases as indicated on drawings requiring isolated grounding, to be capable of terminating quantities and sizes as indicated on electrical drawings.
- .6 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.
- .7 Ratings: mains, number of circuits, and number and size of main and branch circuit breakers as indicated in panel schedules.

## 2.2 BREAKERS

- .1 Breakers: to Section 26 28 21.
- .2 Breakers with thermal magnetic tripping in panelboards except as indicated otherwise. All breakers to GFIC protected.
- .3 Main breaker: When indicated separately mounted on top or bottom of panel to suit cable entry. When mounted vertically, down position should open breaker. If main breaker is mounted on the bottom of panel, panel shall be approved for that purpose and shall be so marked.
- .4 Lock-on devices on handles of circuit breakers ARE to be installed for exit light circuits, fire alarm circuits, CCTV system, alarm monitoring and security, sump pumps to prevent accidental operation.

## 2.3 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 01.
- .2 Nameplate for each panelboard size 4 engraved or as indicated.

- .3 Nameplate for each circuit in distribution panelboards size 2 engraved or as indicated.
- .4 Complete circuit directory with typewritten legend showing location and load of each circuit.

#### 2.4 MANUFACTURERS

- .1 Standard of Acceptance: Cutler Hammer PRL1a
- .2 Other approved manufacturers: Federal Pioneer, Siemens, Square D.

### 3 PART 3 - EXECUTION

#### 3.1 INSTALLATION

- .1 Locate panelboards as indicated and mount securely, plumb true and square, to adjoining surfaces.
- .2 Install surface mounted panelboards on plywood backboards.
- .3 Mount panelboards to height specified in Section 26 05 01 or as indicated.
- .4 Connect loads to circuits as indicated.
- .5 Connect neutral conductors to common neutral bus with respective neutral identified.
- .6 Panels shall be installed in an upright position and the bottom of the panelboard shall be located not less than 1000mm above finished floor level where practicable.
- .7 Install a typed directory under transparent cover on the inside of each new panelboard showing the location and load connected to each circuit.
- .8 Wiring in panelboards shall be secured with tie rap or equivalent means to



present a neat workmanlike appearance. Branch circuitry wiring within panelboards shall have approximately 300mm of "slack" wire installed in 150mm loop adjacent to respective breakers where phase conductors terminate. All branch circuit neutral, ground and/or bond conductors to have approximately 300mm of slack wire neatly "looped" prior to terminations taking place. All feeder conductors to be installed in such a manner as to enable "clip on" type capacitive leakage tester to encompass neutral plus phase conductors together. Feeder conductors to be provided with additional slack wire adjacent to termination lugs.

- .9 Panels shall be flush or surface mounted as indicated in the schedule and shall be equipped with all breakers of the amperage and interrupting capacity noted on the drawings.
- .10 Circuit numbers on drawings do not necessarily correspond to the numbers on the lighting and power panels. Circuits sharing a common neutral shall not be connected to the same phase. Any changes in circuit numbering are to be included on "record drawings". Individual light fixtures fed with two branch circuits are to derive their source from two pole breakers.
- .11 The Lamacoid identification plate on panelboards shall include the voltage phase and wires and amperage (of breaker or fuse protecting it) in addition to the panel designation itself.
- .12 "Labelling" of all branch circuit phase conductors plus neutral and/or

bond conductors shall be done with  
"Panduit" write-on, self laminating  
labels Nos. PDL-1 and PDL-2 as  
required or approved equal.

- .13 Maximum size conduits housing 15A or  
20A branch circuits to be limited to  
25mm in size exiting any panelboard.

### 3.2 TESTS

- .1 Perform tests in accordance with  
Section 26 05 01.

-----END-----

**1 PART 1 - GENERAL**

- 1.1 REFERENCE STANDARDS .1 CSA C22.2 No. 111 - General Use Switches.
- .2 CSA C22.2 No. 42 - General Use Receptacles, Attachment Plugs and Similar Wiring Devices.
- 1.2 RELATED WORK .1 Not Applicable.
- 1.3 SHOP DRAWINGS AND PRODUCT DATA .1 Section 01 33 00 - Submit shop drawings and product data in accordance.
- 1.4 OPERATION AND MAINTENANCE DATA .1 Not Applicable

**2 PART 2 - PRODUCTS**

- 2.1 SWITCHES .1 Not Applicable
- 2.2 LOW VOLTAGE SWITCHING .1 Not Applicable
- 2.3 AUTOMATIC MOTION CONTROL .1 Not Applicable
- 2.4 RECEPTACLES .1 Duplex receptacles (NEMA 5-20R) rated for 15 amp, 125 volt. Receptacles shall be marine grade, IP20 rated  
.1 Standard of Acceptance Hubbell HBL52CM62.
- .2 Receptacles of one manufacturer throughout project whenever possible. All receptacles to be marine grade.
- 2.5 COVER PLATES .1 Weatherproof double lift spring-loaded cast aluminum cover plates, complete with gaskets for wall mounting of duplex receptacles, where indicated.  
.1 Standard of Acceptance: Hubbell #245-AL, 201-HGR.
- 2.6 MANUFACTURERS .1 Standard of Acceptance: Hubbell, Leviton.

**3 PART 3 - EXECUTION**

**3.1 INSTALLATION**

- .1 Switches: Not Applicable
- .2 Receptacles:
  - .1 Mount receptacles at height as shown on drawings.
- .3 Coverplates:
  - .1 Coverplates to be installed plumb and have stainless steel screws.

-----END-----

**1 PART 1 - GENERAL**

- 1.1 REFERENCE STANDARDS .1 CSA C22.2 No. 5.1 - Moulded Case Circuit Breakers.
- 1.2 RELATED WORK .1 Not Applicable
- 1.3 SHOP DRAWINGS AND PRODUCT DATA .1 Submit product data in accordance with Section 01 33 00.
- .2 Include time-current characteristic curves for breakers with ampacity of 400A and over or with interrupting capacity of 22,000A symmetrical rms and over at system voltage.
- 1.4 OPERATION AND MAINTENANCE DATA .1 Not Applicable

**2 PART 2 - PRODUCTS**

- 2.1 BREAKERS GENERAL .1 Bolt on moulded case circuit breaker, quick-make, quick-break type, de-ionizing arc chambers for manual and automatic operation with temperature compensation for 40°C ambient. Breakers to be trip free of operating handles on overloads with a definite indication when tripping has taken place.
- .2 Multi-pole breakers shall have common trip mechanisms; tie handles will not be acceptable.
- .3 Magnetic instantaneous trip elements in circuit breakers, to operate only when the value of current reaches setting. Trip settings on breakers with adjustable trips to range from 10 to 12 times current rating.
- .4 Circuit breakers with interchangeable trips as indicated.
- .5 Minimum acceptable circuit breaker interrupting rating shall be 14,000

RMS symmetrical amperes or as indicated on the drawings.

## 2.2 MANUFACTURERS

- .1 Standard of Acceptance: Cutler Hammer
- .2 Other approved manufacturers: Federal Pioneer, Siemens, Square D.

## 3 PART 3 - EXECUTION

### 3.1 INSTALLATION

- .1 Circuit breakers shall be securely mounted in switchboards, panelboards, or EEMAC one (1) enclosures as indicated on the drawings and as required by other sections of the specifications.

-----END-----

**PART 1 - GENERAL**

1.1 MEASUREMENT FOR  
PAYMENT (Work 'B')

- .1 Measurement for payment under this section shall be paid for at the unit bid price per cubic meter and this price shall be full compensation for hauling, shaping placement, compaction, equipment, labour and incidentals necessary to complete the work.

1.2 RELATED WORK

- .1 Submittal Procedures: Section 01 33 00
- .2 Health and Safety Requirements: Section 01 35 29
- .3 Environmental Procedures: Section 01 35 43
- .4 Construction/Demolition Waste Management and Disposal: Section 01 74 21
- .5 Environmental Protection Plan: Section 01 35 44.

1.3 DESCRIPTION OF WORK

- .1 The work of this Section comprises the furnishing of all labour, materials and equipment necessary for all excavation, trenching, backfilling, compaction including saw cutting of existing asphalt paving and concrete surface, required to complete the work of this Contract, as specified in this Section and as shown on the Drawings.
- .2 The requirements of the following Prince Edward Island, Department of Transportation and Public Works Specifications are to be followed for all work relating to the material specifications for fill materials and bedding sand.

1.4 REFERENCES

- .1 ASTM C117-95, Standard Test Method for Material Finer Than: 0.075mm Sieve in Mineral Aggregates by Washing.

- .2 ASTM C136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .3 ASTM D698-91 (1998), Test Method for Laboratory Compaction Characteristics of Soil using Standard Effort.
- .4 ASTM D1557-91 (1998), Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.
- .5 CAN/ULC -S701-1997, Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .6 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .7 CAN/CGSB-71-GP-24M Adhesive, Flexible for Bonding Cellular Polystyrene Insulation

#### 1.5 DEFINITIONS

- .1 Rock excavation: excavation of material from solid masses of igneous, sedimentary or metamorphic rock which, prior to its removal, was integral with its parent mass and was unable to be removed by a Caterpillar 235 Excavator, or equivalent, machine.
- .2 Common excavation: excavation of materials of whatever nature, which are not included under the definition of rock excavation, including dense tills, hardpan, frozen materials and partially cemented materials which can be ripped and excavated with heavy construction equipment.
- .3 Top Soil: Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.



1.6 PROTECTION OF  
EXISTING FEATURES

- .4 Cohesionless soil: For compaction purposes, cohesionless soil is:
  - .1 Materials having less than 20% passing 75 micrometres sieve, regardless of plasticity of fines.
- .5 Cohesive soil: For compaction purposes, cohesive soil is soil not having properties to be classified as cohesionless.
- .1 Existing buried utilities and structures:
  - .1 Size, depth and location of existing utilities and structures as indicated are for guidance only; completeness and accuracy are not guaranteed.
  - .2 Prior to commencing any excavation work, notify applicable Departmental Representative or authorities, establish location and state of use of buried utilities and structures. Clearly mark such locations to prevent disturbance during work.
  - .3 Confirm locations of buried utilities by careful test excavation.
  - .4 Maintain and protect from damage, water, sewer, gas, electric or other utilities encountered. Obtain direction of Departmental Representative before moving or otherwise disturbing utilities or structures.
  - .5 Where indicated re-route existing lines in area of excavation. Pay costs for such work.
  - .6 Remove abandoned utility lines to distance of 1.5m from foundations. Cap or otherwise seal lines at cut-off points.
  - .7 Record in accordance with requirements of Section 01 78 00 - Closeout Submittals, locations of maintained, re-routed and abandoned underground lines.
  - .8 Make good and pay for damage to any lines resulting from work.

- .2 Existing surface features:
  - .1 Protect existing surface features which may be affected by work from damage while work is in progress and repair damage resulting from work.
  - .2 Where excavation necessitates root or branch cutting do so only under direct control of Departmental Representative.
  - .3 Provide adequate protection around bench markers, layout markers, survey markers, geodetic monuments and signage.
  
- 1.7 SHORING, BRACING AND UNDERPINNING
  - .1 Comply with Section 01 35 28 - Health and Safety Requirements and applicable local regulations and to protect existing features.
  - .2 Whenever shoring, sheeting, timbering and bracing of excavations or underpinning is required engage services of a Professional Engineer registered in Canada, to design and assume responsibility for adequacy of shoring, bracing and underpinning.
  - .3 Design and supporting data submitted to bear the stamp and signature of qualified Professional Engineer registered in Canada.
  
- 1.8 COMPACTION DENSITIES
  - .1 Compaction densities indicated are Standard Proctor Maximum Dry Densities.
  
- 1.9 SITE CONDITIONS
  - .1 The Contractor is responsible to visit the site, assess the setting and become familiar with the existing site conditions.
  - .2 Before visiting the site the bidders **MUST** apply for and receive permission to visit the site from the Project Officer at Departmental Representative office.
  - .3 No extra payment will be made to the Contractor, above the Contract Price, for costs resultant from failure to

determine the conditions that affect the work.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- .1 Type 1 Fill: Crushed rock composed of hard sound, durable uncoated, cubical fragments of consistent quality produced from non-sedimentary bedrock or non-sedimentary boulders, to comply with the P.E.I. Department of Transportation and Public Works Specification 401 - Aggregate, for Class "A" material graded within the following limits:

ASTM Sieve Size	Percent Passing
31.5mm	100
25.0mm	95-100
12.5mm	50-83
4.75mm	30-60
1.18mm	15-40
600um	10-32
300um	5-22
75um	3-9

- .2 Type 2 Fill: Crushed rock composed of hard sound, durable uncoated, cubical fragments of consistent quality produced from non-sedimentary bedrock or non-sedimentary boulders, to comply with the P.E.I. Department of Transportation and Public Works Specification 401 - Aggregate, for Class "B" material graded within the following limits:

ASTM Sieve Size	Percent Passing
31.5mm	100
25.0mm	95-100
12.5mm	50-83
4.75mm	30-60
1.18mm	15-40
600um	10-32
300um	5-26
75um	3-7

- .3 Type 3 Fill: imported, classified as Common Fill, or material from excavation or other sources, approved by Departmental Representative for use

intended, unfrozen, free from rocks larger than 75mm, cinders, ashes, sods, refuse or other deleterious materials.

- .4 Type 4 Fill: natural sand or crushed rock screening, free from clay, shale or organic matter, to comply with P.E.I. Department of Transportation and Public Works Specification 402 - Bedding Sand, graded with the following limits.

ASTM Sieve Size	Percent Passing
9.5mm	100
4.75mm	87-98
2.36mm	55-95
1.18mm	30-90
600um	10-70
300um	0-35
150um	0-15
75um	0-8

- .5 Type 5 Fill: to requirements of Prince Edward Island, Department of Transportation and Public Works Specification #206.02.02 - Select Borrow as follows:

Borrow shall be non-plastic and composed of clean, uncoated particles free from lumps of clay or other deleterious material with a maximum particle size of 100mm, and a maximum of 30% of the material passing the 4.75 sieve shall pass the 0.075 mm sieve.

- .6 Type 6 Fill: clean, washed coarse sand free from clay, shale and organic matter and graded within the following limits:

ASTM Sieve Size	Percent Passing
12.5mm	100
4.75mm	90-100
0.85mm	40-100
0.35mm	0-75
0.25mm	0-38
0.75mm	0-8

- .7 Type 7 Fill: Crushed rock, composed of hard, sound, durable, uncoated, cubical fragments of consistent quality produced

from non-sedimentary bedrock or non-sedimentary boulders, graded within the following limits, to comply with the P.E.I. Department of Transportation and Public Works Specification 401 - Aggregate for Class "D" Material.

ASTM Sieve Size	Percent Passing
50.0mm	100
38.0mm	60-100
31.5mm	50-100
25.0mm	35-70
19.0mm	20-50
12.5mm	10-35
9.5mm	5-25
4.75mm	0-10

- .8 Geotextile filter fabric: Refer to Section 31 32 21.

### PART 3 - EXECUTION

#### 3.1 SITE PREPARATION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- .2 Where applicable, strip topsoil from within limits of excavation and stockpile as directed by Departmental Representative, for re-spreading.
- .3 Sawcut pavement or concrete neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

#### 3.2 STOCKPILING

- .1 Stockpile fill materials in areas designated by Departmental Representative. Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination and freezing.

#### 3.3 DEWATERING OF EXCAVATIONS

- .1 Keep excavations free of water while work is in progress.

- .2 Protect open excavations, trenches and completed installations against damage due to rainwater, surface run-off, spring water, groundwater, backing up of drains, sewers, flooding from watermain and all other water. Provide pumps, equipment and enclosures required for such protection.
- .3 Dispose of water in a manner not detrimental to public and private property, or any portion of work completed or under construction, and in accordance with the requirements of the Environmental Protection Plan.
- .4 All new and existing work damaged by failure to provide protection shall be removed and replaced with new work at the expense of the Contractor.

#### 3.4 SAW CUTTING

- .1 Existing pavement to be saw cut to produce neat, straight vertical cuts at interface between existing asphalt roadway and new pavement, where excavation meets with asphalt driveways, and at limits of Contract, or as directed by Departmental Representative.

#### 3.5 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions indicated or required to construct roadways and to install site services.
- .2 Remove demolished foundations, rubble and other obstructions encountered during excavation.
- .3 Excavations must not interfere with normal 45° splay of bearing from bottom of any footing.
- .4 Do not obstruct flow of surface drainage or natural watercourses.
- .5 Earth bottoms of excavations to be dry undisturbed soil, level, free from loose or organic matter.

- .6 Notify Departmental Representative when soil at bottom of excavation appears unsuitable and proceed as directed by Departmental Representative.
- .7 Obtain Departmental Representative's approval of completed excavation.
- .8 Remove unsuitable material from bottom of excavation to extent and depth directed by Departmental Representative.
- .9 Where required due to unauthorized over-excavation, correct as follows:
  - .1 Fill under other areas with Type 2 compacted to 98% density.
- .10 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed compact foundation soil to density at least equal to undisturbed soil.
- .11 Rock excavation:
  - .1 For the purpose of bidding it is to be assumed that solid sandstone bedrock, as defined under Par. 1.4 above, will not be encountered during the work of this Section.

3.6 FILL TYPES AND  
COMPACTION

- .1 Dimensions specified in following paragraphs are minimum dimensions of fill after compaction.
- .2 Paved areas:
  - .1 Use fill types and thickness as indicated on drawings. Compact top 100 mm of sandstone sub-base directly under granular base to 100% density.
- .3 Underground services:
  - .1 Use Type 4 Fill (bedding sand) to provide bedding and cover as indicated compacted full width of trench to minimum 95% density.

3.7 BACKFILLING

.2 Use Type 3 Fill to underside of topsoil at landscaped areas compacted to density at least equal to adjacent undisturbed soil or minimum 95%.

.1 Do not proceed with backfilling operations until Departmental Representative has inspected and approved installations.

.2 Areas to be backfilled to be free from debris, snow, ice, water or frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow, or debris.

.4 Backfilling around site installations.

.1 Place bedding and surround material as specified and indicated in applicable Section for service or utility to be installed.

.2 Do not backfill around or over cast-in-place concrete within 24 hours after placing.

.3 Place layers simultaneously on both sides of installed work to equalize loading.

.4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:

.1 Permit concrete to cure for minimum of 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval has been obtained from Departmental Representative or:

.2 If approved by Departmental Representative erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Departmental Representative.

.5 Place material by hand under, around and over installations until 600mm of cover is provided, except where specifically permitted otherwise. Dumping material directly



on installations will not be permitted.

- .5 Place backfill material in uniform layers up to grades indicated. Compact each layer before placing succeeding layer. Use methods to prevent damage to installations.

3.8 TESTING AND INSPECTION

- .1 Refer to Section 01 45 00 - Volume 'A'.

3.9 RESTORATION

- .1 Upon completion of work, remove surplus materials and debris, trim slopes and correct defects noted by Departmental Representative.
- .2 Clean and reinstate areas affected by work to satisfaction of Departmental Representative.

3.10 SURPLUS MATERIAL

- .1 Remove all surplus material from site, and pay all fees as may be charged at disposal site.
- .2 Remove all soil contaminated with oil, gasoline, calcium chloride or other toxic or dangerous materials and dispose of in manner to minimize danger at site and in a manner and to a location off site approved by Provincial Authority governing such disposal.

-----END-----

**PART 1 - GENERAL**

- 1.1 RELATED WORK .1 Rip Rap: Section 31 37 10
- 1.2 REFERENCES .1 CAN/CGSB-4.2-M88, Textile Test Methods.
- .2 CAN/CGSB-148.1-M85, Methods of Testing Geotextiles and Geomembranes.
- .3 ASTM D4595-86, Test Method for Tensile Properties of Geotextiles by the Wide Width Strip Method.
- .4 ASTM D4751-87, Test Method for Determining the Apparent Opening Size of a Geotextile.
- 1.3 DELIVERY AND STORAGE .1 During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.
- 1.4 MEASUREMENT FOR PAYMENT .1 Geotextile filter fabric will be measured in square metres of material incorporated in this work.
- .2 Supply and installation of accessories and other attachments will not be measured but considered incidental to work.

**PART 2 - PRODUCTS**

- 2.1 MATERIALS .1 Geotextile: non-woven synthetic fibre fabric, supplied in rolls of minimum 3.5 meters width and in one length.
- .1 Standard of Acceptance: Synthetic Industries 1001 or an approved equal.
- .2 Synthetic fibre to be rot proof, unaffected by action of oil or salt water and not subject to attack of insects or rodents.

- .3 Seams or joints to be constructed in accordance with manufacturer's recommendations.
- .4 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.
- .5 Physical properties:
  - .1 Thickness: minimum 2.54 mm.
  - .2 Mass per unit area: minimum 600 g/m<sup>2</sup>.
  - .3 Tensile strength and elongation (in any principal direction):
    - .1 Tensile strength: minimum 1000 N, wet condition.
    - .2 Elongation at break: 50%.
    - .3 Mullen burst strength: minimum 3600 kPa.
    - .4 Apparent opening size (AOS): 50 to 250 micrometres.
- .6 Securing pins and washers: to CAN/CSA-G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m<sup>2</sup> to CSA G164.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- .1 Place geotextile material by unrolling onto graded surface and against panels in orientation, manner and locations indicated and retain in position with weights.
- .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .3 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.
- .4 Place geotextile material behind concrete panel surfaces in one continuous length from bottom of

harbour to upper extent of panels as indicated.

- .5 Overlap each successive strip of geotextile 600 mm over previously laid strip.
- .6 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .7 Replace damaged or deteriorated geotextile to approval of Departmental Representative.

3.2 PROTECTION

- .1 Do not permit passage of any vehicle directly on geotextile at any time.

-----END-----

**PART 1 - GENERAL**

1.1 RELATED WORK

- .1 Geotextiles: Section 31 32 21

1.2 DESCRIPTION OF WORK

- .1 The work of this Section comprises the furnishing of all labour, materials and equipment necessary for the supply and installation of imported riprap on slopes as indicated, as specified and to lines, grades and typical cross sections shown on drawings.

- .2 Do not remove harbour material from water during shaping and construction of riprap slope protection.

1.3 MEASUREMENT FOR PAYMENT

- .1 Rip Rap material will be paid for at the unit bid price in tonne and this shall be full compensation for supplying and placing rocks, hauling, shaping of underlying material, equipment, tools, labour and incidentals necessary to complete the work in acceptable manner to Departmental Representative.

- .2 Toeing in of the stone will be incidental to the supply and placement of the Stones.

1.4 MATERIALS

- .1 To requirements of Prince Edward Island, Department of Transportation and Public Works Specification # 213 (latest edition) as it relates to Class R-50 imported metamorphic or igneous rock.

- .2 Stone: Imported metamorphic or igneous stones. Random rip rap shall consist of clean hard, durable quarried stone, free from seams, cracks or other structural defects having a density of not less than 2.65 tonne/m<sup>3</sup>.

- .3 The rock material is subject to Los Angeles Abrasion Test (ASTM C131), shall have a loss not greater than 35%.
- .4 When tested for soundness, five cycles of magnesium sulphate (ASTM C88), the rock material shall have a loss not greater than 15%.
- .5 Geotextile in accordance with Section 31 32 21 - Geotextiles.

#### 1.5 PLACING

- .1 Where rip-rap is to be placed on slopes, excavate toe in slope in accordance with dimensions as indicated or as directed by Departmental Representative.
- .2 Fine grade area to be rip-rapped to uniform, even surface. Fill depressions with suitable material and compact to provide firm bed.
- .3 Place geotextile on prepared surface. Place rip-rap on geotextile so as to avoid puncturing geotextile. Do not drive vehicles directly on geotextiles.
- .4 Place rip-rap in accordance with thickness and details as indicated or as directed by Departmental Representative.
- .5 Place stones in manner approved by Departmental Representative to secure surface and create a stable mass. Place larger stones at bottom of slopes and face of slopes.

-----END-----

## **PART 1 - GENERAL**

- |                                           |    |                                                                                                                                                                                        |
|-------------------------------------------|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>1.1 Related Sections</u>               | .1 | Section 31 23 10 - Excavating, Trenching and Backfilling.                                                                                                                              |
|                                           | .2 | Section 31 62 19 - Timber Piles.                                                                                                                                                       |
| <u>1.2 Delivery, Storage and Handling</u> | .1 | Protect piles from damage due to excessive bending stresses, impact, abrasion or other causes during delivery, storage and handling.                                                   |
|                                           | .2 | Replace damaged piles to satisfaction of Departmental Representative.                                                                                                                  |
|                                           | .3 | Load transport and deliver piles.                                                                                                                                                      |
|                                           | .4 | Supply piles as required to complete work.                                                                                                                                             |
| <u>1.3 Protection</u>                     | .1 | Protect public and construction personnel, adjacent structure, services and work of other sections from hazards due to pile driving operations.                                        |
| <u>1.4 Existing Conditions</u>            | .1 | Sub-surface investigation report is available at offices of PWGSC in Charlottetown.                                                                                                    |
|                                           | .2 | Notify Departmental Representative in writing if subsurface conditions at site differ from those indicated and await further instructions from Departmental Representative.            |
| <u>1.5 Scheduling of Work</u>             | .1 | Submit schedule of planned sequence of driving to Departmental Representative and Departmental Representative for review, not less than 2 weeks prior to commencement of pile driving. |

## **PART 2 - PRODUCTS**

- |                      |    |                                                                    |
|----------------------|----|--------------------------------------------------------------------|
| <u>2.1 Materials</u> | .1 | Material requirements for piles are specified in Section 31 62 19. |
|----------------------|----|--------------------------------------------------------------------|

- .2 Supply full length piles and provide equipment of sufficient capacity to handle full length piles without cutting and splicing.
- .3 Piles to be driven to bedrock and as required by Geotechnical investigation and indicated on drawings.
- .4 Do not splice piles without written permission of Departmental Representative.

### **PART 3 - EXECUTION**

#### **3.1 Equipment**

- .1 Prior to commencement of pile installation, submit to Departmental Representative for approval, details of equipment for installation of piles.
- .2 Hammer: Use hammers capable of developing a blow at operating speed with sufficient energy to drive tip of piles to required penetration.
- .3 Leads: Construct pile driver leads to provide free movement of hammer. Hold leads in position at top and bottom, with guys, stiff braces, or other means approved means, to ensure support to pile while being driven.

#### **3.2 Preparation**

- .1 Ensure that ground conditions at pile locations are adequate to support pile driving operation. Make provision for access and support of piling equipment during performance of work.

#### **3.3 Field Measurement**

- .1 Maintain accurate records of driving for each pile, including:
  - .1 Type and make of hammer, stroke or related energy.
  - .2 Other driving equipment including water jet, driving cap, cushion.
  - .3 Pile size, length and location.



- .4 Sequence of driving piles in group.
- .5 Number of blows per metre for entire length of pile and number of blows per 100mm for last 1000mm.
- .6 Final tip and cut-off elevations.
- .7 Other pertinent information such as interruption of continuous driving, pile damage.
- .8 Record elevation taken on adjacent piles during driving of each pile.
- .9 Provide Departmental Representative with three copies of records.

#### 3.4 Driving

- .1 All piles must be driven to established resistance in one continuous operation to avoid freeze.
- .2 Use driving caps and cushions to protect piles. Reinforce pile heads if necessary. Piles with damaged heads will be rejected by Departmental Representative.
- .3 Hold piles securely and accurately in position while driving.
- .4 Deliver hammer blows along axis of pile.
- .5 Do not drive piles within 8m of concrete which has been in place less than 3 days.
- .6 Ensure no contact between pile and structure takes place when driving batter piles adjacent to existing structures.
- .7 Redrive piles lifted during driving of adjacent piles.
- .8 Remove loose and displaced material from around piles after completion of driving, and leave clean, solid

surfaces to receive foundation concrete.

- .9 Use of water jet not permitted.
- .10 Cut off piles neatly and squarely at elevations as indicated. Provide sufficient length above cut-off elevation so that part damaged during driving is cut off.
- .11 Remove cut-off lengths from site on completion of work.

### 3.5 Capacity and Penetration

- .1 Required pile penetration depth to refusal and as indicated.
- .2 Installation of each pile will be subject to approval of Departmental Representative. Departmental Representative will be sole judge of acceptability of each pile with respect to final driving resistance, depth of penetration or other criteria used to determine capacity and penetration depth.
- .3 Drive each pile to bedrock and to pile tip elevation as indicated. Do not overdrive to cause damage to piles in bedrock. Departmental Representative will determine refusal criteria for piles driven to rock based on type of piles and driving equipment.
- .4 Refer to geotechnical investigation for piling recommendations in Appendix B.

### 3.6 Test Piles

- .1 With a view to determining the required lengths of the piling requirements the contractor may, at his discretion, carry out test driving of piles. The location and number of test piles is left to the discretion of the contractor.

3.7 Driving Tolerances

- .1 Install piles to the following tolerances: pile heads to be within 75mm of locations shown on drawing and to permit installation of concrete pile caps.
- .2 Top of piles to be aligned to approval of Departmental Representative. Take measure to correct alignment as required.

3.8 Damaged or Defective Piles

- .1 Departmental Representative will reject any pile that is driving out of position, twisted or is damaged during driving or handling.
- .2 Remove rejected pile and replace with a new, and if necessary, a longer pile.
- .3 No extra compensation will be made for removing and replacing or other work made necessary through rejection of defective piles.

-----END-----

**PART 1 - GENERAL**

1.1 Related Sections

- .1 Section 31 61 13 - Pile Foundations, General.

1.2 Measurement Procedures

- .1 Consider shoes, cap plates, straps and preservative treatment incidental to supply of piles.
- .2 Measure supply of piles in metres delivered to site, in lengths indicated or authorized in writing. (Supply quantity includes a cut-off length of 1.5m.)
- .3 Measure installation of piles in number of piles and lengths actually driven, and approved by Departmental Representative including those for test purposes.
- .4 Mobilization of equipment will not be considered as a separate item and will be included in the price quoted for the supply and installation of the piles.
- .5 Departmental Representative will establish actual number and lengths of piles installed from driving records.
- .6 Unit of measurement for install piles will be per metre measured from tip toe elevation to cut-off elevation at pile cap.

1.3 References

- .1 CSA B111-1974, Wire Nails, Spikes and Staples.
- .2 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CAN3-O56-M79, Round Wood Piles (metric version).

- .4 CAN/CSA-O80 Series-M89, Wood Preservation (including CSA Preliminary Standard O80.31-M1989).
- .5 ASTM A 123-89a, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .6 ASTM A 153-82(1987), Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware.
- .7 ASTM A 307-92a, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.

#### 1.4 Protection

- .1 Avoid dropping, bruising or breaking of wood fibres.
- .2 Avoid breaking surfaces of treated piles.
- .3 Do not damage surfaces of treated piles below cutoff elevation.
- .4 Treat cuts, breaks or abrasions on surfaces of treated piles, bolt holes and field cuts in accordance with CAN/CSA-O80.18 Series.

### **PART 2 - PRODUCTS**

#### 2.1 Materials

- .1 Round wood piles: all piles will conform to the requirements of CAN3-056, with minimum butt size of 330mm and tip diameter related to length as indicated in table A-1. All piles to be peeled and shod with a steel point as shown on plans or a substitute point approved by Departmental Representative.
- .2 Pile species: Coast Douglas Fir or Red Pine.
- .3 Preservative Treatment: to CAN/CSA-O80.18 Series. All timber piles shall

be pressure treated with CCA preservatives in accordance with CSA 080.18 (latest revision).

- .4 Departmental Representative will be sole judge as to quality and dimension of piles. Remove rejected piles from site of work.
- .5 Wire nails, spikes, staples: to CSA B111.
- .6 Bolts, nuts and washers: to ASTM A 307.
- .7 Hot dip galvanize bolts, nuts and washers and unless otherwise specified, staples, cable clamps, pipe sleeves, spikes and nails to CAN/CSA-G164. Other hardware to be galvanized to ASTM A 123.

### **PART 3 - EXECUTION**

#### **3.1 Wood Preservation**

- .1 Treat wood piles with wood preservative treatment as specified herein.

#### **3.2 Preparation**

- .1 Select piles in each bent group for uniformity of size and straightness to facilitate placing of brace timbers.
- .2 Where necessary, protect pile heads by means of heavy steel straps or wrought iron rings.
- .3 Equip piles with metal shoes or other tip protection of approved design. Submit details of proposed method of tip protection to Departmental Representative for approval.

#### **3.3 Installation**

- .1 Install piles in accordance with Section 31 61 13 - Pile Foundations, General.

- .2 Submit full details of method and sequence of installation of piling to Departmental Representative for approval prior to start of pile installation work.
- .3 Provide temporary guide frames and/or bracing to hold piles in proper alignment during setting and driving.
- .4 Provide proper guide frames to insure the batter piles achieve the specified angle and can be driven to the specified penetration.
- .5 Should an obstruction be encountered during driving, leave obstructed pile and proceed to drive remaining piles. Return and attempt to complete driving of pile later.
- .6 Secure a hardened steel point to each pile before driving.
- .7 Treat all end cut offs and field drilled bolt holes with preservative.

3.4 Pile Caps

- .1 Install timber pile caps as indicated.
- .2 Cut off piles to elevation indicated.

3.5 Bracing & Wales

- .1 Install bracing as indicated.

3.6 Splices

- .1 Splices of wood piles will not be permitted.

-----END-----

**PART 1 - GENERAL**

- 1.1 MEASUREMENT FOR PAYMENT .1 Dust Control will be considered incidental to the work and not measured separately for payment.
- 1.2 DESCRIPTION OF WORK .1 The work of this Section comprises the furnishing of all labour, materials and equipment necessary for the supply and application of water for prevention of dust nuisance caused by traffic, and/or weather conditions.

**PART 2 - PRODUCTS**

- 2.1 MATERIALS .1 Water: to Departmental Representative's approval.
- 2.2 SUPPLY .1 At least one mobile unit of at least 4.5 KL capacity for applying water shall be available on the project at all times.
- .2 The intake hose to the tank shall be equipped with a device satisfactory to the Departmental Representative to prevent fish from being pumped into the tank.

**PART 3 - EXECUTION**

- 3.1 APPLICATION .1 Apply water, when and where required, in location directed by Departmental Representative, with distributors equipped with a spray system that will ensure uniform application and with positive means of shut-off.

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