

SPECIFICATIONS

FOR

HIGHWAY 430 (kms 39.9 to 88.5)- Recapitalization
PARKS CANADA
GROS MORNE NATIONAL PARK, ROCKY HARBOUR, NL

ISSUED FOR TENDER

PCA Project No.: 1350
Date: February 23, 2016

Highway 430 (kms 39.9 to
88.5) - Recapitalization
Parks Canada

Stamped Signature Page

Page 1 of 2

Gros Morne National Park, Rocky Harbour, NL

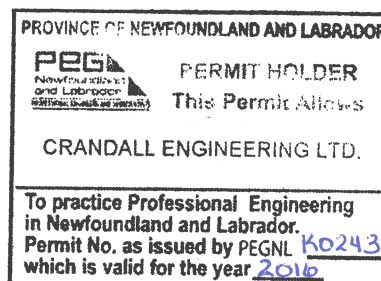
February 23, 2016

Specifications
Issued for Tender

PARKS CANADA

HIGHWAY 430 (kms 39.9 to 88.5) - Recapitalization, GROS MORNE NATIONAL PARK

Standing Offer Agreement: 5P301-14-0001/004
PCA Project No.: 1350



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Highway 430 (kms 39.9 to
88.5) - Recapitalization
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Gros Morne National Park, Rocky Harbour, NL

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Page 2 of 2

February 23, 2016

PARKS CANADA

HIGHWAY 430 REHABILITATION, GROS MORNE NATIONAL PARK

Crandall Engineering Ltd.

Issued for Tender - Technical Specifications

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<u>Section</u>	<u>Title</u>	<u>Pages</u>
<u>Division 01 - General Requirements</u>		
01 11 00	General Instructions	10
01 14 10	Scheduling and Management of Work	3
01 29 00	Project Particulars and Measurement	8
01 33 00	Submittal Procedures	6
01 35 29	Health & Safety Requirements	13
01 35 43	Environmental Procedures	10
01 35 45	Environmental Protection Refueling Vehicles	3
01 45 00	Testing & Quality Control	2
01 52 00	Construction Facilities	6
01 55 26	Traffic Regulation	8
01 56 00	Temporary Barriers and Enclosures	2
01 61 00	Common Product Requirements	5
01 71 00	Examination and Preparation	2
01 74 11	Cleaning	2
01 74 21	Construction/Demolition Waste Management & Disposal	5
01 77 00	Closeout Procedures	2
01 78 00	Closeout Submittals	5
<u>Division 03 - Concrete</u>		
03 10 00	Concrete Forming and Accessories	6
03 20 00	Concrete Reinforcing	5
03 30 00	Cast-in-Place Concrete	11
<u>Division 31 - Earthwork</u>		
31 05 17	Aggregates: General	5
31 11 00	Clearing & Grubbing	3
31 23 10	Excavating, Trenching & Backfilling	6
31 23 16.26	Rock Excavation	2
31 24 13	Roadway Embankments	4
31 37 00	Rip Rap	2
<u>Division 32 - Exterior Improvements</u>		
32 01 16	Removal of Existing Asphalt	2
32 11 19	Granular Subbase	4
32 11 23	Granular Base	4
32 12 13.16	Asphalt Tack Coat	4
32 12 16	Hot-Mix Asphalt Concrete Paving	17
32 17 23	Painted Traffic Lines & Markings	7
32 92 21	Hydroseeding	5
<u>Division 33 - Utilities</u>		
33 42 13	Pipe Culverts	8
<u>Appendix A</u>	Basic Impact Analysis (BIA)	

List of Drawings

Civil / Segment C Rehabilitation

C01 - Replacement Culvert Location Plan STA 40+406 to 52+025
C02 - Replacement Culvert Location Plan STA 52+220 to 62+290
C03 - Replacement Culvert Location Plan STA 63+320 to 67+900
C04 - Replacement Culvert Location Plan STA 82+446 to 88+515
C05 - Culvert Profile and Section View STA. 42+000
C06 - Culvert Sections STA. 40+408 to 42+478
C07 - Culvert Sections STA. 42+819 to 44+782
C08 - Culvert Sections STA. 44+982 to 46+733
C09 - Culvert Sections STA. 47+092 to 48+042
C10 - Culvert Sections STA. 48+233 to 49+971
C11 - Culvert Sections STA. 50+300 to 58+281
C12 - Culvert Sections STA. 58+432 to 60+830
C13 - Culvert Sections STA. 61+016 to 63+530
C14 - Culvert Sections STA. 63+700 to 67+900
C15 - Culvert Sections STA. 82+446 to 85+400
C16 - Culvert Sections STA. 85+525 to 88+515
C17 - Culvert Details and Cross Sections

Structural Drawings

S01 - Culvert at STA 42+000 Foundation Plan Sections and Details

PART 1 - GENERAL

- 1.1 Description of Work
- .1 The work will be carried out on Hwy 430, within the boundaries of Gros Morne National Park.
 - .2 The work of this contract includes the provision of all materials, labour, equipment, and ancillaries, all as necessary for the completion of the work as indicated on the drawings and as described in the specifications and notes. Work on this project consists generally of, but is not limited to, the following:
 - .1 Supply and install all environmental protection measures required such as site erosion and sediment control measures, check dams, silt fencing, hay/straw bales, vegetative stabilization and other measures, to be maintained for the duration of the project and removed following completion.
 - .2 Supply and operation of traffic control and signage for the duration of the project.
 - .3 Excavation, removal and disposal of existing CSP culverts indicated for replacement.
 - .4 Ditching in locations on Route 430 as directed by Departmental Representative.
 - .5 Supply and installation of new galvanized CSP arch and aluminized CSP culverts, complete with backfill, headwalls (if required) and rip rap aprons as indicated.
 - .6 Reconstruction of roadway embankment to match existing.
 - .7 Supply, installation and compaction of new asphalt pavement, including keyed joints at existing pavement.
 - .8 Temporary line striping.
 - .9 All other labour, materials and work necessary to complete the project to the Departmental Representative's full satisfaction.
 - .3 All work to be carried out in accordance with
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applicable federal and provincial regulations for those agencies having jurisdiction for the work. The work is subject to the National Park Act and Regulations, Canadian Environmental Protection Act, Canada Labour Code and the NL Occupational Health and Safety Act and Regulations.

- .4 The Contractor is advised that other construction work may be being performed by others at different locations during the time frame of this contract, including work required to replace Bottom Brook Bridge and Resurfacing of Route 430 - Segment 'C' Station (station 26+800 to 40+120). Contractor is to cooperate with other contractor's within the project limits.

1.2 Work Restrictions

- .1 A maximum of four (4) culvert replacement or construction locations will be permitted to be under construction at any given time, with traffic control as required.
- .2 Contractor is advised that all sub-excavation areas and/or transverse cuts along Route 430 must be reinstated (paved) prior to Contractor's crew shift change and/or every two (2) weeks maximum.

1.3 Familiarization With Site

- .1 Before submitting a bid, it is recommended that bidders visit the site to review and verify the form, nature and extent of the work, materials needed, the means of access and the temporary facilities required to perform the Work.
- .2 The chainage referred to on Route 430 is located along the center of the road with the south Park boundary located near the community of Wiltondale as station 0 + 000.
- .3 Obtain prior permission from the Parks Canada Asset Manager before carrying out such site inspection.
- .4 Contractors, bidders or those they invite to site are to review specification Section 01 35 29 - Health and Safety Requirements before

visiting site. Take all appropriate safety measures for any visit to site, both before and after acceptance of bid.

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|--|----|---|
| <u>1.4 Interpretation of Documents</u> | .1 | Supplementary to the Order of Precedence article of the General Conditions of the Contract, the Division 01 sections take precedence over the technical specification sections in other Divisions of the Specification Manual. |
| <u>1.5 Term Engineer</u> | .1 | Unless specifically stated otherwise, the term Engineer where used in the Specifications and on the Drawings shall mean the Departmental Representative as defined in the General Conditions of the Contract. |
| <u>1.6 Setting Out Work</u> | .1 | The Departmental Representative will provide layout. |
| <u>1.7 Measurement For Payment</u> | .1 | Notify Departmental Representative sufficiently in advance of operations to permit required measurements for payment. |
| <u>1.8 Maintenance of Work During Construction</u> | .1 | Maintain work during construction. Undertake continuous and effective maintenance work day by day, with adequate equipment and forces so that the roadway or structures are continuously kept in a condition satisfactory to Departmental Representative. |
| <u>1.9 Codes and Standards</u> | .1 | Perform work in accordance with National Parks Act, Code of Practice of the Department of Labour, as it pertains to the Traffic Control Manual (Department of Transportation & Works) and any other code of federal, provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements shall apply. |
| | .2 | Materials and workmanship must conform to or exceed applicable standards of Canadian General Standards Board (CGSB), Canadian Standards Association (CSA), American Society for Testing |
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and Materials (ASTM) and other standards organizations.

- .3 Conform to latest revision of any referenced standard as re-affirmed or revised to date of specification. Standards or codes not dated shall be deemed editions in force on date of tender advertisement.

1.10 Work Within Park
Boundaries

- .1 The project is within a national park and it is essential that lands remain as undisturbed as possible. The Contractor will be expected to use standards and methods beyond those for normal construction in order to protect the environment and ensure the aesthetics of the work. Contract limits shall be strictly adhered to and every precaution shall be taken to minimize environmental damage and disruption to vegetation, wildlife habitat, and structures or existing services, both on construction and storage sites.
 - .1 If any damage occurs during construction, the Contractor is responsible to bear the expense to immediately restore such damaged areas to the satisfaction of the Departmental Representative.
 - .2 If Contractor fails to repair damage to the satisfaction of the Departmental Representative, the Departmental Representative may have repairs completed by others at the Contractor's expense.
 - .3 The Contractor shall ensure that contracted work meets the standards outlined in the contract specification and drawings.
 - .4 The Contractor shall ensure that no damage will be done to any existing underground telephone cables.
 - .5 All sources of aggregate and asphalt cement must be submitted to the Departmental Representative for approval at least two weeks prior to the start of any work.
 - .6 The Contractor is responsible to follow the Provincial requirements regarding the following:
 - .1 Pit and Quarry Guidelines

.2 Environmental Construction
Practice specifications

- .7 The Contractor will make arrangements with authorities or owners of private properties for quarrying and transporting materials and machinery over their properties and be responsible for obtaining and paying of fees.

1.11 Work Within Park Boundaries

- .1 Maintain at job site, one copy each of following:
- .1 Contract drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed drawings.
 - .5 Change orders.
 - .6 Other modifications to Contract.
 - .7 Copy of approved work schedule.
 - .8 Field test reports.
 - .9 Manufacturer's installation and application instructions.
 - .10 Site specific Health and Safety Plan and other safety related documents.
 - .11 Other documents as stipulated elsewhere in the Contract Documents.

1.12 Site Conditions

- .1 The Contractor will be responsible to visit the roadway and review existing site conditions.

1.13 Departmental Representative

- .1 Departmental Representative will be assigned after contract award.

1.14 Work Schedule

- .1 Provide to the Departmental Representative in writing and within 5 working days after Contract award, a detailed construction schedule and traffic control plan. The schedule shall show proposed work to be undertaken and anticipated completion dates for each category of work.

1.15 Sanitary Services

- .1 The Contractor shall provide and maintain sanitary facilities for the use of workers at locations specified by the Departmental Representative. Provision of sanitary facilities shall meet requirements of provincial government and municipal statutes
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- and authorities.
- 1.16 Contractor's Use of Site
- .1 Use of site: for execution of work within roadway right of way and those areas specified by the Departmental Representative.
 - .2 The Departmental Representative will specify the areas for work and storage.
- 1.17 Project Meetings
- .1 Contractor will arrange project meetings and are to occur every two (2) weeks and assume responsibility for setting times and recording and distributing minutes.
 - .2 After receiving the Contractor's schedule, traffic control plan, health and safety hazard assessment, and environmental protection plan, and prior to start of construction, a meeting involving Contractor, Departmental Representative and Parks Canada will be held at a place and time to be determined by the Departmental Representative. This meeting will review implications of the contract, design, schedule of work health and safety, methods of construction, environment protection methods and traffic control.
 - .3 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative and schedule updated by Contractor in conjunction with and to approval of Departmental Representative.
 - .4 No work will begin until the pre-construction meeting is held, and all submittals have been approved.
 - .5 Following the pre-construction meeting and approval of submittals, the work will be carried out to meet the time restraints and have the project completed on time.
- 1.18 Cutting & Patching
- .1 Cut and patch as required to make work fit.
 - .2 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.
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1.19 Existing
Services

- .1 Carry out work at times directed by authorities having jurisdiction, with minimum of disturbance to pedestrian and vehicular traffic.
- .2 Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings.
- .3 Submit schedule to and obtain approval from Departmental Representative for any shut down or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.
- .4 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .5 Record locations of maintained, re-routed and abandoned service lines.
- .6 Ensure that at least one (1) lane of alternating two-way traffic is maintained at construction sites at all times.
- .7 Ensure pedestrian and other traffic is not unduly impeded, interrupted or endangered by execution or existence of work or plant.
- .8 Maintain existing signs at all times. When it is necessary to temporarily remove a sign, it shall be dismantled and re-established on a temporary post or stand set back from construction area. The work is considered to be incidental and no separate payment will be made for maintaining or moving signs.
- .9 Verify locations of any underground utilities.

1.20 Additional
Drawings

- .1 Departmental Representative may furnish additional drawings for clarification. These additional drawings have same meaning and intent as if they were included with plans referred to in Contract documents.

1.21 Relics,
Antiquities and
Wildlife Habitat

- .1 Protect relics, antiquities, wildlife habitat, items of historical or scientific interest such as cornerstones and contents, animal nesting sites, commemorative plaques, inscribed tablets, and similar objects found during course of work.
- .2 Give immediate notice to Departmental Representative and await Departmental Representative's written instructions before proceeding with work in this area.
- .3 Relics, antiquities and items of historical or scientific interest remain the property of Canada.

1.22 National Park
Act

- .1 For projects within boundaries of National Park, perform work in accordance with Canada National Parks Act and Regulations.

1.23 Measurement
of Quantities

- .1 Linear: Items which are measured by metre or kilometre are to be measured along centreline of installation unless otherwise shown on plans.
- .2 Area:
 - .1 Longitudinal and transverse measurements for areas to be measured horizontally.
- .3 Mass:
 - .1 Term "tonne" shall mean 1000 kg.
 - .2 Materials which are specified for measurement by mass shall be weighed on scales approved by and at locations designated by Departmental Representative. Units used to haul material being paid for by mass shall bear legible identification numbers plainly visible to scale person as it approaches and leaves scale-house.
- .4 Time:
 - .1 Unless otherwise provided for elsewhere or by written authority of Departmental Representative, hourly rental of

equipment will be measured in actual working time and necessary travelling time of equipment within limits of project at an all-inclusive rate. Equip each unit of mobile equipment with an approved device to register hours of operation. Devices which only measure hours of running of motor will not be accepted.

1.24 Permits/
Authorities

- .1 The Contractor shall obtain, and pay for, permits from authorities as required for all operations and construction. He shall also comply with all pertinent regulations of all authorities having jurisdiction over the work. The Contractor shall provide copies of all permits to the Departmental Representative prior to starting the work. The Contractor shall be responsible for obtaining all applicable permits, inspections and approvals required and shall pay all charges in connection therewith.

1.25 Equipment
Rental Rates

- .1 Upon written request, the Contractor will supply the Departmental Representative with a list of the rental equipment to be used on work beyond the scope of bid items. Equipment rental rates will be in accordance with current rates published by the Newfoundland and Labrador Department of Transportation and Works.

1.26 Existing Survey

- .1 Topographic survey used in the preparation of these Contract Documents was provided by PCA.

1.27 Protection

- .1 Store all materials and equipment to be incorporated into work to prevent damage by any means.
- .2 Repair and replace all materials or equipment damaged in transit or storage to the satisfaction of the Departmental Representative and at no cost to Canada.
- .3 Contractor will take adequate precautions to protect existing structures when operating tracked equipment.
- .4 Exercise care so as not to obstruct or damage public or private property in the area.
- .5 At completion of work, restore area to its

original condition. Damage to ground and property will be repaired by Contractor. Remove all construction materials, residue, excess, etc., and leave site in a condition acceptable to Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 Submittals

- .1 Upon acceptance of bid and prior to commencement of work, submit to Departmental Representative the following work management documents:
 - .1 Work Schedule as specified herein.
 - .2 Health and Safety Plan as specified in Section 01 35 29 - Health and Safety Requirements.
 - .3 Environmental Protection Plan as specified in Section 01 35 43 - Environmental Procedures.
 - .4 Traffic Control Plan as specified in Section 01 55 26 - Traffic Regulation.

1.2 Work Schedule

- .1 Upon acceptance of bid submit:
 - .1 Preliminary work schedule within 5 calendar days of contract award.
 - .2 Schedule to indicate all calendar dates from commencement to completion of all work within the time stated in the accepted bid.
 - .3 Provide sufficient details in schedule to clearly illustrate entire implementation plan, depicting efficient coordination of tasks and resources, to achieve completion of work on time and permit effective monitoring of work progress in relation to established milestones.
 - .4 Work schedule content to include as a minimum the following:
 - .1 Bar (GANTT) Charts, indicating all work activities, tasks and other project elements, their anticipated durations, planned dates for achieving key activities and major project milestones supported with:
 - .1 Written narrative on key elements of work illustrated in bar chart, providing sufficient details to demonstrate a reasonable implementation plan for completion of project within designated time.
 - .2 Generally Bar Charts derived from commercially available computerized project management system are preferred
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but not mandatory.

- .5 Work schedule must take into consideration and reflect the work phasing.
 - .6 Schedule work in cooperation with the Departmental Representative.
 - .7 Completed schedule shall be approved by Departmental Representative. When approved, take necessary measures to complete work within scheduled time. Do not change schedule without Departmental Representative's approval.
 - .8 Ensure that all subtrades and subcontractors are made aware of the work restraints and operational restrictions specified.
 - .9 Schedule Updates:
 - .1 Submit when requested by Departmental Representative.
 - .2 Provide information and pertinent details explaining reasons for necessary changes to implementation plan.
 - .3 Identify problem areas, anticipated delays, impact on schedule and proposed corrective measures to be taken.
 - .10 Departmental Representative will make interim reviews and evaluate progress of work based on approved schedule. Frequency of such reviews will be as decided by Departmental Representative. Address and take corrective measures on items identified by reviews and as directed by Departmental Representative. Update schedule accordingly.
 - .11 In every instance, any change or deviation from the Work Schedule, no matter how minimal the risk or impact on safety or inconvenience to tenant or public might appear, will be subject to prior review and approval by the Departmental Representative.
 - .12 A maximum section of highway no longer than 3 km will be permitted to be under construction for the purpose of placing new asphalt pavement at any given time, with traffic control as required.
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- .13 A maximum of four (4) culvert replacements will be permitted to be under construction at any given time, with traffic control as required.

1.3 Project Meetings

- .1 Schedule and administer project meetings every two (2) weeks for entire duration of work.
- .2 Prepare agenda for meetings.
- .3 Notify participants by e-mail 4 days in advance of an unscheduled meeting date.
 - .1 Ensure attendance of all subcontractors.
 - .2 Departmental Representative will provide list of other attendees to be notified.
- .4 Hold meetings at project site or where approved by Departmental Representative.
- .5 Preside at meetings and record minutes.
 - .1 Indicate significant proceedings and decisions. Identify action items by parties.
 - .2 Distribute to participants by e-mail or by facsimile within 3 calendar days after each meeting.
- .6 Make revisions as directed by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 General
Requirements

- .1 The Form of Tender includes one lump sum priced item and several unit priced items.
- .2 The total tendered price shall be the sum of the lump sum item plus the amounts calculated from the unit priced items based on the approximate quantities identified for each of the unit priced items.
- .3 The Contractor in submitting their Tender for the project understand that they will only be entitled to payment under the unit priced items when prior written authorization has been received from the Departmental Representative for utilization and then only to the extent of the work authorized by the Departmental Representative.
- .4 Additional instructions for measurement and/or payment for items of the work may be contained in specific sections of the Technical Specifications. In the case of a conflict between the instructions for measurement and payment contained in this section with that of any other section, the requirement of this section shall apply.

The submitted tender prices will be inclusive of all costs for the complete supply and installation of all materials, labour and equipment required to complete the work. No separate payment will be made for any testing inspections and approvals required by Contractor.
- .5 All measurement shall be along a horizontal plane unless otherwise indicated.

- 1.2 Lump Sum Item
- .1 No separate measurement for payment shall be made for any work completed under this item.
 - .2 The work of the lump sum item shall include all other works which are required for completion of the project exclusive of those covered by the unit priced items.
 - .3 All and any items not specifically included in the unit price items are considered incidental to the work and are to be included in the lump sum portion of the work.
- 1.3 Unit Price Items
- .1 Clearing and Grubbing:
 - .1 Unit of measurement: hectare (ha).
 - .2 Method of Measurement: horizontal area.
 - .3 This item includes: clearing and disposal of all roadside vegetation, including trees (standing and felled), shrub vegetation and underbrush, within the limits of Route 430, the intersection upgrades and ditching areas as directed by Departmental Representative. Stripping of topsoil layer on road widening areas is incidental to the work.
 - .2 Ditching:
 - .1 Unit of Measurements: Hour(hr) of crew time.
 - .2 Method of Measurement: From accepted time sheets, signed by Departmental Representative.
 - .3 This Item Includes a crew consisting of the following; One (1) 25 tonne excavator; Four (4) Tandem Dump Trucks; Five (5) Operators for above equipment, flagpersons, etc. as required; Equipment and personnel as required at the dump site including all costs to rehabilitate dump site to meet standards of those having jurisdiction. Ditching to be completed at locations on Route 430 as directed by Departmental Representative.
 - .3 Common Excavation:
 - .1 Unit of Measurement: Cubic meter (m³) in-situ.
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- .2 Method of Measurement: All excavation required for culvert removal, and installation will not be measured separately for payment but shall be incidental to culvert installation.
 - .4 Rock Excavation:
 - .1 Unit of Measurement: cubic meters, in place measurement.
 - .2 Method of Measurement: Rock will be measured in its original position, by the cross-section method. Cross sections will be measured at five (5) metre intervals.
 - .3 This item includes: The unit price will be full compensation for material, equipment, and work required for rock removal excavation, and re-using in embankment backfill.
 - .4 Remove rock 300mm below invert of culverts. Remove rock as required to construct backslopes and ditches, as indicated on the drawings or as directed by Departmental Representative in the field.
 - .5 Granular "A" Base, Granular "B" Subbase and Rock Borrow Materials:
 - .1 Unit of Measurement: Metric Tonnes (1000 kg).
 - .2 Method of Measurement: Scale tickets signed by Departmental Representative, except as provided below.
 - .3 These items include: supply, placement, hauling and compaction of granular materials for culvert installations, culvert backfill, shoulder reconstruction (where millings are not able to be used), roadway granular base and subbase. This item also includes grading and compaction of existing subgrade below granular materials prior to their installation to provide required subgrades.
 - .4 There shall be no payment for extra thickness of subbase and base materials placed outside of specified limits. Whenever in the opinion of the Departmental Representative there is
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extra thickness, the appropriate weight will be deducted.

.6 Channel Excavation:

- .1 Unit of Measurement: cubic meter (m^3) in-situ.
- .2 Method of measurement: Channel excavation shall be measured as the volume of cubic metres calculated by the average end area method between cross-sections before and after removal of material acceptably excavated. Departmental Representative and Contractor shall agree on quantity measurements at the end of each day's work. Excavation below grade, or beyond the cross section limits staked will not be measured for payment.
- .3 This item includes: Supply and transportation of all labour, equipment and materials, removal and disposal of unsuitable material and debris, clean up and all work incidental thereto, all as specified or as shown on the Drawings or as directed by the Departmental Representative required to remove all channel excavation materials and disposing of the removed materials at approved disposal locations. All material not accepted by Departmental Representative for re-use shall be disposed of off-site.

.7 Rip Rap:

Unit of Measurement: Metric Tonne (1000 kg)

- .1 Method of Measurement: Scale tickets signed by Departmental Representative, except as provided below.
- .2 This item includes: supply, placement, hauling and compaction. There shall be no payment for extra thickness of materials placed outside of limits. Whenever in the opinion of the Departmental Representative there is extra thickness, the appropriate weight will be deducted.

.8 Asphalt Tack Coat:

- .1 Unit of measurement: square meter (m^2).

- .2 Method of Measurement: horizontal surface area, rounded to one decimal place.
 - .3 This item includes: labour, materials and equipment used to clean the existing surface, and supply and apply tack coat. This item also includes tack coat application on any vertical joints at limits of surface areas.
- .9 Hot-Mix Asphalt Concrete Paving (Surface Course)
- .1 Unit of Measurement: Metric Tonnes (1000 kg).
 - .2 Method of Measurement: Scale tickets signed by Departmental Representative, except as provided below.
 - .3 This item includes: supply, placement and compaction of surface course asphaltic concrete. All key joints are to be included in this unit item.
 - .4 There shall be no payment for extra thickness or extra width of asphalt placed. Wherever in the opinion of the Departmental Representative there is extra thickness, the appropriate weight will be deducted.
- .10 Asphalt Cement:
- .1 Unit of measurement: Metric Tonnes (1000 kg)
 - .2 Method of Measurement: Bills of loading, signed by Departmental Representative, for binder delivered to the plant and incorporated into the work. The Departmental Representative reserves the right to have the asphalt cement weighed at the asphalt plant to verify quantities incorporated and accepted into the work. Adjustments will be made for the initial and final tank measurements corrected to 15 degrees C. See Section 32 12 16 - Hot-Mix Asphalt Concrete Paving.
- .11 Placement of Asphalt Millings for Shoulders:
- .1 Unit of Measurement: Metric Tonnes (1000 kg).
 - .2 Method of Measurement: Scale tickets
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signed by Departmental Representative,
except as provided below.

- .3 These items include: supply, placement,
hauling and compaction of granular
materials for shoulder reconstruction.
This item also includes grading and
compaction of existing subgrade below
granular materials prior to their
installation to provide required
subgrades.
- .4 Payment for RAP for shoulder
reconstruction will be paid as Granular
'B' Subbase where incorporated into
shoulders.

.12 Pipe-Culverts:

- .1 Unit of Measurement: metre (m).
- .2 Method of Measurement: along centerline
of new culvert pipe, from end to end of
culvert, as laid and as accepted by the
Departmental Representative.
- .3 Supply and installation of culverts will
be measured and paid separately.
- .4 Supply item includes: supply of new
culvert pipe or arch including couplers,
bolts, etc. and delivery to site.
- .5 Payment for culvert installation item
includes:
 - .1 Dewatering of site.
 - .2 Excavation and removal of existing
CSP culverts and disposal of any
unsuitable material.
 - .3 Common excavation.
 - .4 Installation of new culverts.
 - .5 Providing end treatment/beveling of
culverts as indicated.
 - .6 Backfilling with suitable excavated
material from culvert excavation above
the Granular "B" backfill up to the road
subgrade.
 - .7 Supply and placement of rip rap to
be paid for separately.
 - .8 Supply and placement of concrete
headwall to be paid for separately.
 - .9 All other cost not included with
other units in this contract.

.13 Concrete Headwalls:

- .1 Unit of measure: cubic meters, in place

- measurement.
- .2 Method of measurement: Based on dimensions indicated on drawings for consolidated concrete in place within the completed structure. No payment will be made for surplus concrete used outside the dimensions indicated.
 - .3 This item includes excavation, furnishing of all materials, aggregates, cement, supplementary cementing materials, concrete mixes, admixtures, reinforcing steel, tools, equipment, falsework, forms, bracing, chairs, bolsters, ties, labour, curing, surface finishing, and all other items required to complete the work. Supply, installation and securing of reinforcing steel is incidental to this work and is included in this item.
- .14 Cast-In-Place Reinforced Concrete:
- .1 Unit of Measurement: cubic metre (m³)
 - .2 Method of Measurement: Volume of consolidated concrete installed in completed structures, based on the neat lines called for in the Drawings. Waste materials not included.
 - .3 This item includes: furnishing of all materials, aggregates, cement, supplementary cementing materials, concrete mixes, admixtures, unshrinkable fill, reinforcing steel, tools, equipment, falsework, forms, bracing, chairs, bolsters, ties, labour, curing, surface finishing, and all other items required to complete the work. Supply, installation and securing of Reinforcing Steel is incidental to this work and is included in this item.
 - .4 This item also includes excavation required for installation, backfilling with suitable excavated material, shoring, temporary retaining wall or structures, dewatering, temporary control of stream water flow as required, protection of the stream from the demolition of existing or construction of the new structure.
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- .15 Permanent Line Striping and Markings:
 - .1 Unit of measurement: each culvert site.
 - .2 This item includes: painting
 - .3 No additional payment for traffic control (including signage) associated with the application of pavement markings shall be made.
 - .4 All pavement markings to be in accordance with the Manual of Uniform Traffic Devices for Canada (MUTDC), latest edition.
- .16 Hydroseeding:
 - .1 Unit of measurement: square metre (m²).
 - .2 Method of Measurement: The slope area actually seeded and mulched, from within the limits as staked by the Departmental Representative, will be measured in square metres, rounded to the nearest whole number. The surface area shall be measured jointly with the Departmental Representative using a measuring wheel or approved alternative method.
 - .3 This item includes: all labour, materials and equipment for the preparation of the ground to be treated with hydroseeding and the supply and placement of hydroseed mix, together with such watering and maintenance as may be required over a one-year establishment period from date of initial acceptance.
 - .4 Seeded areas will be accepted by the Departmental Representative provided evidence of growth and plants are uniformly established.
 - .5 An additional application of fertilizer is required the following Spring after initial application. No additional payment will be made for maintenance over the establishment period or the extra application of fertilizer.
 - .6 A holdback of 25% of the cost for hydroseeding will be released for each seeded area upon fulfilment of the following conditions:
 - .1 An additional application of fertilizer has been provided the

following Spring after initial application.

- .2 Growth is sustained throughout the establishment period to the satisfaction of the Departmental Representative.

.17 Fish Weirs:

- .1 Unit of Measurement: each fish weir installed.
- .2 This item includes furnishing of all materials, aggregates, cement, supplementary cementing materials, concrete mixes, admixtures, reinforcing steel, tools, equipment, falsework, forms, bracing, chairs, bolsters, ties, labour, curing, surface finishing, assembly and anchor bolts and all other items required to complete the work. Supply, installation and securing of reinforcing steel is incidental to this work and is included in this item.

END OF SECTION

PART 1 - GENERAL

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|-------------------------------|----|--|
| <u>1.1 Related Sections</u> | .1 | Section 01 35 29 - Health and Safety Requirements. |
| | .2 | Section 01 35 43 - Environmental Procedures. |
| | .3 | Section 32 12 16 - Hot-Mix Asphalt Concrete Paving. |
| | .4 | Section 33 42 13 - Pipe Culverts. |
|
<u>1.2 Administrative</u> | .1 | Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed. |
| | .2 | Do not proceed with Work affected by submittal until review is complete. |
| | .3 | Present shop drawings, product data, samples and mock-ups in SI Metric units. |
| | .4 | Where items or information is not produced in SI Metric units converted values are acceptable. |
| | .5 | Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected. |
| | .6 | Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations. |
| | .7 | Verify that field measurements and affected |
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adjacent Work are co-ordinated.

- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative's review.
- .10 Keep one reviewed copy of each submission on site.

1.3 Shop Drawings and Product Data

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow 5 days for Departmental Representative to review each submission.
- .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in shop drawings as Departmental

Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.

- .7 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
 - .8 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
 - .9 After Departmental Representative's review, distribute copies.
 - .10 Submit one (1) transparency on plastic film, six (6) prints and one (1) electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
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- .11 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
 - .12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accordance with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
 - .13 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
 - .14 Submit electronic copies of manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
 - .15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by
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Departmental Representative.

- .1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
 - .16 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
 - .17 Delete information not applicable to project.
 - .18 Supplement standard information to provide details applicable to project.
 - .19 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, transparency copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
 - .20 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.
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1.4 Samples

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

1.5 Certificates And Transcripts

- .1 Immediately after award of Contract, submit Workplace NL status.
- .2 Submit transcription of insurance immediately after award of Contract.

END OF SECTION

PART 1 - GENERAL

1.1 Definitions

- .1 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.
- .2 Competent Person: A person who is:
 - .1 Qualified by virtue of personal knowledge, training and experience to perform assigned work in a manner that will ensure the health and safety of persons in the workplace, and;
 - .2 Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work and;
 - .3 Knowledgeable about potential or actual danger to health or safety associated with the Work.
- .3 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.
- .4 PPE: personal protective equipment.
- .5 Work Site: where used in this section shall mean areas, located at the premises where Work is undertaken, used by Contractor to perform all of the activities associated with the performance of the Work.

1.2 Submittals

- .1 Make submittals in accordance with Section 01 33 00.
 - .2 Submit site-specific Health and Safety Plan prior to commencement of Work.
 - .1 Submit within 10 work days of notification of Bid Acceptance. Provide 3 copies.
 - .2 Departmental Representative will review Health and Safety Plan and provide comments.
 - .3 Revise the Plan as appropriate and resubmit within 10 work days after receipt of comments.
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- .4 Departmental Representative's review and comments made of the Plan shall not be construed as an endorsement, approval or implied warranty of any kind by Canada and does not reduce Contractor's overall responsibility for Occupational Health and Safety of the Work.
- .5 Submit revisions and updates made to the Plan during the course of Work.

- .3 Submit name of designated Health & Safety Site Representative and support documentation specified in the Safety Plan.
- .4 Submit building permit, compliance certificates and other permits obtained.
- .5 Submit copy of Letter in Good Standing from Provincial Workers Compensation or other department of labour organization.
 - .1 Submit update of Letter of Good Standing whenever expiration date occurs during the period of Work.
- .6 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .7 Submit copies of incident reports.
- .8 Submit WHMIS MSDS - Material Safety Data Sheets.

1.3 Compliance Requirements

- .1 Comply with Occupational Health and Safety Act for Province of Newfoundland and Labrador, and Occupational Health & Safety Regulations made pursuant to the Act.
 - .2 Comply with Canada Labour Code - Part II (entitled Occupational Health and Safety) and the Canada Occupational Health and Safety Regulations (COSH) as well as any other regulations made pursuant to the Act.
 - .1 The Canada Labour Code can be viewed at:
[www.http://laws.justice.gc.ca/en/L-2/](http://laws.justice.gc.ca/en/L-2/)
 - .2 COSH can be viewed at:
[www.http://laws.justice.gc.ca/eng/SOR-86-304/n e .html](http://laws.justice.gc.ca/eng/SOR-86-304/n e .html)
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- .3 A copy may be obtained at: 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.)
- .3 Observe construction safety measures of:
 - .1 Part 8 of National Building Code.
 - .2 Provincial Worker's Compensation Board.
 - .3 Municipal by-laws and ordinances.
- .4 In case of conflict or discrepancy between above specified requirements, the more stringent shall apply.
- .5 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.
- .6 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.
- .7 Comply with all works outlined in the Department of Transportation and Works, Traffic Control Manual, Revised April 2014.

1.4 Responsibility

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons and environment adjacent to the site to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by all workers, sub-contractors and other persons granted access to Work Site with safety requirements of Contract Documents, applicable federal, provincial, and local by-laws, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.5 Site Control and Access

- .1 Control the Work and entry points to Work Site. Approve and grant access only to workers and authorized persons. Immediately stop and remove non-authorized persons.
 - .1 Departmental Representative will
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provide names of those persons authorized by Departmental Representative to enter onto Work Site and will ensure that such authorized persons have the required knowledge and training on Health and Safety pertinent to their reason for being at the site, however, Contractor remains responsible for the health and safety of authorized persons while at the Work Site.

- .2 Isolate Work Site from other areas of the premises by use of appropriate means.
 - .1 Erect fences, hoarding, barricades and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and create a safe environment. See Section 01 56 00 - Temporary Barriers and Enclosures for minimum acceptable requirements.
 - .2 Post signage at entry points and other strategic locations indicating restricted access and conditions for access.
 - .3 Use professionally made signs with bilingual message in the 2 official languages or international known graphic symbols.
- .3 Provide safety orientation session to persons granted access to Work Site. Advise of hazards and safety rules to be observed while on site.
- .4 Ensure persons granted site access wear appropriate PPE. Supply PPE to inspection authorities who require access to conduct tests or perform inspections.
- .5 Secure Work Site against entry when inactive or unoccupied and to protect persons against harm. Provide security guard where adequate protection cannot be achieved by other means.

1.6 Protection

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

- .2 Should unforeseen or peculiar safety related hazard or condition become evident during performance of Work, immediately take measures to rectify situation and prevent damage or harm. Advise Departmental Representative verbally and in writing.

1.7 Filing of Notice

- .1 File Notice of Project with pertinent provincial health and safety authorities prior to beginning of Work.
 - .1 Departmental Representative will assist in locating address if needed.

1.8 Permits

- .1 Post permits, licenses and compliance certificates, specified in section 01 11 00 - General Instructions, at Work Site.
- .2 Where a particular permit or compliance certificate cannot be obtained, notify Departmental Representative in writing and obtain approval to proceed before carrying out applicable portion of work.

1.9 Hazard Assessments

- .1 Perform site specific health and safety hazard assessment of the Work and its site.
- .2 Carryout initial assessment prior to commencement of Work with further assessments as needed during progress of work, including when new trades and subcontractors arrive on site.
- .3 Record results and address in Health and Safety Plan.
- .4 Keep documentation on site for entire duration of the Work.

1.10 Project / Site Conditions

- .1 Following are potential health, environmental and safety hazards at the site for which Work may involve contact with:
 - .1 Known latent site and environmental conditions:
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- .1 Steep slopes and rock faces.
 - .2 Streams, brooks and other water bodies.
 - .3 Wildlife.
- .2 Facility on-going operations:
 - .1 Highway traffic.
- .2 Above items shall not be construed as being complete and inclusive of potential health and safety hazards encountered during Work.
- .3 Include above items in the hazard assessment of the Work.

1.11 Meetings

- .1 Attend pre-construction health and safety meeting, convened and chaired by Departmental Representative, prior to commencement of Work, at time, date and location determined by Departmental Representative. Ensure attendance of:
 - .1 Superintendent of Work.
 - .2 Designated Health & Safety Site Representative.
 - .3 Subcontractors.
 - .2 Conduct regularly scheduled tool box and safety meetings during the Work in conformance with Occupational Health and Safety regulations.
 - .3 Keep documents on site.
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1.12 Health and Safety
Plan

- .1 Prior to commencement of Work, develop written Health and Safety Plan and Safety Control Plan specific to the Work. Implement, maintain, and enforce Plan for entire duration of Work and until final demobilization from site.
- .2 Health and Safety Plan shall include the following components:
 - .1 List of health risks and safety hazards identified by hazard assessment.
 - .2 Control measures used to mitigate risks and hazards identified.
 - .3 On-site Contingency and Emergency Response Plan as specified below.
 - .4 On-site Communication Plan as specified below.
 - .5 Name of Contractor's designated Health & Safety Site Representative and information showing proof of his/her competence and reporting relationship in Contractor's company.
 - .6 Names, competence and reporting relationship of other supervisory personnel used in the Work for occupational health and safety purposes.
- .3 On-site Contingency and Emergency Response Plan shall include:
 - .1 Operational procedures, evacuation measures and communication process to be implemented in the event of an emergency.
 - .2 Evacuation Plan: site and floor plan layouts showing escape routes, marshalling areas. Details on alarm notification methods, fire drills, location of fire fighting equipment and other related data.
 - .3 Name, duties and responsibilities of persons designated as Emergency Warden(s) and deputies.
 - .4 Emergency Contacts: name and telephone number of officials from:
 - .1 General Contractor and subcontractors.
 - .2 Pertinent Federal and Provincial Departments and Authorities having jurisdiction.

- .3 Local emergency resource organizations.
 - .5 Harmonize Plan with Facility's Emergency Response and Evacuation Plan. Departmental Representative will provide pertinent data including name of PCA and Facility Management contacts.
 - .4 On-site Communication Plan:
 - .1 Procedures for sharing of work related safety information to workers and subcontractors, including emergency and evacuation measures.
 - .2 List of critical work activities to be communicated with Facility Manager which have a risk of endangering health and safety of Facility users.
 - .5 Address all activities of the Work including those of subcontractors.
 - .6 Review Health and Safety Plan regularly during the Work. Update as conditions warrant to address emerging risks and hazards, such as whenever new trade or subcontractor arrive at Work Site.
 - .7 Departmental Representative will respond in writing, where deficiencies or concerns are noted and may request re-submission of the Plan with correction of deficiencies or concerns.
 - .8 Post copy of the Plan, and updates, prominently on Work Site.
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1.13 Safety Supervision

- .1 Employ Health & Safety Site Representative responsible for daily supervision of health and safety of the Work. Representative to be trained in occupational health and safety procedures and practices.
- .2 Health & Safety Site Representative may be the Superintendent of the Work or other person designated by Contractor and shall be assigned the responsibility and authority to:
 - .1 Implement, monitor and enforce daily compliance with health and safety requirements of the Work.
 - .2 Monitor and enforce Contractor's site-specific Health and Safety Plan.
 - .3 Conduct site safety orientation session to persons granted access to Work Site.
 - .4 Ensure that persons allowed site access are knowledgeable and trained in health and safety pertinent to their activities at the site or are escorted by a competent person while on the Work Site.
 - .5 Stop the Work as deemed necessary for reasons of health and safety.
- .3 Health & Safety Site Representative must:
 - .1 Be qualified and competent person in occupational health and safety.
 - .2 Have site-related working experience specific to activities of the Work.
 - .3 Be on Work Site at all times during execution of the Work.
- .4 All supervisory personnel assigned to the Work shall also be competent persons.
- .5 Inspections:
 - .1 Conduct regularly scheduled safety inspections of the Work on a minimum bi-weekly basis. Record deficiencies and remedial action taken.
 - .2 Conduct Formal Inspections on a minimum monthly basis. Use standardized safety inspection forms. Distribute to subcontractors.
 - .3 Follow-up and ensure corrective measures taken.
- .6 Cooperate with Facility's Occupational Health and Safety representative should one be

designated by Departmental Representative.

- .7 Keep inspection reports and supervision related documentation on site.

1.14 Training

- .1 Use only skilled workers on Work Site who are effectively trained in occupational health and safety procedures and practices pertinent to their assigned task.
- .2 Maintain employee records and evidence of training received. Make data available to Departmental Representative upon request.
- .3 When unforeseen or peculiar safety-related hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

1.15 Minimum Site Safety Rules

- .1 Notwithstanding requirement to abide by federal and provincial health and safety regulations; ensure the following minimum safety rules are obeyed by persons granted access to Work Site:
 - .1 Wear appropriate PPE pertinent to the Work or assigned task; minimum being hard hat, safety footwear, safety glasses, hearing protection and high-visibility workwear.
 - .2 Immediately report unsafe condition at site, near-miss accident, injury and damage.
 - .3 Maintain site and storage areas in a tidy condition free of hazards causing injury.
 - .4 Obey warning signs and safety tags.

Brief persons of disciplinary protocols to be taken for non compliance. Post rules on site.

1.16 Correction of Non-Compliance

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
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- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative will stop Work if non-compliance of health and safety regulations is not corrected in a timely manner.

1.17 Incident Reporting

- .1 Investigate and report the following incidents to Departmental Representative:
 - .1 Incidents requiring notification to Provincial Department of Occupational Safety and Health, Workers Compensation Board or to other regulatory Agency.
 - .2 Medical aid injuries.
 - .3 Property damage in excess of \$10,000.00.
 - .4 Interruptions to Facility operations resulting in an operational lost to a Federal department in excess of \$5000.00.
- .2 Submit report in writing.

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.
 - .1 Post on site.
 - .2 Submit copy to Departmental Representative.
 - .3 For interior work in an occupied Facility, post additional copy in one or more publically accessible locations.

1.19 Blasting

- .1 Blasting or other use of explosives is not permitted on site without prior receipt of written permission and instructions from Departmental Representative.

1.20 Powder Actuated Devices

- .1 Use powder actuated fastening devices only after receipt of written permission from Departmental Representative.
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| <u>1.21 Confined Spaces</u> | .1 | Abide by occupational health and safety regulations regarding work in confined spaces. |
| | .2 | Obtain an Entry Permit in accordance with Part XI of the Canada Occupational Health and Safety Regulations for entry into an existing identified confined space located at the Facility or premises of Work. <ul style="list-style-type: none">.1 Obtain permit from Facility Manager.2 Keep copy of permit issued. |
| | .3 | Safety for Inspectors: <ul style="list-style-type: none">.1 Provide PPE and training to Departmental Representative and other persons who require entry into confined space to perform inspections..2 Be responsible for efficacy of equipment and safety of persons during their entry and occupancy in the confined space. |
| <u>1.22 Site Records</u> | .1 | Maintain on Work Site copy of safety related documentation and reports stipulated to be produced in compliance with Acts and Regulations of authorities having jurisdiction and of those documents specified herein. |
| | .2 | Upon request, make available to Departmental Representative or authorized Safety Officer for inspection. |
| <u>1.23 Posting of Documents</u> | .1 | Ensure applicable items, articles, notices and orders are posted in conspicuous location on Work Site in accordance with Acts and Regulations of Province having jurisdiction. |
| | .2 | Post other documents as specified herein, including: <ul style="list-style-type: none">.1 Site specific Health and Safety Plan.2 WHMIS data sheets.3 Incident reports.4 Tool box and safety meeting minutes |
| <u>1.24 Scalehouse</u> | .1 | Ensure Scalehouse is a sufficient distance away from scales to prevent roll-over accidents. |
| | .2 | Ensure scalehouse is equipped with washroom |
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facilities and air conditioning/heat.

END OF SECTION

15003PART 1 - GENERAL

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|-------------------------------|----|---|
| <u>1.1 Precedence</u> | .1 | For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual. |
| <u>1.2 Related Sections</u> | .1 | Section 01 35 45 - Environmental Protection Refueling Vehicles. |
| | .2 | Section 01 74 21 - Constructional Demolition Management and Disposal. |
| <u>1.3 Fires</u> | .1 | Fires and burning of rubbish on site not permitted. |
| <u>1.4 Disposal of Wastes</u> | .1 | Do not bury rubbish and waste materials on site unless approved by Departmental Representative. |
| | .2 | Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers. |
| | .3 | Dispose of uncontaminated construction/ demolition material which cannot be recycled or reused, at an approved construction and debris disposal site. |
| <u>1.5 Drainage</u> | .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 local authority requirements |
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1.6 Site Clearing
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 vegetation removal to areas indicated or designated by Departmental Representative.
- .6 Vegetation and topsoil should not be removed to obtain fill for road construction purposes.
- .7 Whenever possible, organic debris removed during grading operations should be stored for use during site restoration. Such stockpiles should be located well away from any stream or water body and should be covered with coarse material or tarps to minimize wind and water erosion.

1.7 Work Adjacent to
Waterways

- .1 Do not operate construction equipment in waterways.
 - .2 Do not use waterway beds for borrow material without Departmental Representative's approval.
 - .3 Do not dump excavated fill, waste material or debris in waterways.
 - .4 Design and construct temporary crossings to minimize erosion to waterways.
 - .5 Do not skid logs or construction materials across waterways.
 - .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.
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- .7 Do not blast under water or within 100 m of indicated spawning beds.
- .8 Temporary diversion ditches, approved by the Departmental Representative, are to be plastic lined.
- .9 Temporary storage sites for debris generated from clearing operations should be deposited away from watercourses and should be surrounded by a natural vegetative buffer.
- .10 Do not pump or drain water containing suspended materials into waterways. Water containing suspended materials shall be pumped into vegetation a minimum of 30 m away from watercourses.

1.8 Pollution Control

- .1 Maintain temporary erosion and pollution control features installed under this contract.
 - .2 Control emissions from equipment and plant to local authorities' emission requirements.
 - .3 Prevent sandblasting and other extraneous materials from contaminating air 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. Chemicals used in dust control must have prior approval of the Departmental Representative.
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1.9 General
Requirements

- .1 Work under this contract is to be carried out in a National Park, and environmental protection must be given a high priority by all staff involved with the work. Perform work in accordance with Canada National Parks Act and Regulations.
- .2 An Environmental Briefing will be held prior to work commencing at the site, which will outline environmental factors to be considered during the work. It is mandatory that all current staff of the Contractor attend this meeting with the Departmental Representative and Environmental Protection Officer (EPO).
- .3 The Contractor shall meet all requirements as detailed in Appendix A - Basic Impact Analysis (BIA) Segment C Mattie Mitchell's to Rocky Harbour Highway 430 Rehabilitation, Gros Morne National Park. This document is not all-inclusive, and site adjustment of the mitigation methods for the work may be required. The Departmental Representative will advise the Contractor of any additional requirements as they arise.

1.10 Site Set-up and
Use

- .1 All site activities related to construction are to be confined within the defined project boundaries.
 - .2 Work sites will be equipped with appropriate and properly maintained sanitary facilities.
 - .3 Garbage must be collected and removed daily from the work site. All material must be removed, transported and disposed of in accordance with existing provincial - municipal and Park solid waste disposal guidelines and/or regulations.
 - .4 Littering is prohibited.
 - .5 Temporary storage, parking areas, and turn-a-round facilities for contractor-related equipment and vehicles will be limited to those areas agreed to and designated by the Departmental Representative.
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1.11 Environmental
Protection Plan

- .1 The Contractor is required to submit a plan showing all pollution control measures that will be used to fulfill the requirements of the Environmental Protection Section. This plan will be reviewed by the Departmental Representative and the Environmental Protection Officer prior to commencement of any work. Any deviation from this plan will require further approval by the Departmental Representative. The protection plan shall be submitted prior to the pre-construction meeting.
- .2 The Environmental Plan will outline how the Contractor will address the environmental protection requirements, including removal and installation of culverts, and ensure pollution created by the construction is controlled. It will show sufficient detail on products to be used and physical placement on site to determine effectiveness of these items.
- .3 The plan must cover all activities within the limits of all construction, laydown and traffic diversion areas.

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| <u>1.12 Environmental Performance</u> | .1 | The Contractor is required to follow the Canadian Environmental Protection Act and Canadian National Parks Act. |
| | .2 | The Contractor is held responsible to ensure that all necessary permits related to Environmental Protection have been obtained and that necessary documentation is available on-site. |
| <u>1.13 Vehicular Movements</u> | .1 | Restrict movement of vehicles and equipment to existing disturbed areas (access roads, borrow pits, disposal areas and right-of-ways). |
| <u>1.14 Storage and Handling of Fuels And Dangerous Fluids</u> | .1 | Locate fuel storage facility a minimum of 100 m from any water body in an area approved by Departmental Representative and construct impermeable dykes so that any spillage is contained. Fueling of vehicles or equipment will not be permitted within 100 m of any water body. Maintenance of vehicles and equipment will be permitted only in designated areas as directed by the Departmental Representative. |
| | .2 | Exercise care in handling of fuels or dangerous materials to minimize potential for spills. Report immediately any spills to Departmental Representative. Contractor is responsible for responding immediately to any spill to minimize environmental damage and for clean-up, repair or rehabilitation resulting from any spills to the satisfaction of the Departmental Representative. |
| | .3 | Supply and maintain on site emergency response material to contain spills and minimize environmental damage, i.e. absorbent material, to the approval of Departmental Representative. Disposal of all contaminated material shall be off-site at an approved facility. |
| | .4 | Dangerous goods, whose release into the environment could cause adverse effect, should be stored and handled in a manner which gives due regard for workers and public safety, and for the protection of the environment. |
| | .5 | No material toxic to fish or any aquatic life |
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shall be permitted to enter any stream, river, or lake. This shall include, but not be limited to lubricants, fuels, testing fluids, insecticides, detergents, herbicides, cement, lime or concrete.

- .6 The management of fuels, lubricants and chemicals must meet with the requirements of the Newfoundland & Labrador Department of Environment & Conservation and all other appropriate provincial and federal regulations.
 - .7 Fuel storage containers must be accompanied by impermeable structures that would provide containment of 125% of the container capacity in the event of a leak or spill.
 - .8 All refueling and lubricating operations should employ protection measures such as drip pans, to reduce the potential for escape of petroleum products to the environment.
 - .9 The Departmental Representative and the Park's Environmental Protection Officer (EPO) must be immediately contacted after a spill of fuel or lubricant, and after any amount of other chemical products has escaped.
 - .10 Storage of any fuel has to occur only in previously approved locations, and with Park consent. The Contractor must submit plans for fuel management and a Spill Contingency Plan seven days prior to the start of the Work. The Contractor is expected to be prepared to effect the containment and cleanup of all spills related to the Work.
 - .11 Storage of hazardous material, including explosives, shall not be permitted, except for quantities which shall normally be expected to be utilized in a day of Work, and which are not permitted to stockpile.
 - .12 Emulsion storage tanker and transfer of emulsion from tanker to spray vehicle are not permitted.
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1.15 Erosion and
Sediment Control

- .1 Appropriate preventative controls should be in place at all times during construction to prevent undue erosion and sedimentation. The Contractor is required to provide to the Departmental Representative for approval ten (10) working days before start-up an erosion and sedimentation control plan, as part of the Environmental Protection Plan. The plan shall incorporate all necessary silt fences, silt traps, plastic lined trenches and ditches as approved by the Departmental Representative.
 - .2 The Contractor shall install and maintain all sedimentation and erosion control features for the duration of the project, in accordance with the approved plan. The Contractor shall remove all sedimentation and erosion control upon completion of the work and when requested by the Departmental Representative.
 - .3 Sediment fences and erosion control structures shall be constructed in roadside ditches or at culvert inlets prior to any excavation as directed by Departmental Representative.
 - .4 To minimize run-off, work on slopes which may affect water body will be curtailed during periods of heavy rainfall, as directed by the Departmental Representative.
 - .5 Prior to carrying out work, check long range weather forecast to ensure that there is adequate time before forecast of heavy rain storms to stabilize the work. Provide details of stabilization plan to Departmental Representative for review.
 - .6 Maintain a stockpile of appropriate erosion and environmental protection materials (e.g. silt fences, straw bales, wood chips, clean rock fill and aggregate base course) on site at all times.
 - .7 Install additional erosion control measures as required by site conditions to prevent sediment from entering drainage courses.
 - .8 Inspect erosion and sediment control measures on a daily basis and maintain as necessary.
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| <u>1.16 Fisheries Regulations</u> | .1 | Obtain proper permits or authorization from Federal Department of Fisheries and Oceans and maintain a copy of said permit on site. Regulations stipulated in the Permit will be strictly enforced. |
| <u>1.17 Relics and Antiquities</u> | .1 | Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found on site or in structures to be demolished, shall remain property of Canada. Protect such articles and request direction from Departmental Representative. |
| | .2 | Give immediate notice to Departmental Representative if evidence of archaeological finds are encountered during construction and await his written instructions before proceeding with work in this area. |
| <u>1.18 Treated Wood</u> | .1 | Workers shall be made aware of the possible health risks associated with exposure to CCA or creosote treated timber as well as the recommended safe practices for handling such materials. |
| | .2 | Disposal of treated wood wastes including saw-dust must be outside of the site, and in accordance with all applicable Provincial and Municipal regulations. Similar attention must be given to disposal of any replaced guiderail posts which have been treated with creosote, which must also be removed from the park for disposal. |
| <u>1.19 Environmental Incident or Emergency</u> | .1 | In the event of an environmental incident or emergency such as: <ul style="list-style-type: none">.1 Chemical spill or petroleum spill;.2 Poisonous or caustic gas emission;.3 Hazardous material spill;.4 Sewage spill;.5 Contaminated water into waterways..6 The Contractor or his employees shall immediately:<ul style="list-style-type: none">.1 Notify the Contractor's job superintendent. |
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- .2 Call the local emergency services and give type of emergency.
- .3 Notify the Departmental Representative and the Park's Environmental Protection Officer (EPO).

- .2 The Contractor is to submit to Departmental Representative a copy of its Environmental/Spill Response Plan for approval.

1.20 Site Decommissioning

- .1 Unless prior permission from the Departmental Representative is obtained, all contractor equipment, facilities and materials must be removed from the Park at the finish of each work phase, or if work is suspended due to weather or other circumstances, upon the suspension of work activities.
- .2 All work sites must be returned to a neat and tidy condition upon site abandonment.

1.21 Site Clearing

- .1 Timber and vegetation shall not be cleared unless approved by Departmental Representative.
- .2 Vegetation and topsoil shall not be removed to obtain fill for road construction purposes.
- .3 All cleared trees and timber shall become the property of the Contractor, and are to be disposed of outside the park boundaries.
- .4 All cut shrub vegetation and underbrush shall be chipped and evenly dispersed on-site or dragged from sight into the adjacent forest edge. No burning of any vegetation or debris will be permitted in the park boundaries.
- .5 No roadside vegetation clearing will be permitted during the annual songbird nesting period of June and July.

END OF SECTION

PART 1 – GENERAL

1.1 Refuelling

- .1 Refueling of equipment to be performed in locations as directed by Departmental Representative.
 - .2 .2 Do not refuel equipment within 100 metres of any watercourse or storm water catch basin unless protection against spills is in place and location is approved by Departmental Representative.
 - .3 Use petroleum containers approved for products with no spill fill spouts for dispensing fuels. The sure pour nozzle to have self closing valve, prevent any flow of fuel until the nozzle is inserted into the receiving container. On removal from the receiving container the slide valve closes to eliminate any fuel spill. Nozzle to be equipped with its own automatic vent eliminating the need for the user to open or close air inlets on the pouring container.
 - .4 Nozzle to support the weight of the pouring container. Nozzles to automatically stop the flow when the receiving container becomes full. The nozzle to be such that it reduces evaporative losses of volatile organic compounds during the fuel transfer.
 - .5 All spills of hydrocarbon based products such as gasoline, kerosene, naphtha, lubricating oils, engine oils, greases and de-icing fluids or antifreeze **no** matter how large or small to be reported to Departmental Representative and the Park's Environmental Protection Officer (EPO).
 - .6 Oil changes or equipment repairs in the field or on Parks Canada land are not permitted.
 - .7 Refueling to be performed on level surfaces, PCC Portland cement concrete or HMA surfaces when approved by the Departmental Representative unless otherwise directed.
 - .8 Contractor to have drip pans sized for amounts
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of product to be recovered and customized to fit under pieces of equipment to perform routine maintenance to equipment while maintaining equipment on property. Drip Pans to be used whenever leaving equipment on site or parking overnight when not in use.

- .9 Parking of equipment on site to be on level ground in locations away from watercourses and as approved by Departmental Representative. Equipment with leaks or poor mechanical repair to be removed from site when so ordered by Departmental Representative.

1.2 Spill Control Kit

- .1 Contractor to have at the work site a spill control kit consisting of the following minimum types of equipment:
 - .1 a spaded shovel;
 - .2 a stable broom;
 - .3 a broad nosed shovel;
 - .4 a container(s) suitable, compatible to and of sufficient size to contain petroleum products being used with equipment;
 - .5 Absorbents;
 - .6 Rags;
 - .7 Metal container for soiled rags;
 - .8 Booms when working next to a watercourse that will traverse the width of the watercourse by two times; and
 - .9 Spill control kit to be inspected and approved by both the Newfoundland and Labrador Department of Environment & Conservation and the Departmental Representative prior to Work commencing. Spill control kits to be available to Contractor employees at all areas where Work of the Contract is being performed and at all times during the course of the Contract.
 - .10 Contractor employees to be trained in the use of the spill control kit and the equipment they contain.

1.3 Spills

- .1 Disposal of spilled materials to be off Parks Canada property and at approved locations for
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materials to be disposed of.

- .2 When parking of equipment on site, the equipment is to be secured from entry, inspected for leaks and the ground protected from leaks.
- .3 Contractor to protect all wells, catch basins, drywells, drains and watercourses from contamination in event of a spill.
- .4 All equipment to be used for the Work of the Contract to be inspected by the Departmental Representative for leaks. Equipment not in good repair to be removed/repaired when directed by Departmental Representative.
- .5 Spills to be reported immediately to Departmental Representative, the Park's Environmental Protection Officer (EPO) and the Newfoundland and Labrador Department of Environment and Conservation.
- .6 Contractor to immediately remove as much or all of the contaminated soils as possible, from any spills created from Work of the Contractor.
- .7 Contaminated soils/materials to be placed in containers compatible to the contaminants.
- .8 Any remaining clean-up to be performed at no extra cost to Parks Canada. Clean-up to be to the Departmental Representative's satisfaction.

END OF SECTION

PART 1 - GENERAL

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| <u>1.1 Related Sections</u> | .1 | Section 01 33 00 - Submittal Procedures. |
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| <u>1.2 Inspection</u> | .1 | Give minimum 24 hours notice requesting inspection of Work designated for special tests, inspections or approvals by Departmental Representative or by inspection authorities having jurisdiction. |
| | .2 | In accordance with the General Conditions, Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. |
| | .3 | If Contractor covers or permits to be covered Work designated for special tests, inspections or approvals before such is made, uncover Work until particular inspections or tests have been fully and satisfactorily completed and until such time as Departmental Representative gives permission to proceed. |
| | .4 | Pay costs to uncover and make good work disturbed by inspections and tests. |
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| <u>1.3 Testing</u> | .1 | Tests on materials, as specified in various sections of the Specifications are the responsibility of the Department except where stipulated otherwise. |
| | .2 | Departmental Representative will engage and pay for service of Independent Inspection and Testing Agencies for purpose of inspecting and testing portions of Work except for the following which remain part of Contractor's responsibilities: <ul style="list-style-type: none">.1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities..2 Inspection and testing performed exclusively for Contractor's convenience..3 Mill tests and certificates of compliance..4 Tests as specified within various |
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sections designated to be carried out by Contractor under the supervision of Departmental Representative.

- .5 Additional tests specified in Clause 1.3.2.

1.4 Access to Work

- .1 Facilitate Departmental Representative's access to Work. If part of Work is being fabricated at locations other than construction site, make preparations to allow access to such Work whenever it is in progress.
- .2 Furnish labour and facility to provide access to the work being inspected and tested.
- .3 Co-operate to facilitate such inspections and tests.

1.5 Rejected Work

- .1 Remove and replace defective Work, whether result of poor workmanship, use of defective or damaged products and whether incorporated in Work or not, which has been identified by Departmental Representative as failing to conform to Contract Documents.
- .2 Make good damages to new construction and finishes resulting from removal or replacement of defective work.

END OF SECTION

PART 1 - GENERAL

<u>1.1 Section Includes</u>	.1	Construction aids.
	.2	Office and sheds.
	.3	Parking.
	.4	Project identification.
<u>1.2 Precedence</u>	.1	For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual.
<u>1.3 Related Sections</u>	.1	Section 01 56 00 - Temporary Barriers and Enclosures.
<u>1.4 References</u>	.1	Canadian General Standards Board (CGSB. .1 CGSB 1-GP-189M-84, Primer, Alkyd, Wood, Exterior. .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
	.2	Canadian Standards Association (CSA International) .1 CAN3-A23.1-/A23.2-94, Concrete Materials and Methods for Concrete Construction/Method of Test for Concrete. .2 CSA-0121-M1978, Douglas Fir Plywood. .3 CAN/CSA-Z321-96, Signs and Symbols for the Occupational Environment.
<u>1.5 Installation And Removal</u>	.1	Provide construction facilities in order to execute work expeditiously.
	.2	Remove from site all such work after use.
<u>1.6 Scaffolding</u>	.1	Provide and maintain scaffolding, ladders and temporary stairs.

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| <u>1.7 Hoisting</u> | .1 | Provide, operate and maintain hoists cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof. |
| | .2 | Hoists cranes shall be operated by qualified operator. |
| <u>1.8 Site Storage/Loading</u> | .1 | Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products. |
| | .2 | Do not load or permit to load any part of Work with a weight or force that will endanger the Work. |
| <u>1.9 Construction Parking</u> | .1 | Parking will be limited to Contractor vehicles and equipment required to carry out work only, provided it does not disrupt performance of Work. |
| | .2 | Provide and maintain adequate access to project site. |
| | .3 | Build and maintain temporary roads where indicated or directed by Departmental Representative and provide snow removal during period of Work. |
| | .4 | If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads. |
| <u>1.10 Security</u> | .1 | Contractor shall provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays (24 hours per day, 7 days per week). |
| <u>1.11 Departmental Representative's Site Offices</u> | .1 | Contractor to provide Departmental Representative's office trailer/space. Minimum office trailer/space size is 40 m ² . |
| | .2 | Contractor to arrange and pay for phone, fax |
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machine, internet connection and photocopier in Departmental Representative's office for its exclusive use. Long distance calls placed on this phone and fax to be paid for by Departmental Representative. Replacement cartridges for printer and photocopier to be supplied by contractor.

- .3 Contractor to equip office with washroom, kitchen and one separate office, two 1 m x 2 m tables, one 1 m x 2 m drafting table, 4 chairs, 6 m of shelving 300 mm wide, one 3 drawer filing cabinet, one plan rack and one coat rack and shelf.
 - .4 Upon completion of the Contract; all equipment and furniture provided by the Contractor shall be returned to contractor.
 - .5 Supply of the Departmental Representative's office, supplies and services will be incidental to the work. Payment to be included in the lump sum portion of the work.
 - .6 Contractor to ensure site office is supplied and operational within 14 days after contract award.
 - .7 Provide garbage and cleaning services bi-weekly.
 - .8 Maintain inside air temperature at 20 degrees.
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| <u>1.12 Testing Laboratory</u> | .1 | Provide testing laboratory at aggregate production site and at asphalt concrete plant for exclusive use of Departmental Representative. <ul style="list-style-type: none">.1 Provide water, electrical power and propane to testing laboratory at aggregate production site, and at asphalt concrete plant..2 Notify Departmental Representative sufficiently in advance of operations to allow for assignment of Laboratory personnel and scheduling of tests..3 No separate payment to be made for Testing Laboratory. Cost shall be deemed incidental to Contract, and deemed to be included in the lump sum portion of the work..4 If testing laboratory at aggregate production site is required at the same time as testing laboratory at asphalt concrete production site, provide additional laboratory as required..5 Maintain inside air temperature at 20 degrees..6 Refer to the DTW Specifications Book, standard drawing 1203, for minimum size and equipment requirements. |
| <u>1.13 Equipment, Tool And Materials</u> | .1 | Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials. |
| | .2 | Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities. |
| <u>1.14 Sanitary Facilities</u> | .1 | Provide sanitary facilities for work force in accordance with governing regulations and ordinances. |
| | .2 | Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition. |
| <u>1.15 Construction Signage</u> | .1 | No other signs or advertisements, other than warning signs, are permitted on site. |
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- .2 Signs and notices for safety and instruction shall be in both official languages Graphic symbols shall conform to CAN3-Z321.
- .3 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.

1.16 Weigh Scale and
Scale House

- .1 The scales shall be of such capacity to accurately weigh any single loaded truck arriving on the site. The contractor is advised that split weighing will not be permitted under any circumstances. The vehicle being weighed must be fully supported by the scale platform. Split or axle weighing is a method to be used only for highway weight restriction control.
 - .2 The scale shall be equipped with a portable scale house complete with furniture and adequate provision for heat, air conditioning and light.
 - .3 The Contractor shall periodically clean the scale house and maintain all lights, air conditioning, and heating in good working condition at all times when the scales are in use.
 - .4 The scale platform and mechanism shall at all times be maintained clean and free from encumbrances such as gravel, asphalt, snow, and ice.
 - .5 Scale houses must be equipped with suitable washroom facilities that meet the OHS Act and Regulations under Sections 13 and 14 of the Regulations. These facilities must be located within 100m of the scale house.
 - .6 These facilities must be provided for use of the Department of Transportation and Works employees only for the duration of the project while scales are being used. These facilities must be cleaned twice weekly and in the case of a portable toilet, emptied of sewage as well. Contractor must also supply toiletries for the
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facility.

- .7 Ensure scale house is sufficient distance away from scales to prevent roll-over accidents.

END OF SECTION

PART 1 - GENERAL

<u>1.1 Description</u>	.1	This section is to provide traffic control as stipulated in the Department of Transportation and Works Traffic Control Manual (TCM).
	.2	Given the nature of the highway, its critical transportation link, effect on motorists, etc. it is imperative that Park personnel be kept notified as to the number of construction areas, their locations, duration of work, etc. This information must be provided by the contractor to the Park Communications staff on an ongoing basis.
	.3	A Traffic Control Plan must be approved by the Departmental Representative prior to commencing any work. Traffic Control Plan to be submitted prior to the pre-construction meeting.
	.4	The Departmental Representative reserves the right to direct the contractor to reduce either the number or length of traffic control work areas during peak traffic volumes or when cumulative delays exceed the specified maximum.
<u>1.2 Related Work</u>	.1	Section 01 11 10 - General Instructions.
	.2	Section 01 35 29 - Health and Safety Requirements.
	.3	Section 01 56 00 - Temporary Barriers and Enclosures.
<u>1.3 Reference Standard</u>	.1	Government of Newfoundland and Labrador Department of Transportation and works, Highway
	.2	Design Division. Traffic Control Manual (TCM), latest edition.
<u>1.4 Protection of Traffic</u>	.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 When working on travelled way:
 - .1 Place equipment in position to present minimum of interference and hazard to travelling public.
 - .2 Keep equipment units as close together as working conditions will permit and preferably on same side of travelled way.
 - .3 Do not leave equipment on travelled way overnight.
 - .3 Do not close any lanes of roadway without approval of Departmental Representative. Before re routing traffic, erect suitable signs and devices in accordance with instructions contained in the TCM. Provide sufficient crushed gravel to ensure a smooth riding surface during work.
 - .4 Keep travelled way well graded, free of pot holes and of sufficient width that required number of lanes of traffic may pass.
 - .5 Ensure at least one (1) lane of alternating two-way traffic at all times.
 - .6 When directed by Departmental Representative, provide well graded, detours or temporary roads to facilitate passage of traffic around restricted construction area. Provide and maintain signs and lights and maintain roadway.
 - .7 Provide and maintain reasonable road access and egress to property fronting along or in vicinity of work under Contract unless approved otherwise by Departmental Representative.
 - .8 All flag persons and traffic control personnel shall have successfully completed a traffic control training course approved by the Workplace Health, Safety and Compensation Commission of Newfoundland and Labrador. Proof of training for all persons shall be available on site at all times.
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1.5 Informational and
Warning Devices

- .1 Provide and maintain signs and other devices required to indicate construction activities or other temporary and unusual conditions resulting from project work which may require road user response.
- .2 All traffic signs are to be bilingual or symbolic and shall be Level 1 reflectivity.
- .3 Supply and erect signs, declinators, barricades and miscellaneous warning devices as specified in TCM.
- .4 Place signs and other devices in locations recommended in the TCM.
- .5 The contractor shall provide an Accredited Sign Supervisor to be on site at all times when active construction is taking place. The Accredited Traffic Control Sign Supervisor will be responsible to supervise the placement and dismantling of all temporary condition signs and devices that indicate to the road user that highway construction activity exist and also to ensure that proper traffic control procedures are carried out in accordance with the TCM. The Accredited Sign Supervisor is considered part of the contractor's supervision and administration staff and compensation for the provision this individual is considered incidental to the work.
- .6 A Traffic Control Plan must be approved by the Departmental Representative prior to commencing any work.
- .7 Continually maintain traffic control devices in use by:
 - Checking signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
 - .1 Removing or covering signs which do not apply to conditions existing from day to day.

1.6 Portable Variable
Message Sign

.1 General:

- .1 It is a requirement that electronic signage trailer mounted) be employed at both ends of the work area, notifying the general public that construction will be occurring over the next 14 kms, along with anticipated delay times, etc. Notification signage is critical for this project, given the traffic volumes and potential for accidents to occur.

.2 Operating Characteristics:

- .1 The Portable Variable Message Signs (PVMS) shall exhibit the following operating characteristics while in use:
 - .1 Light emitting diode (LED) technology or hybrid LED/Flip Disk Technology.
 - .2 Antiglare polycarbonate sheeting.
 - .3 Solar powered.
 - .4 Capable of operating for 7 consecutive days on battery power supply with solar panels disconnected.
 - .5 Shall include all hardware and software necessary to facilitate reliable local and remote sign control.
 - .6 Programmable (25 message sequence for one week duration).
 - .7 Capable of displaying a multiphase message with variable dwell times for each phase.
 - .8 Text of message shall not scroll or travel horizontally or vertically across the face of the sign.
 - .9 Capable of displaying 3 lines of 8 characters, each character being approximately 457 mm high.
 - .10 Each character matrix comprised of 35 pixels, 5 wide by 7 high.
 - .11 Message visible from 500 metres away in all ambient light conditions.
 - .12 Message legible from 50 metres to 300 metres away in all ambient light conditions.
 - .13 Ability to raise the bottom of the display board a minimum of 1.5 metres above ground level.

.14 Flat black background on the display area when the pixels are in the off position.

.15 Trailer painted orange or yellow.

.16 Capability to accurately level the sign and aim it towards oncoming traffic.

.17 Photo sensor array to enable the luminance of the sign to be controlled both automatically and manually in relation to ambient light levels.

.18 Locking device to prevent rotation of the sign in winds up to 10-km/hour, while the sign is in display mode.

.3 Trailer Mounting:

.1 The maximum dimensions of the Portable Variable Message Sign and trailer assembly while in display mode shall be as follows:

.1 Maximum overall height = 4.5 metres.

.2 Maximum overall width = 3.75 metres.

.3 Maximum overall length = 5.5 metres.

.4 Maximum gross unit weight = 2500 kilograms.

.4 Conspicuity Markings:

.1 PVMS trailer assemblies shall require high reflectivity micro-prismatic fluorescent sheeting tape (or equivalent) (e.g. diamond grade or Type VII) (meeting ATSM standard E991 and ASTM E1247 for fluorescent materials). The reflectorized tape shall be of alternating, uniform white and orange or white and yellow sections. Sections of reflectorized tape shall be placed around the trailer frame, tongue or other outermost dimension, at uniform height and width such to reflect the light from the headlights of a vehicle approaching from any direction.

.2 PVSM sign assemblies shall require high reflectivity micro-prismatic fluorescent sheeting tape (or equivalent) (e.g. diamond grade or Type VII) ((meeting ATSM standard E991 and ASTM E1247 for fluorescent materials). The reflectorized tape shall be

construction orange in colour, and 13 mm in width. The tape shall surround the outside of the sign assembly on all sides and be uniform distance from the outmost pixels.

1.7 Control of Public Traffic

- .1 Provide traffic control personnel who have valid provincial certification and are trained in accordance with and properly equipped as specified in the TCM, in following situations:
 - .1 When public traffic is required to pass working vehicles or equipment which may block all or part of travelled 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 workers or equipment are employed on travelled 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 For emergency protection when other traffic control devices are not readily available.
 - .6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
- .2 All Traffic Control Personnel shall be equipped with portable radios of sufficient range to ensure continuous communication within the traffic control zone.
- .3 All construction vehicles shall operate in accordance with and are subject to traffic control restrictions and operations in place on the project.
- .4 In addition to traffic control during the normal hours of work, the contractor shall have a

responsible person on site at all times to monitor that the traffic signage is working properly (including nights, weekends and holidays).

- .5 Flagpersons are to be equipped with portable radios only, not cellular devices. Any flagperson using cellular devices, except for emergency use only, shall be deemed incompetent and shall be removed from site immediately. PCA shall not be held responsible for lost time incurred due to the removal of such an individual.

1.8 Traffic Management
Plan Requirement

- .1 Contractor to provide a Traffic Control plan, prior to construction, for approval by the Departmental Representative.

1.9 Operational
Requirements

- .1 Maintain existing conditions for traffic throughout period of contract except that, when required for construction under contract and when measures have been taken as specified herein and approved by Departmental Representative to protect and control public traffic, existing conditions for traffic may be restricted as follows:
 - .1 In accordance with TCM.
 - .2 Individual traffic control zone delay shall not exceed **10 minutes**.
- .2 Maintain existing conditions for traffic crossing right-of-way containing work except that, when required for construction under this Contract and when measures have been taken as specified herein and approved by Departmental Representative, to protect and control public traffic.
- .3 A maximum section of highway no longer than 8 km will be permitted to be under construction for the purpose of milling of old asphalt at any given time, with traffic control as required.
- .4 A maximum section of highway no longer than 2 km will be permitted to be under construction

for the purpose of placing new asphalt pavement at any given time, with traffic control as required.

- .5 A maximum of four (4) culvert replacements will be permitted to be under construction at any given time, with traffic control as required.

END OF SECTION

PART 1 - GENERAL

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| <u>1.1 Precedence</u> | .1 | For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual. |
| <u>1.2 Related Sections</u> | .1 | Section 01 52 00 - Construction Facilities. |
| | .2 | Section 01 55 26 - Traffic Regulation. |
| <u>1.3 References</u> | .1 | Canadian General Standards Board (CGSB)
.1 CGSB 1.189M-84, Primer, Alkyd, Wood, Exterior.
.2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel. |
| | .2 | Canadian Standards Association (CSA International)
.1 CSA-0121-M1978, Douglas Fir Plywood. |
| | .3 | Government of Newfoundland and Labrador, Department of Transportation and works, Highway Design Division.
.1 Traffic Control Manual (TCM), latest edition. |
| <u>1.4 Installation And Removal</u> | .1 | Provide temporary controls in order to execute Work expeditiously. |
| | .2 | Remove from site all such work after use. |
| <u>1.5 Guard Rails and Barricades</u> | .1 | Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs. |
| | .2 | Provide as required by governing authorities. |
| | .3 | Provide Traffic Control guard rails, barricades and delineators in accordance with Section 01 55 26 - Traffic Regulation. |
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| <u>1.6 Access to Site</u> | .1 | Provide and maintain access roads, as may be required for access to Work. |
| <u>1.7 Public Traffic Flow</u> | .1 | Provide Traffic Control in accordance with Section 01 55 26 - Traffic Regulation. |
| <u>1.8 Fire Routes</u> | .1 | Maintain access to properties for use by emergency response vehicles. |
| <u>1.9 Protection for Off-Site and Public Property</u> | .1 | Protect surrounding private and public property from damage during performance of Work. |
| | .2 | Be responsible for damage incurred. |

END OF SECTION

PART 1 - GENERAL

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| <u>1.1 Precedence</u> | .1 | For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual. |
| <u>1.2 Reference Standards</u> | .1 | Within text of each specifications section, reference may be made to reference standards. |
| | .2 | Conform to these reference standards, in whole or in part as specifically requested in specifications. |
| | .3 | If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance. |
| | .4 | Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance. |
| | .5 | Conform to latest date of issue of referenced standards in effect on date of submission of Tenders, except where specific date or issue is specifically noted. |
| <u>1.3 Quality</u> | .1 | Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided. |
| | .2 | Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses |
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caused by rejection.

- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.4 Availability

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
 - .2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.
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1.5 Storage, Handling
And Protection

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

1.6 Transportation

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

1.7 Manufacturer's Instructions

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

1.8 Quality of Work

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

1.9 Coordination

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

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

1.11 Existing Utilities

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants and pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

END OF SECTION

PART 1 - GENERAL

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| <u>1.1 Related Sections</u> | .1 | Section 01 78 00 - Closeout Submittals. |
| <u>1.2 Precedence</u> | .1 | For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual. |
| <u>1.3 References</u> | .1 | Owner's identification of existing survey control points and property limits. Departmental Representative is responsible for surveys and layout of work. |
| <u>1.4 Survey Reference Points</u> | .1 | Contractor is to locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction. |
| | .2 | Make no changes or relocations without prior written notice to Departmental Representative. |
| | .3 | Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations. |
| | .4 | The contractor is responsible to hire surveyor to replace control points in accordance with original survey control, if disturbed unnecessarily during construction activities. |
| <u>1.5 Survey Requirements</u> | .1 | Departmental Representative will: <ul style="list-style-type: none">.1 Establish permanent bench marks on site, as required, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents..2 Establish lines and levels, locate and lay out, by instrumentation..3 Stake for grading, fill and topsoil placement..4 Stake slopes. |
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- .5 Establish pipe invert elevations and location of any exposed pipe not being removed under this contract.
- .6 Record elevation and location of all existing and installed end caps of abandoned underground services.
- .7 Provide coordinates, elevations and dimensions in the field, as required by the Departmental Representative.

1.6 Existing Services

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.

1.7 Records

- .1 Departmental Representative will:
 - .1 Maintain a complete, accurate log of control and survey work as it progresses.
 - .2 On completion of site works, prepare a certified survey showing dimensions, locations, angles and elevations of Work.
 - .3 Record locations of maintained, re-routed and abandoned service lines.

END OF SECTION

PART 1 - GENERAL

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| <u>1.1 Precedence</u> | .1 | For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual. |
| <u>1.2 Related Sections</u> | .1 | Section 01 77 00 - Closeout Procedures. |
| <u>1.3 Project Cleanliness</u> | .1 | Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors. |
| | .2 | Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site. |
| | .3 | Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris. |
| | .4 | Provide on-site containers for collection of waste materials and debris. |
| | .5 | Provide and use clearly marked separate bins for recycling. |
| | .6 | Remove waste material and debris from site and deposit in waste container at end of each working day. |
| | .7 | Store volatile waste in covered metal containers, and remove from premises at end of each working day. |
| | .8 | Dispose of waste materials, and debris off site at approved facilities. |
| <u>1.4 Final Cleaning</u> | .1 | When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work. |
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- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review, remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .7 Remove dirt and other disfiguration from exterior surfaces.
- .8 Sweep and wash clean paved areas.

END OF SECTION

PART 1 - GENERAL

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|-----------------------------|----|---|
| <u>1.1 Related Sections</u> | .1 | Section 01 33 00 - Submittal Procedures. |
| <u>1.2 Precedence</u> | .1 | For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual. |
| <u>1.3 Definitions</u> | .1 | Materials Source Separation Program (MSSP): Consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation. |
| | .2 | Recyclable: Ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse by others. |
| | .3 | Recycle: Process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products. |
| | .4 | Recycling: Process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste. |
| | .5 | Reuse: Repeated use of product in same form but not necessarily for same purpose. Reuse includes: <ul style="list-style-type: none">.1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects..2 Returning reusable items including pallets or unused products to vendors. |
| | .6 | Salvage: Removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling. |
-

- .7 Separate Condition: Refers to waste sorted into individual types.
- .8 Source Separation: Acts of keeping different types of waste materials separate beginning from first time they became waste.

1.4 Documents

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

1.5 Submittals

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare and submit following prior to project start-up:
 - .1 Submit 2 copies of Materials Source Separation Program (MSSP) description.

1.6 Waste Reduction Workplan (WRW)

- .1 Prepare, Waste Reduction Workplan.
- .2 Structure WRW to prioritize actions and follow as first priority Reuse, then followed by Recycle.
- .3 Describe management of waste.
- .4 Post workplan or summary where workers at site are able to review its content.

1.7 Materials Source Separation Program(MSSP)

- .1 Prepare MSSP and have ready for use prior to project start-up. The Demolition Waste Audit (DWA), with related weight bills and/or receipt must be submitted on a monthly basis with the Contractor's monthly Progress claim.
 - .2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Departmental Representative.
 - .3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
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- .4 Provide containers to deposit reusable and recyclable materials.
- .5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
- .6 Locate separated materials in areas which minimize material damage.
- .7 Collect, handle, store on-site, and transport off-site, salvaged materials in separated condition.
 - .1 Transport to approved and authorized recycling facility.

1.8 Storage, Handling
And Production

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

1.9 Disposal of Wastes

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste, volatile materials, mineral spirits, oil or paint thinner into waterways, storm, or sanitary sewers.
- .3 Keep records of construction waste including:
 - .1 Number and size of bins.
 - .2 Waste type of each bin.
 - .3 Total tonnage generated.
 - .4 Tonnage reused or recycled.
 - .5 Reused or recycled waste destination.
- .4 Remove materials from deconstruction as deconstruction/disassembly Work progresses.
- .5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.10 Use of Site And Facilities

- .1 Execute work with least possible interference or disturbance to normal use of premises.
- .2 Maintain security measures established by PCA.

1.11 Scheduling

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

PART 2 - PRODUCTS

- .1 Not Applicable

PART 3 - EXECUTION

3.1 Application

- .1 Do Work in compliance with WRW.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 Cleaning

- .1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
- .2 Clean-up work area as work progresses.
- .3 Source separate materials to be reused/recycled into specified sort areas.

END OF SECTION

PART 1 - GENERAL

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| <u>1.1 Precedence</u> | .1 | For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual. |
| <u>1.2 Related Sections</u> | .1 | Section 01 78 00 - Closeout Submittals. |
| | .2 | Section 01 74 11 - Cleaning. |
| <u>1.3 Inspection and Declaration</u> | .1 | Contractor's Inspection: Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents. <ul style="list-style-type: none">.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made..2 Request Departmental Representative's Inspection. |
| | .2 | Departmental Representative's Inspection: Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly. |
| | .3 | Completion: submit written certificate that following have been performed: <ul style="list-style-type: none">.1 Work has been completed and inspected for compliance with Contract Documents..2 Defects have been corrected and deficiencies have been completed..3 Work has been completed and in compliance with Workplace Health, Safety and Compliance Commission of Newfoundland and Labrador (WHSCC)..4 Operation of systems have been demonstrated to Departmental Representative's personnel..5 Work is complete and ready for Final Inspection. |
| | .4 | Final Inspection: when items noted above are |
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completed, request final inspection of Work by Departmental Representative, in conjunction with Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request reinspection.

END OF SECTION

PART 1 - GENERAL

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| <u>1.1 Precedence</u> | .1 | For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual. |
| <u>1.2 Related Sections</u> | .1 | Section 01 33 00 - Submittal Procedures. |
| | .2 | Section 01 45 00 - Testing and Quality Control. |
| | .3 | Section 01 71 00 - Examination and Preparation. |
| | .4 | Section 01 77 00 - Closeout Procedures. |
| <u>1.3 Submission</u> | .1 | Prepare instructions and data using personnel experienced in maintenance and operation of described products. |
| | .2 | Copy will be returned after final inspection, with Departmental Representative's comments. |
| | .3 | Revise content of documents as required prior to final submittal. |
| | .4 | Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of operating and maintenance manuals in English. |
| | .5 | Ensure spare parts, maintenance materials and special tools provided are new, undamaged, free of defects, and of same quality and manufacture as products provided in Work. |
| | .6 | If requested, furnish evidence as to type, source and quality of products provided. |
| | .7 | Defective products will be rejected, regardless of previous inspections. Replace products at own expense. |
| | .8 | Pay costs of transportation. |
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1.4 Format

- .1 Organize data in the form of an instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.
- .4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by systems, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: Manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- .9 Provide 1:1 scaled CAD files in dxf or dwg format on diskettes or CD.

1.5 Contents - Each
Volume

- .1 Table of Contents: provide title of project;
 - .1 Date of submission; names,
 - .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties;
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to clearly

identify specific products and component parts, and data applicable to installation; delete inapplicable information.

- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Testing and Quality Control.

1.6 As-Builts and
Samples

- .1 Maintain at the site for Departmental Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to the Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.7 Recording Actual
Site Conditions

- .1 Record information on set of opaque drawings, provided by Departmental Representative.

- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .2 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .3 Field changes of dimension and detail.
 - .4 Changes made by change orders.
 - .5 Details not on original Contract Drawings.
 - .6 References to related shop drawings and modifications.
- .5 Specifications: legibly mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

1.8 Final Survey

- .1 Contractor is to submit final site survey certificate, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.9 Warranties and Bonds

- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.
- .4 Except for items put into use with Departmental Representative's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.
- .5 Verify that documents are in proper form, contain full information, and are notarized.
- .6 Co-execute submittals when required.
- .7 Retain warranties and bonds until time specified for submittal.

1.10 Materials and
Finishes

- .1 Building Products, Applied Materials, and Finishes: include produce data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.

END OF SECTION

PART 1 - GENERAL

<u>1.1 Related Sections</u>	.1	Section 01 33 00 - Submittal Procedures.
	.2	Section 01 74 21 - Construction/Demolition Management and Disposal.
	.3	Section 03 20 00 - Concrete Reinforcing.
	.4	Section 03 30 00 - Cast-in-Place Concrete.
<u>1.1 Description</u>	.1	This section specifies the materials for forms as well as their fabrication, erection and removal.
<u>1.3 References</u>	.1	American Concrete Institute (ACI) .1 ACI 301-10, Specifications for Structural Concrete.
	.2	Canadian Standards Association (CSA International) .1 CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction. .2 CSA-O86-14, Engineering Design in Wood (Limit States Design). .3 CSA O121-08(R2013), Douglas Fir Plywood. .4 CSA S269.1-1975(R2003), Falsework for Construction Purposes. .5 CAN/CSA-S269.3-M92(R2013), Concrete .6 Formwork, National Standard of Canada.
	.3	Council of Forest Industries of British Columbia (COFI)
<u>1.4 Shop Drawings</u>	.1	Submit shop drawings for formwork and falsework in accordance with Section 01 33 00 - Submittal Procedures.
	.2	Indicate method and schedule of construction and stripping procedures, materials, arrangements of joints, ties, liners, and locations of temporary embedded parts. Comply with CAN/CSA-S269.3 for formwork drawings.
	.3	Indicate formwork design data, such as permissible rate of concrete placement, and

temperature of concrete, in forms.

- .4 Indicate sequence of erection and removal of formwork as directed by Departmental Representative.
- .5 Each shop drawing submission shall bear the stamp and signature of qualified professional Engineer registered or licensed in the Province of Newfoundland and Labrador.

1.5 Responsibility

- .1 Design for method and schedule of construction, stripping, materials, arrangement of joints, ties, liners, and locations of temporary embedded parts. Comply with CAN/CSA-S269.3 for formwork drawings.

1.6 Waste Management And Disposal

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition 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 away from children.

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

1.7 Delivery, Storage And Handling

- .1 Deliver, handle and store formwork materials to prevent weathering, warping or damage detrimental to the strength of the materials or to the surface to be formed.
 - .2 Ensure that formwork surfaces which will be in contact with concrete are not contaminated by foreign matter. Handle and erect the fabricated formwork so as to prevent damage.
-

PART 2 - PRODUCTS

2.1 Materials

- .1 Formwork materials:
 - .1 Use high density overlaid plywood to CSA 0121. Alternatively, use heavy-gauge steel forms.
 - .2 The form facing material shall be free from surface defects and meet deflection requirements in accordance with CAN/CSA S269.3.
- .2 Form ties:
 - .1 Use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface. Holes are to be filled with non-shrink grout.
 - .2 Adjustable in lengths to permit tightening and alignment of forms.
- .3 Form release agent: compatible with repair materials, non-toxic, biodegradable, low VOC, 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 Form stripping agent: colourless mineral oil, non-toxic, biodegradable, low VOC, free of kerosene, with viscosity between 15 and 24 mm²/sat 40°C, flashpoint minimum 150°C, open cup.

PART 3 - EXECUTION

3.1 Fabrication and Erection

- .1 Verify lines, levels and centres before proceeding with formwork and ensure dimensions agree with drawings. Review all drawings and check dimensions prior to construction for proper fit and report any discrepancies before proceeding with the work.
 - .2 Assemble formwork so that concrete is not damaged during its removal.
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- .3 Fabricate and erect falsework in accordance with CSA S269.1 and COFI Exterior Plywood for Concrete Formwork.
 - .4 Provide site drainage to prevent washout of soil supporting mud sills and shores.
 - .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 CSA-A23.1/A23.2.
 - .6 Align form joints and make watertight. Keep form joints to minimum.
 - .7 Make the form mortar tight by sealing with building tape or sealants along all joints.
 - .8 Where concrete is to remain exposed, use 25 mm chamfer strips on external corners and 25 mm fillets at interior corners, joints, unless specified otherwise.
 - .9 Form chases, slots, openings, drips, recesses and expansion joints as indicated.
 - .10 Prior to placing concrete, the elevations of forms shall be checked to verify conformance to required shapes.
 - .11 Provide 48 hour notice to Departmental Representative for inspection prior to concrete placement.
 - .12 Clean formwork to remove foreign matter. Remove cuttings, shavings and debris from within forms. Flush completely with water to remove remaining foreign matters. Ensure that water and debris drain to exterior through clean-out ports.
 - .13 During cold weather, remove ice and snow from within forms, do not use de-icing salts. Do not use water to clean out completed forms, unless formwork and concrete construction proceed within a heated enclosure.
 - .14 Repair concrete will be placed within the
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working time of bonding coats.

- .15 Construction Joints:
 - .1 Form construction joints where required and as approved.
- .16 Build in anchors, sleeves, and other inserts required to accommodate work specified in other sections.
- .17 Clean formwork in accordance with CSA A23.1/A23.2 before placing concrete.

3.2 Removal and Reshoring

- .1 Notify Departmental Representative prior to form removal.
 - .2 Form removal times are dependent on proper curing in accordance with CAN/CSA-A23.1, CSA S269.1 and CAN/CSA-S269.3. Provide written evidence of concrete strength to the Departmental Representative 24 hours prior to form removal to show that suitable strength has been achieved. Contractor shall pay for the concrete cylinder strength tests to demonstrate concrete strength prior to form removal.
 - .3 Remove formwork progressively and in accordance with the reference code requirements, and so that no shock loads or imbalanced loads are imposed on the structure.
 - .4 Leave formwork in place for following minimum periods of time after placing concrete.
 - .1 One day for footings.
 - .2 3 days or at achievement of 80% of 28-day design strength for walls and vertical surfaces.
 - .5 Remove forms not directly supporting the weight of concrete as soon as stripping operations will not damage concrete.
 - .6 Re-use formwork subject to requirements of CSA-A23.1/A23.2.
 - .7 Loosen forms carefully. Do not wedge pry bars, hammers or tools against concrete surfaces.
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Remove all forms. Do not leave any forms in place
after completion of project.

3.3 Finishes

- .1 Form finishes: to CSA A23.1 and ACI 301 as follows:
 - .1 Sides of footings, walls and formed surfaces buried below earth: Rough form finish.

END OF SECTION

PART 1 - GENERAL

<u>1.1 Related Sections</u>	.1	Section 01 33 00 - Submittal Procedures.
	.2	Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
	.3	Section 03 10 00 - Concrete Forming and Accessories.
	.4	Section 03 30 00 - Cast-in-Place Concrete.
<u>1.2 Related Sections</u>	.1	This section specifies concrete reinforcing materials, their fabrication and placing.
<u>1.3 References</u>	.1	American Concrete Institute (ACI) <ul style="list-style-type: none">.1 ACI 315R-04, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures.
	.2	American Society for Testing and Materials International (ASTM) <ul style="list-style-type: none">.1 ASTM A108-13, Standard Specification for Steel Bar, Carbon and Alloy, Cold finished..2 ASTM A1064/A1064M-15, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
	.3	Canadian Standards Association (CSA) <ul style="list-style-type: none">.1 CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction..2 CSA-A23.3-14, Design of Concrete Structures..3 CSA-G30.18-09 (R2014), Carbon Steel Bars for Concrete Reinforcement.
	.4	Reinforcing Steel Institute of Canada (RSIC) <ul style="list-style-type: none">.1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.
<u>1.4 Shop Drawings</u>	.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, and locations of reinforcement with identifying code marks to permit correct placement without reference to structural drawings. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada.
- .3 Detail lap lengths and bar development lengths to CSA-A23.3, unless otherwise indicated. Provide Class B tension lap splices unless otherwise indicated.
- .4 Each shop drawing submitted to bear the stamp and signature of a qualified Professional Engineer registered in the Province of Newfoundland and Labrador.

1.5 Waste Management And Disposal

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

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: minimum 1.5 mm diameter to ASTM A1064/A1064M.

Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2, adequate for strength and support of reinforcing during construction conditions, all of which to be non-staining. Do not use metal chairs. Colour to be grey where all or portions of the chair may remain exposed.

2.2 Fabrication

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2, ANSI/ACI 315 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada. Shopfabricate and bend all reinforcing steel.
- .2 Fabricate to the following tolerances:
 - .1 Sheared length + 25 mm.
 - .2 Stirrups + 10 mm.
 - .3 Other bends + 25 mm.
- .3 Obtain Departmental Representative's approval for locations of reinforcement splices other than those shown on placing drawings.
- .4 Ship bundles of bar reinforcement clearly identified in accordance with bar bending details and lists.

2.3 Source Quality Control

- .1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 2 weeks prior to beginning reinforcing work. Mill certificates shall be in accordance with CAN/CSA G30.18.
- .2 Upon request inform Departmental Representative of proposed source of material to be supplied.

2.4 Cleaning

- .1 Clean reinforcing to CSA-A23.1/A23.2. All reinforcing bars are to be free of scale rust and contamination at time of placing in forms.

PART 3 - EXECUTION

3.1 Examination

- .1 Examine work related to this section and report discrepancies to Departmental Representative.
- .2 Commencement of work shall imply acceptance of conditions.

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| <u>3.2 Field Bending</u> | .1 | Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative. |
| | .2 | When field bending is authorized, bend without heat, applying slow and steady pressure. |
| | .3 | Replace bars, which develop cracks or splits. |
| <u>3.3 Placing Reinforcement</u> | .1 | Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CSA-A23.1/A23.2. |
| | .2 | Provide all chairs, braces, lateral support, headers, ties, etc. to secure reinforcing in place during construction. |
| | .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 | Under no circumstances will concrete trucks or highway traffic be permitted to travel over the reinforcing during concrete placing operations. |
| | .6 | After reinforcing is placed and prior to closing of forms, notify the Departmental Representative for inspection of the Work. |
| | .7 | Reinforcement shall be adequately supported by chairs, spacers or hangers and secured against displacement within the tolerance permitted and in accordance with the latest ACI Standard 315. |
| <u>3.2 Storage</u> | .1 | Store reinforcing steel to prevent deterioration, contamination or disfigurement. |
| | .2 | Store reinforcing steel off the ground. |

END OF SECTION

PART 1 - GENERAL

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| <u>1.1 Related Sections</u> | .1 | Section 01 33 00 - Submittal Procedures. |
| | .2 | Section 01 35 29.06 - Health and Safety Requirements. |
| | .3 | Section 01 45 00 - Quality Control. |
| | .4 | Section 03 10 00 - Concrete Forming and Accessories. |
| | .5 | Section 03 20 00 - Concrete Reinforcing. |
| | .6 | Section 31 23 10 - Excavating, Trenching and Backfilling. |
| <u>1.2 Description</u> | .1 | This section specifies requirements for the supply and installation of all cast-in-place concrete work. This includes, but is not necessarily limited to: <ul style="list-style-type: none">.1 Culvert foundation footings and walls. |
| <u>1.3 References</u> | .1 | American Concrete Institute (ACI) <ul style="list-style-type: none">.1 ACI 117M-10, Standard Tolerances for Concrete Construction and Materials. |
| | .2 | American Society for Testing and Materials International (ASTM) <ul style="list-style-type: none">.1 ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete..2 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete..3 ASTM C494/C494M-15a, Standard Specification for Chemical Admixtures for Concrete..4 ASTM C881/C881M-14, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete..5 ASTM D1751-04(2013)e1, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types). |
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- .3 Canadian Standards Association (CSA)
 - .1 CSA-A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CSA A283-06 (R2011), Qualification Code for Concrete Testing Laboratories.
 - .3 CSA-A3000-13, Cementitious Materials Compendium.
- .4 Government of Newfoundland and Labrador, Department of Transportation and Works, Highway Design Division, Specifications Book 2011.

1.4 Certificates

- .1 Submit certificates in accordance with Section - 01 33 00 Submittal Procedures.
 - .2 Provide certification indicating the concrete supplier is certified in accordance with the Atlantic Provinces Ready Mix Concrete Association Program or equivalent.
 - .1 Only concrete supplied from such certified plants shall be acceptable to the Departmental Representative.
 - .2 Plant certification shall be maintained for the duration of the fabrication and erection until the warranty period expires.
 - .3 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1.
 - .4 Provide mix design in compliance with CSA-A23.1 to provide concrete of quality, yield and strength as specified under 2.2 Mix Design. Mix design to be prepared by and stamped by an engineer licensed to practice in the Province of Newfoundland and Labrador.
 - .5 Prior to starting concrete work, submit to Departmental Representative manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements:
 - .1 Portland cement.
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- .2 Blended hydraulic cement.
- .3 Supplementary cementing materials.
- .4 Admixtures.
- .5 Aggregates.
- .6 Water.

1.5 Waste Management
And Disposal

- .1 Designate a cleaning area for concrete trucks off site, at a company owned site for such a purpose meeting all federal and provincial requirements.
- .2 Use trigger operated spray nozzles for water hoses.
- .3 Designate a cleaning area for tools to limit water use and runoff.
- .4 Carefully coordinate the specified concrete work with weather conditions.
- .5 Prevent plasticizers, water-reducing agents and air-entraining agents from entering drinking water supplies or waterways. Using appropriate safety precautions, collect liquid or solidify liquid with an inert, noncombustible material and remove for disposal.
- .6 Choose least harmful, appropriate cleaning method which will perform adequately.

1.6 Quality Assurance

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
 - .2 Submit to Departmental Representative, minimum four weeks prior to starting concrete work, valid and recognized certificate from plant delivering concrete.
 - .1 When plant does not hold valid certification, provide test data and certification by qualified independent inspection and testing laboratory that materials used in concrete mixture will meet specified requirements.
 - .3 Minimum 4 weeks prior to starting concrete work, submit proposed quality assurance procedures
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for review by Departmental Representative on following items:

- .1 Falsework erection.
 - .2 Hot weather concrete.
 - .3 Cold weather concrete.
 - .4 Curing.
 - .5 Finishes.
 - .6 Formwork removal.
 - .7 Joints.
- .4 At least fifteen (15) days prior to the start of the concrete construction schedule, a pre-concrete conference must be held. The mix designs shall be reviewed, and the required methods and procedures to achieve the required concrete shall be discussed. Send a pre-concrete conference agenda to all the attendees ten (10) days prior to the scheduled date of the conference.
- .5 Arrange for representatives of parties concerned with the concrete work to attend the conference, including but not limited to the following:
- .1 The Contractor.
 - .2 The concrete subcontractor.
 - .3 The Departmental Representative.
 - .4 The Owner's Representative.
- .6 Record minutes of meeting and distribute to all parties concerned within five (5) days of meeting. Submit minutes to Departmental Representative.
- .7 Quality Control Plan: submit written report to Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.
- .8 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- 1.7 Delivery, Storage And Handling
- .1 Concrete hauling time: maximum allowable time for concrete to be delivered to site of Work and discharged not to exceed 120 minutes after

batching.

- .1 Modifications to maximum time limit must be agreed to by Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
 - .2 Deviations to be submitted for review by Departmental Representative.
- .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

PART 2 - PRODUCTS

2.1 Materials

- .1 All materials for concrete structure to be in accordance with the Newfoundland and Labrador Department of Transportation and Works Specifications Book, 2011 edition, Section 904 - Concrete Structures, article 904.02 - Materials.
- .2 Cementing materials for all components except mudslabs to be Type GUBF/SF TEC 3.
- .3 Curing compound: to CSA-A23.1/A23.2.

2.2 Mixes

- .1 The contractor shall be responsible for the concrete mix design.
 - .2 It shall be the responsibility of the Contractor to ensure that the mixture proportions shall be properly batched, mixed, placed and cured such that the concrete conforms to the specifications.
 - .3 Mix designs to be in accordance with the Newfoundland and Labrador Department of Transportation and Works Specifications Book, 2011 edition. Mix designs to produce the specified properties and meet the parameters listed in the table given in article 904.04.02 - Concrete Quality as follows:
 - .1 For culvert walls and footings: meet parameters listed for substructure, 40
-

- MPa concrete.
- .2 For mudslabs: meet parameters listed for Mass and Tremie concrete.
- .4 Where admixtures are used, do not allow end-of-truck slump with admixtures to exceed 150mm.
- .5 In sufficient time before placement, submit all concrete mix designs to Departmental Representative for approval. No concrete shall be placed before mix designs are approved.
- .6 Obtain authorization from Departmental Representative for use of super plasticizing admixture, water reducer and all other admixtures. Add plasticizer, water reducer and/or other admixtures as approved by Departmental Representative to achieve desired concrete properties. Pay for all admixtures required.
- .7 Provide quality management plan to ensure verification of concrete quality to specified performance.
- .8 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 Place, consolidate, finish, cure and protect concrete to CAN/CSA-A23.1 except where specified otherwise.
- .3 Pumping of concrete is permitted only after approval of equipment and mix.
- .4 Secure in position reinforcing steel, embedded parts, anchor bolts and dowels etc. prior to placing concrete and ensure these are not disturbed during concrete placement in

accordance with CAN/CSA A23.1.

- .5 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.
 - .6 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature, and test samples taken.
 - .7 Do not place load upon new concrete until authorized by Departmental Representative.
 - .8 During concreting operations:
 - .1 Development of cold joints not allowed.
 - .2 Ensure concrete delivery and handling facilities placing with minimum of rehandling, and without damage to existing structure or work.
 - .9 Ensure that reinforcement and formwork are thoroughly clean before placing.
 - .10 Place concrete in dry conditions.
 - .11 Ensure that foundation bearing materials are free from water and frost. Remove previously frozen bearing materials.
 - .12 Keep excavation dry while placing concrete.
 - .13 All dowels shall be placed before concrete footings are poured.
 - .14 Ensure reinforcement and inserts are not disturbed during concrete placement.
 - .15 Maintain adequate frost protection to all soils under footings for entire duration of work.
 - .16 Protect previous work from staining.
 - .17 Bond fresh concrete to hardened concrete to CAN/CSA A23.1.
 - .18 Do not permit vertical free fall of concrete mix to exceed 1500 mm.
-

3.2 Construction

- .1 Do cast-in-place concrete work in accordance with CSA-A23.1/A23.2.
 - .2 Construction Joints
 - .1 Construction joint locations shall be approved by Departmental Representative wherever they are not specifically designated on drawings.
 - .2 Surface of concrete construction joints shall be cleaned and laitance removed.
 - .3 Locate construction joints in wall and footings so as to least impair the strength of the structure and to Departmental Representative's approval. Construction joints shall be as detailed on design drawings.
 - .4 Immediately before concrete is placed, all construction joints shall be wetted and standing water removed.
 - .3 Concrete shall not be placed on or against any surface (including rebar) that is at a temperature below 5°C (40°F).
 - .4 Concrete at time of deposit shall be between 10°C (50°F) and 30°C (85°F).
 - .5 Pour concrete continuously between predetermined construction and control joints.
 - .6 Carry out winter concreting in strict accordance with. CSA-A23.1/A23.2.
 - .7 Carry out hot weather concreting in accordance with CAN/CSA A23.1.
-

3.3 Field Quality Control

- .1 Quality Control Inspection and testing of concrete and concrete materials will be carried out by an independent testing agency in accordance with CAN/CSA A23.1/A23.2.
- .2 For compressive strength testing of concrete a minimum of 3 cylinders and 2 field cured cylinders are required for:
 - .1 Each day's pour.
 - .2 Each type of grade of concrete.
 - .3 Each change of supplier.
 - .4 Each 40 cubic meters or fraction thereof.
 - .5 Test cylinders are required for testing at 7, 14 and 28 days as per requirements of CAN/CSA A23.1.
 - .6 Test cylinders are required for testing at 56 days, in addition to requirements of CAN/CSA A23.1.
 - .7 Conduct at least one slump and one air entrainment test with each compressive strength test.
 - .8 In addition, each truck to be tested for air and slump.
 - .9 Additional test specimen shall be taken whenever requested by Departmental Representative to verify concrete quality.
 - .10 Additional test specimen shall be taken during cold weather concreting.
- .3 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 CSA-A23.1/A23.2.
- .5 Inspection and testing by testing laboratory will not augment or replace contractor quality assurance nor relieve contractor of contractor responsibility.

3.4 Concrete Cover Over Reinforcement

- .1 Ensure reinforcing steel is placed to specified tolerances.
 - .2 Concrete cover around reinforcing steel shall be as follows unless noted on drawings:
 - .1 Top surface of buried structure: 70mm
 - .2 Cast against earth: 100mm
-

.3 Vertical Surfaces of Walls: 70mm

- .3 The preceding clear covers to be maintained within tolerances as per CAN/CSA S6.
- .4 Provide continuous supervision during placement of concrete to ensure that reinforcing steel is maintained in its correct position.

3.5 Finishing

- .1 Only ACI (American Concrete Institute) certified or other pre-approved concrete finishers are to be utilized in finishing all concrete works.
- .2 Finish concrete in accordance with CSA-A23.1.
 - .1 Float surfaces with wood or metal floats or power finishing machines and bring surfaces to true grade or dimensions.

3.6 Curing

- .1 Cure concrete in accordance with CAN/CSA A23.1.
- .2 Ensure that freshly placed concrete is protected from freezing, dehydration, mechanical shock and contact with injurious substances.
- .3 Protect the concrete from premature drying and extremes of temperature.
- .4 Do not remove forms during curing period.

3.7 Defective Work

- .1 Repairs and classification of unacceptable concrete to be in accordance with CSA-A23.1/A23.2.
 - .2 Remove defective concrete and embedded debris and repair as directed by Departmental Representative.
 - .3 A cold joint, honeycombing or embedded debris in any concrete shall deem it defective. Remove and replace defective concrete as directed by Departmental Representative.
 - .4 Remove to bare concrete curing compounds detrimental to application of specified
-

finishes.

- .5 Concrete to be supplied at the minimum strength requirement at 28 days. Tests indicating strengths lower than specified will necessitate further testing as required by Departmental Representative. Cost for such testing to be at the Contractor's expense. Should further tests confirm low values, Departmental Representative has the right to require strengthening of the affected area or removal and replacement of weak concrete all to the Contractor's expense.
- .6 Repair all shrinkage cracks in the completed concrete work minimum 28 days after casting employing an epoxy injection technique acceptable to Departmental Representative to completely seal all such cracks.

END OF SECTION

PART 1 - GENERAL

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| <u>1.1 Related Sections</u> | .1 | Section 31 23 10 - Excavating, Trenching and Backfilling. |
| | .2 | Section 32 11 23 - Granular Base. |
| | .3 | Section 32 11 19 - Granular Subbase. |
| <u>1.2 References</u> | .1 | American Society for Testing and Materials (ASTM) <ul style="list-style-type: none">.1 ASTM D 4791-10, Standard Test Method for Flat Particles, Elongated Particles or Flat and Elongated Particles in Coarse Aggregate. |
| <u>1.3 Source Approval</u> | .1 | Inform Departmental Representative of proposed source of aggregates and provide access for sampling. |
| | .2 | If, in opinion of Departmental Representative, aggregate from the proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that aggregate from source in question can be processed to meet specified requirements. |
| | .3 | Should a change of aggregate source be proposed during work, advise Departmental Representative 1 week in advance of proposed change to allow sampling and testing. |
| | .4 | Acceptance of an aggregate at source does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified, or if its field performance is found to be unsatisfactory. |
| <u>1.4 Sampling</u> | .1 | Submit samples in accordance with Section 01 33 00 - Submittal Procedures. |
| | .2 | Allow continual sampling by Departmental Representative during production. |
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- .3 Provide Departmental Representative with access to source and processed material for sampling.
- .4 Install sampling facilities at discharge end of production conveyor, to allow Departmental Representative to obtain representative samples of items being produced. Stop conveyor belt when requested by Departmental Representative to permit full cross section sampling.
- .5 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

PART 2 - PRODUCTS

2.1 Materials

- .1 Aggregate quality: sound, hard, durable aggregate free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in a deleterious manner for the use intended.
- .2 Flat and elongated particles of coarse aggregate: to ASTM D4791.
 - .1 Greatest dimension to exceed three times least dimension.
- .3 Fine aggregate satisfying requirements of applicable section to be one, or a blend of following:
 - .1 Natural sand.
 - .2 Manufactured sand.
 - .3 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
- .4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
 - .1 Crushed rock.
 - .2 Gravel and crushed gravel composed of naturally formed particles of stone.
 - .3 Light weight aggregate, including slag and expanded shale.

PART 3 - EXECUTION

3.1 Development of
Aggregate Source

- .1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as directed by Departmental Representative.
- .2 Where clearing is required, leave a screen of trees between cleared area and roadways as per the Guidelines.
- .3 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.
- .4 When excavation is completed dress sides of excavation to nominal 1.5:1 slope, and provide drains or ditches as required to prevent surface standing water.
- .5 Trim off and dress slopes of waste material piles and leave site in neat condition.

3.2 Stripping of
Topsoil

- .1 Commence topsoil stripping of areas as indicated by the Guidelines and as directed by the Departmental Representative.
- .2 Avoid mixing topsoil with subsoil.
- .3 Stockpile in locations as indicated by the Guidelines. Stockpile height not to exceed 2 metres.

3.3 Processing

- .1 Park owned pit location to be determined near the Work Zone. Contractor to provide Pit Development Plan.
 - .2 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
 - .3 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified.
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Use methods and equipment approved by
Departmental Representative.

- .4 Wash aggregates, if required to meet specifications. Use only equipment approved by Departmental Representative.
- .5 When operating in stratified deposits use excavation equipment and methods that will produce uniform, homogeneous aggregate.

3.4 Handling

- .1 Handle and transport aggregates to avoid segregation, contamination and degradation.

3.5 Stockpiling

- .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative. Do not stockpile on completed pavement surfaces.
- .2 Stockpile aggregates in sufficient quantities to meet project schedules.
- .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
- .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into work.
- .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
- .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 hours of rejection.
- .7 Stockpile materials in uniform layers of thickness as follows:
 - .1 Maximum 1.5 m for coarse aggregate and base coarse aggregate.

.2 Maximum 1.5 m for fine aggregate and
sub-base aggregate.

.3 Maximum 1.5 m for other aggregate.

.8 Uniformly spot-dump aggregates delivered to
stockpile in trucks and build up stockpile as
specified.

.9 Do not cone piles or spill material over edges
of piles.

.10 Do not use conveying stackers.

.11 During winter operations, prevent ice and snow
from becoming mixed into stockpile or in
material being removed from stockpile.

3.6 Aggregate Stockpile Cleanup

.1 Leave aggregate stockpile site in tidy, well
drained condition, free of standing surface
water.

.2 Leave any unused aggregates in neat compact
stockpiles as directed by Departmental
Representative.

3.7 Source Abandonment

.1 For temporary or permanent abandonment of
aggregate source, rehabilitate source to
condition meeting requirements of the
Guidelines.

END OF SECTION

<u>1.1 Related Sections</u>	.1	Section 01 35 43 - Environmental Procedures.
	.2	Section 31 23 10 - Excavating, Trenching & Backfilling.
<u>1.1 Definitions</u>	.1	Clearing consists of cutting off trees and brush vegetative growth to not more than a specified height above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.
<u>1.3 Storage & Protection</u>	.1	Prevent damage to fencing, trees, landscaping, natural features, bench marks, existing buildings, existing pavement, utility lines, site appurtenances, water courses, root systems of trees which are to remain.
	.2	Repair any damaged items to approval of Departmental Representative. Replace any trees designated to remain, if damaged, as directed by Departmental Representative.

Not Applicable

<u>3.1 Preparation</u>	.1	Inspect site and verify with Departmental Representative, items designated to remain.
	.2	Locate and protect above ground and underground utility lines. Preserve in operating condition active utilities traversing site.
	.3	Notify utility authorities before starting clearing.
<u>3.2 Clearing</u>	.1	Clear all trees and underbrush by saw cutting from areas indicated to within 100 mm of

original ground surface. Mechanical brushers are not permitted. Trees and underbrush as well as all other materials disturbed during this clearing operation are to be removed from the site and disposed of outside the park boundaries in a manner and location approved by the Departmental Representative or it can be placed outside clearing limit in a manner satisfactory to Departmental Representative.

Mechanical brushers and harvesters may be used in areas of new highway intersection construction only.

- .2 Cut off branches and cut down trees overhanging area cleared as directed by Departmental Representative.
- .3 Cut off unsound branches on trees designated to remain as directed by Departmental Representative.
- .4 All cleared trees and timber shall become the property of the Contractor and are to be disposed of outside the park boundaries.
- .5 No roadside vegetation clearing will be permitted during the annual songbird nesting period of June and July. Contractor to ensure no songbird nests are present in areas of selective clearing. Contractor must receive written approval from Departmental Representative prior proceeding with any clearing or cutting during the nesting period.

3.3 Grubbing

- .1 Remove all stumps, grass, sod, and organic growth to a depth of 300 mm below the existing grade, or as directed by the Departmental Representative, and dispose at a location outside of the Park boundary.
- .2 Where grubbing operations are required near a watercourse or water body, the Contractor shall ensure that a minimum 15 m "no grub" zone is left between the watercourse or water body and adjacent work area. This "no grub" buffer shall be clearly marked in the field by the Departmental Representative prior to any grubbing so that the area is visible to heavy

equipment operators.

- .3 Grubbing to be re-used for restoration as an organic layer to promote growth.

END OF SECTION

PART 1 - GENERAL

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|-----------------------------|----|---|
| <u>1.1 Related Sections</u> | .1 | Section 01 35 43 - Environmental Procedures. |
| | .2 | Section 31 05 17 - Aggregates: General. |
| | .3 | Section 31 24 13 - Roadway Embankments. |
| | .4 | Section 33 42 13 - Pipe Culverts. |
| <u>1.2 References</u> | .1 | American Society for Testing and Materials (ASTM) <ul style="list-style-type: none">.1 ASTM C117-04, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing..2 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates..3 ASTM D422-63(2007), Standard Test Method for Particle-Size Analysis of Soils..4 ASTM D698-07, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbs/ft³) (600 kN-m/m³)..5 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils. |
| | .2 | Canadian General Standards Board (CGSB) <ul style="list-style-type: none">.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series..2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric. |
| <u>1.3 Definitions</u> | .1 | Excavation classes: one class of excavation will be recognized; common. <ul style="list-style-type: none">.1 Common excavation: excavation of materials of whatever nature. |
| | .2 | Waste material: excavated material unsuitable for use in Work or surplus to requirements. |
-

.3 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

.4 Unsuitable materials:

.1 Weak and compressible materials under excavated areas.

.2 Frost susceptible materials under excavated areas.

.3 Frost susceptible materials:

.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.1.

.2 Table

<u>Sieve Designation % Passing</u>	
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2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45

.3 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.

.5 Unshrinkable fill: very weak mixture of Portland cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.4 Quality Assurance

.1 Qualification Statement: submit proof of insurance coverage for professional liability.

.2 For design of any temporary structures submit design and supporting data at least 2 weeks prior to installation or construction.

.3 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.

.4 Keep design and supporting data on site.

- .5 Engage services of qualified professional Engineer who is registered or licensed in Province of Newfoundland and Labrador, Canada in which Work is to be carried out to design and inspect shoring, bracing and underpinning required for Work.

1.5 Shoring, Bracing, And Underpinning

- .1 Shoring, Bracing or underpinning may be required to prevent undermining of adjacent structures, underground utilities and/or traffic areas.
- .2 Comply with safety requirements and applicable local legislation to protect existing features.
- .3 Engage services of qualified Professional Engineer who is registered in the Province of Newfoundland and Labrador to design and inspect cofferdams, shoring, bracing and underpinning required for work.
- .4 At least 2 weeks prior to commencing work, submit design and supporting data.
- .5 Design and supporting data submitted to bear the stamp and signature of qualified Professional Engineer licensed in the Province of Newfoundland and Labrador.

PART 2 - PRODUCTS

2.1 Materials

- .1 Rock Borrow - maximum 250 mm diameter, angular, well graded. Use approved common excavation material from existing granular shoulders in fill areas.

PART 3 - EXECUTION

3.1 Site Preparation

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
 - .2 Sawcut pavement neatly along limits of
-

proposed removal in order that surface may break evenly and cleanly.

3.2 Dewatering

- .1 Keep excavations free of water while Work is in progress.
- .2 Protect open excavations against flooding and damage due to surface run-off.
- .3 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures to approved runoff areas and in manner not detrimental to public and private property, existing facilities, or portion of Work completed or under construction.
 - .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.
- .4 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

3.3 Excavation

- .1 Excavate to lines, grades, elevations and dimensions as indicated.
 - .2 Excavation must not interfere with bearing capacity of adjacent foundations.
 - .3 Dispose of surplus and unsuitable excavated material in approved location off site.
 - .4 Do not obstruct flow of surface drainage.
 - .5 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
 - .6 Notify Departmental Representative when bottom of excavation is reached.
 - .7 Obtain Departmental Representative's approval of completed excavation.
 - .8 If encountered, remove unsuitable material
-

from excavation bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.

3.4 Fill Types and Compaction

- .1 Use types of fill as indicated, and compacted in accordance with the requirements stated elsewhere in this specification.
- .2 Minimum roller size: 9t

3.5 Backfilling

- .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 and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .5 Backfilling around installations.
 - .1 Place bedding and surround material as specified elsewhere.
 - .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
 - .3 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 1.0 m.

3.6 Restoration

- .1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.
 - .2 Clean and reinstate areas affected by Work as directed by Departmental Representative.
 - .3 Restore site to its normal state prior to excavation.
-

Highway 430 (kms 39.9 to	Excavating, Trenching &	Section 31 23 10
88.5) - Recapitalization	Backfilling	Page 6 of 6
Parks Canada		
Gros Morne National Park, Rocky Harbour, NL		February 23, 2016

END OF SECTION

PART 1 - GENERAL

- | | | |
|-----------------------------------|----|---|
| <u>1.1 Related Sections</u> | .1 | Section 01 33 00 - Submittal Procedure. |
| | .2 | Section 01 56 00 - Temporary Barriers and Enclosures. |
| | .3 | Section 01 35 29.06 - Health and Safety Requirements. |
| | .4 | Section 31 23 33.01 - Excavating, Trenching and Backfilling. |
| <u>1.2 Definitions</u> | .1 | Rock: any solid material in excess of 1.0m ³ and which cannot be removed by means of mechanical excavating equipment having 0.95 to 1.15m ³ bucket. Frozen material not classified as rock. |
| <u>1.3 Measurement Procedures</u> | .1 | Mass rock: <ul style="list-style-type: none">.1 Rock quantities will be taken from cross section showing original rock surface and actual grade line set by Owner's Representative, except that minimum depth or rock required to excavated to be considered as 300 mm..2 Volume of individual boulders and rock fragments will be determined by measuring three maximum mutually perpendicular dimensions. |
| | .2 | Trench rock: rock quantities measured will be actual volume removed within following limits: <ul style="list-style-type: none">.1 Width for trench excavation as indicated..2 Width for excavation for structures to be bounded by vertical planes up to 500 mm outside and parallel to neat lines for footings as indicated..3 Depth from rock surface elevations immediately prior to excavation, to elevation as indicated..4 Where design elevation is less than 300 mm below original rock surface depth will be considered to be 300 mm below original rock surface. |
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- .3 Replacement imported fill: Imported fill quantities will be measured in cubic metres, compacted in place.
- .4 Quantities for measurement purposes are indicated in Tender Form. If no quantities are provided, rock removal and fill replacement considered inclusive to the work and will not be measured.
- .5 Contractors shall provide all survey equipment needed and provide assistance to Owner's Representative in taking cross sections. Sections shall be taken at 5 m intervals for mass and trench rock excavation. Sections will be submitted to contractor's site representative for verification. Additional sections shall be taken at points or significant change in elevation or at any other locations as determined by Owner's Representative. Contractor to schedule work to allow sufficient time for Owner's Representative to take necessary sections.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.1 Rock Disposal

- .1 Dispose of surplus removed rock off site. Dispose in locations acceptable to authorities having jurisdiction and Owner's Representative.
- .2 Do not dispose removed rock into landfill. Material must be sent to appropriate location as approved by the Owner's Representative.

END OF SECTION

PART 1 - GENERAL

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|-------------------------------|----|---|
| <u>1.1 Related Sections</u> | .1 | Section 31 23 10 - Excavating, Trenching and Backfill. |
| | .2 | Section 31 37 00 - Rip Rap. |
| <u>1.2 Definitions</u> | .1 | Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding. |
| | .2 | Waste material: material unsuitable for use in embankment or surplus to requirements. |
| | .3 | Borrow material: Rock Borrow material obtained from areas off site required for construction of embankments or for other portions of work. |
| | .4 | Embankment: Material derived from usable excavation and placed above original ground or stripped surface up to subgrade. |
| | .5 | Pavement structure: combination of layers of unbound or stabilized granular sub-base, base, and asphalt or concrete surfacing. |
| | .6 | Subgrade elevation: elevation immediately below pavement structure. |
| <u>1.3 Traffic Provisions</u> | .7 | Provide and maintain roadways, walkways and detours, for vehicular and pedestrian traffic and access to fire hydrants, alarms and emergency telephones. |

PART 2 - PRODUCTS

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|----------------------|----|--|
| <u>2.1 Materials</u> | .1 | Embankment materials to approval of Departmental Representative. |
| | .2 | Material used for embankment not to contain organic matter, frozen lumps, weeds, sod, roots, logs, stumps, boulders larger than 150 mm or any other unsuitable material. |
-

- .3 Embankment Material:
 - .1 Suitable excavated material from culvert trench excavation.
 - .2 Rock Borrow: in accordance with Section 31 23 10 - Excavating, Trenching and Backfilling.
 - .3 Rip Rap: in accordance with Section 31 37 00 - Rip Rap.

PART 3 - EXECUTION

3.1 Compaction Equipment

- .1 Compaction equipment must be capable of obtaining required densities in materials on project.
 - .1 Demonstrate compaction equipment effectiveness on specified material and lift thickness by documented performance of test-strip before start of Work.
 - .2 Replace or supplement equipment that does not achieve specified densities.
- .2 Operate compaction equipment continuously in each embankment when placing material.
- .3 Minimum roller size: 9t

3.2 Water Distributors

- .1 Apply water with equipment capable of uniform distribution.

3.3 Embankments

- .1 Remove topsoil and rootmat.
 - .2 Cold Mill existing pavement to elevations shown as directed.
 - .3 Do not place material which is frozen nor place material on frozen surfaces.
 - .4 Maintain a crowned surface during construction to ensure ready runoff of surface water. Do not place material in free standing water.
 - .5 Use specialized compaction equipment supplemented by routing, hauling, and leveling equipment over each layer of fill.
-

.6 Compaction:

- .1 Place and compact to full width in uniform layers not exceeding 200 mm loose thickness. Departmental Representative may authorize thicker lifts if specified compaction can be achieved.
- .2 Compact to a density of not less than 95% corrected maximum dry density in accordance with ASTM D698.
- .3 Bring moisture content of soil to level required to achieve specified compaction. Add water or aerate as required.
- .4 Compact each layer of embankment until compaction equipment achieves no further significant consolidation.
- .5 Ensure required compaction for each layer before placing any material for next layer.

3.3 Excavations

- .1 Excavate fill or bedrock to subgrade level in accordance with Section 31 23 10 - Excavating, Trenching and Backfilling.

3.5 Subgrade Compaction

- .1 After grading has been completed, scarify and mix subgrade surface to required depth of subgrade compaction.
- .2 Remove unsuitable materials found during work. Replace with material approved by Departmental Representative.
- .3 Bring moisture content of soil to level required to achieve specified compaction. Add water or aerate as required.

3.6 Finishing Tolerances

- .1 Shape and compact surfaces to within 30 mm of design elevations but not uniformly high or low.
- .2 Do scarifying, grading, compacting or other methods of work as necessary to provide thoroughly compacted roadbed shaped to grades and cross sections as indicated or as directed by Departmental Representative.

- .3 Finish edges and slopes of common material to neat condition, true to line and grade.
 - .1 Remove isolated boulders exposed in cut slopes and fill resulting cavities.
 - .2 Hand finish slopes that cannot be finished satisfactorily by machine.

3.7 Maintenance

- .1 Maintain finished surfaces in condition conforming to this section until acceptance.

END OF SECTION

PART 1 - GENERAL

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|-----------------------------|----|-----------------------------------|
| <u>1.1 Related Sections</u> | .1 | Section 31 32 19.01 - Geotextiles |
|-----------------------------|----|-----------------------------------|

PART 2 - PRODUCTS

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|-----------------|----|--|
| <u>2.1 Rock</u> | .1 | Hard, with relative density (formally specific gravity) not less than 2.5, durable quarry stone, free from seams, cracks or other structural defects, to meet following size distribution for use intended: <ul style="list-style-type: none">.1 Rip Rap :<ul style="list-style-type: none">.1 As per sizes shown on drawings. |
| | .2 | Rip rap to be clean, inorganic, non ore-bearing, non-toxic material from a non-watercourse source. It shall be hard, resistant to weathering and angular in shape. |

PART 3 - EXECUTION

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|--------------------|----|---|
| <u>3.1 Placing</u> | .1 | Where rip rap is to be placed on slopes, excavate trench at toe of slope. |
| | .2 | Fine grade area to be to uniform, even surface. Fill depressions with suitable material and compact to provide firm bed. |
| | .3 | Place rip rap to thickness and details as indicated. |
| | .4 | Place stones in manner approved by departmental representative to secure surface and create a stable mass. Place larger stones at bottom of slopes. |
| | .5 | Hand or Machine placing: <ul style="list-style-type: none">.1 Use larger stones for lower courses and as headers for subsequent courses..2 Stagger vertical joints and fill voids with rock spalls or cobbles..3 Finish surface evenly, free of large |
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openings and neat in appearance.

END OF SECTION

<u>PART 1 - GENERAL</u>	Not Applicable
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<u>PART 2 - PRODUCTS</u>	Not Applicable
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<u>PART 3 - EXECUTION</u>	
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<u>3.1 Preparation</u>	.1	Prior to commencing removal operation, inspect and verify with Department Representative areas, depths and lines of asphalt concrete pavement to be removed.
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<u>3.2 Equipment</u>	.1	Cold planing where required, shall be accomplished using a cold-milling machine. The cold-milling machine shall be a self-driven rotating drum type, capable of removing asphalt 50 mm thick and at least 1200 mm wide in a single pass. Cutting depth shall be adjustable from 0 mm to 50 mm over the length of the drum. The machine shall have automatic grade control and be able to load milled material directly into trucks, or be able to windrow the material for subsequent pick-up by other equipment.
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<u>3.3 Removal</u>	.1	Remove existing asphalt pavement to lines and grades as indicated.
	.2	Prior to paving operations commencing a transverse butt joint must be constructed. If a transverse vertical cut is milled in the existing pavement at the limit of the work area the contractor shall immediately construct with hot mix asphalt concrete a temporary smooth 1.5 meter long taper. The temporary taper must be removed prior to paving of the milled area.
	.3	Use equipment and methods of removal and hauling which do not tear, gouge, break or otherwise damage or disturb underlying pavement.
	.4	Prevent contamination of removed asphalt concrete pavement and granular base by topsoil, underlying gravel or other materials.

- .5 Provide for suppression of dust generated by removal process.
- .6 In areas where localized pavement removal is carried out within the traffic lane ensure traffic is restricted from area until the surface is restored.

3.4 Placement of Asphalt Millings and Use of Recycled Asphalt Pavement

- .1 The Contractor will be permitted to use Recycled Asphalt Pavement (RAP) as shoulder granulars subject to the following conditions:
 - .1 RAP used for shoulder gravels will not contain particles larger than 50mm;
 - .2 RAP will not be placed in lift thicknesses greater than 100mm;
 - .3 Compaction of RAP for shoulder material will be based on attaining maximum density as determined from a test rolling strip.
- .2 Recycled Asphalt Pavement (RAP) for shoulder granular to be supplied by the Owner from the following locations:
 - .1 Baker's Brook, 5.1km away from southeastern limits of contract;
 - .2 Green Point, 8.2km away from southeastern limits of contract;
 - .3 Broom Point, 28.4km away from southeastern limits of contract.

3.5 Traffic Control

- .1 Maintain at least one lane of alternating two-way traffic at construction sites at all times as specified in Section 01 55 26 - Traffic Regulations.

3.6 Disposal

- .1 Unused RAP to be disposed of outside the Park.

END OF SECTION

PART 1 - GENERAL

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|-----------------------------|----|---|
| <u>1.1 Related Sections</u> | .1 | Section 31 05 17 - Aggregates: General. |
| | .2 | Section 31 23 10 - Excavating Trenching and Backfilling. |
| <u>1.2 References</u> | .1 | American Society for Testing and Materials (ASTM) |
| | .1 | ASTM C 117-13, Standard Test Methods for Material Finer Than 75-microm (No. 200) Sieve in Mineral Aggregates by Washing. |
| | .2 | ASTM D6928-10, Standard Test Method for Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus. |
| | .3 | ASTM C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates. |
| | .4 | ASTM D 422-63 (2007), Standard Test Method for Particle-Size Analysis of Soils. |
| | .5 | ASTM D 698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ftn) (600kN-m/mn). |
| | .6 | ASTM D 1883-07e2, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils. |
| | .7 | ASTM D 4318-10, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils. |

PART 2 - PRODUCTS

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| <u>2.1 Materials</u> | .1 | Granular "B" Sub-base Material: in accordance with Section 31 05 17 - Aggregates: General and following requirements: |
| | .1 | Crushed blasted rock. |
| | .2 | Gradations to be within limits specified when tested To ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1 AND CAN/CGSB-8.2. |
| | .3 | Table: |
-

Sieve Designation	% Passing
50.8 mm	100
25.4 mm	50 - 100
4.76 mm	20 - 55
1.20 mm	10 - 35
0.300 mm	5 - 20
0.075 mm	2 - 6 (Pit Source)
	2 - 8 (Rock Source)

- .4 Other Properties as follows:
 - .1 Liquid Limit: to ASTM D 4318, Maximum 25.
 - .2 Plasticity Index: to ASTM D 4318 Maximum 0.
 - .3 Los Angeles degradation: to ASTM C131. Max % loss by mass: 35.
 - .4 Crushed Particles: at least 100% of particles by mass retained on the 4.75 mm sieve to have at least one fractured face.
 - .5 Particles smaller than 0.02 mm: to ASTM D 422, Maximum 3%.
 - .6 Flat and elongated particles: maximum percent by mass: 15.

PART 3 - EXECUTION

3.1 Inspection of Underlying Subbase

- .1 Place granular sub-base after surface is inspected and approved by Departmental Representative.
- .2 Underlying material to be compacted to 100% of Standard Proctor Density to ASTM D698.

3.2 Placing

- .1 Place granular sub-base after subgrade is to the satisfaction of the Departmental Representative.
- .2 Construct granular sub-base to depth and grade in areas indicated.
- .3 Ensure no frozen material is placed.

- .4 Place material only on clean, unfrozen surface, free from snow or ice.
- .5 Place granular sub-base materials using methods which do not lead to segregation or degradation.
- .6 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
- .7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .8 Remove and replace portion of layer in which material has become segregated during spreading.
- .9 Place and compact shouldering to 2% cross slope in reconstruction areas. In overlay sections, feather new shoulder material from top of new asphalt to rounding of shoulder slope. RAP may be used in place of granular subbase.
- .10 Compacted shouldering to be flush with asphalt concrete surface. RAP may be used in place of granular subbase.
- .11 Hand work will be required to form base for asphalt concrete gutters/offtakes.
- .12 Place, hand rake and compact new shoulder material under and behind guiderail.

3.3 Compaction

- .1 Compaction equipment to be vibratory-type and capable of obtaining required material densities.
- .2 Compact to density of not less than 100% of Maximum Dry Density in accordance with ASTM D 698.
- .3 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.

- .4 Apply water as necessary during compaction to obtain specified density.
- .5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers to the satisfaction of the Departmental Representative.
- .6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.3 Site Tolerances

- .1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.

3.5 Protection

- .1 Maintain finished sub-base in condition conforming to this section until succeeding Base is constructed, or until granular sub-base is accepted by the Departmental Representative.
- .2 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- .3 Shouldering to have 2% cross slope.

END OF SECTION

PART 1 - GENERAL

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|-----------------------------|----|---|
| <u>1.1 Related Sections</u> | .1 | Section 31 05 17 - Aggregates: General. |
| | .2 | Section 31 23 10 - Excavating, Trenching and Backfilling. |
| <u>1.2 References</u> | .1 | American Society for Testing and Materials (ASTM) <ul style="list-style-type: none">.1 ASTM C 117-13, Standard Test Methods for Materials Finer Than 75-micron Sieve in Mineral Aggregates by Washing..2 ASTM D 6928-10, Standard Test Method for Resistance of coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus..3 ASTM C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates..4 ASTM D 698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft²) (600kN-m/m²)..5 ASTM D 1883-07e1, Standard Test Method for CBR (California Bearing Ratio) of Laboratory-Compacted Soils..6 ASTM D 4318-10, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils. |
| | .2 | Canadian General Standards Board (CGSB) <ul style="list-style-type: none">.1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series..2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric. |

PART 2 - PRODUCTS

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|----------------------|----|--|
| <u>2.1 Materials</u> | .1 | Granular "A" base: material in accordance with Section 31 05 17 - Aggregates: General and following requirements: <ul style="list-style-type: none">.1 Crushed blasted rock..2 Gradations to be within limits specified when tested to ASTM C 136 and ASTM C 117. |
|----------------------|----|--|
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Sieve sizes to CAN/CGSB-8.1 and
CAN/CGSB-8.2.

.1 Gradation to:

Sieve Designation	% Passing
19 mm	100
9.51 mm	50-80
4.76 mm	35-60
1.20 mm	15-35
0.300 mm	5-20
0.075 mm	2-6 (pit source)
	2-8 (pit source)

.2 Liquid limit: to ASTM D 4318, maximum
25.

.3 Plasticity index: to ASTM D 4318,
maximum 0.

.4 Los Angeles degradation: to ASTM C
131. Maximum % loss by mass: 35.

.5 Crushed particles: at least 100% of
particles by mass within each of
following sieve designation ranges to
have at least one (1) freshly fractured
face. Material to be divided into ranges
using methods of ASTM C 136.

.6 Flat and elongated particles:
maximum by mass: 15%.

PART 3 - EXECUTION

3.1 Placing

- .1 Place granular base after sub-base surface is
inspected and approved by the Departmental
Representative.
- .2 Construct granular base to depth and grade in
areas indicated.
- .3 Ensure no frozen material is placed.
- .4 Place material only on clean unfrozen surface,
free from snow and ice.
- .5 Place material using methods which do not lead
to segregation or degradation of aggregate.

- .6 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
- .7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .8 Remove and replace that portion of layer in which material becomes segregated during spreading.

3.2 Compaction

- .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Compact to density not less than 100% of Maximum Dry Density in accordance with ASTM D 698.
- .3 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
- .4 Apply water as necessary during compacting to obtain specified density.
- .5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers to the satisfaction of the. Departmental Representative.
- .6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.3 Site Tolerances

- .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.
- .2 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.4 Protection

- .1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by the Departmental

Highway 430 (kms 39.9 to	Granular Base	Section 32 11 23
88.5) - Recapitalization		Page 4 of 4
Parks Canada		
Gros Morne National Park, Rocky Harbour, NL		February 23, 2016

Representative.

END OF SECTION

PART 1 - GENERAL

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|-------------------------------------|----|--|
| <u>1.1 Related Sections</u> | .1 | Section 32 12 16 - Hot-Mix Asphalt Concrete Paving. |
| <u>1.2 References</u> | .1 | American Society for Testing and Materials International, (ASTM) <ul style="list-style-type: none">.1 ASTM D 140-2009, Standard Practice for Sampling Bituminous Materials..2 ASTM D 244-09, Standard Test Methods and Practices for Emulsified Asphalts..3 ASTM D 997-13, Standard Specification for Emulsified Asphalt. |
| <u>1.3 Environmental Provisions</u> | .1 | Tack coat spills larger than 70 L shall be immediately reported to the Newfoundland and Labrador Department of Environment & Conservation and the Departmental Representative. |
| | .2 | The Contractor shall take such steps as are necessary to abate the discharge, clean up the area affected, dispose of waste materials in an approved waste disposal site, and restore the environment to the satisfaction of the Newfoundland and Labrador Department of Environment & Conservation and the Departmental Representative, all at the Contractor's expense. |

PART 2 - PRODUCTS

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|----------------------|----|---|
| <u>2.1 Materials</u> | .1 | Emulsified Asphalt: Type SS-1 or Type SS-1h emulsified asphalt, to ASTM D 997 as the tack coat material. <ul style="list-style-type: none">.1 The Departmental Representative shall be notified in advance as to which type the Contractor intends to use and the tack coat shall meet the following standards. |
| | .2 | Water: Water for forming the solution shall be clean water free from impurities. |
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PART 3 - EXECUTION

3.1 Equipment

- .1 Tack coat shall be applied by means of an approved pressure distributor equipped with thermometer, pressure gauge, fifth wheel tachometer and suitable spray nozzles which shall all be of the same orifice and manufacturer and capable of producing a fog-type spray. The slot of each nozzle shall be set at 30 degrees to the axis of the spray bar and the spray bar shall be set at a height above the existing pavement that will permit the fan from each nozzle to overlap its neighbouring fan by exactly half.

3.2 Application

- .1 Obtain Departmental Representative's approval of existing surface before applying asphalt tack coat. Clean surface as required.
 - .2 Tack coat shall only be placed on surfaces that are clean and dry and then only when the atmospheric temperature is at least 10°C and when rain is not forecast within 2 hours of application.
 - .3 Should the surface to be treated be dirty, then the Contractor shall thoroughly clean the surface by means of a power broom, or equivalent.
 - .4 The Contractor shall plan his work so that no more tack coat than is necessary for the day's paving operation is applied at one time.
 - .5 Paint contact surfaces of existing abutting asphalt surface with thin, uniform coat of asphalt tack coat material.
 - .6 To avoid nuisance and possible property damage to the travelling public, the Contractor shall install portable traffic lights or other means of directing one-way traffic while working on the adjacent part of the road.
 - .7 Type SS-1 or Type SS-1h emulsion shall be diluted with an equal volume of water prior to the application. The diluted SS-1 or SS-1h
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emulsion shall be applied at a rate of 0.3 to 0.5 l/m² of diluted emulsion on old pavement. Both the mixing temperature and the application temperature shall be between 20°C and 50°C. Care must be exercised not to exceed the recommended application rate.

- .8 Tack coat application shall be visually uniform. Areas of insufficient or non-uniform tack coat coverage shall be corrected by the contractor at no cost to Canada.
- .9 Where traffic is to be maintained, treat no more than one half of width of surface in one application.
- .10 Keep traffic off tacked areas until asphalt tack coat has set.
- .11 Re-tack contaminated or disturbed areas as directed by Departmental Representative.
- .12 Permit asphalt tack coat to set before placing asphalt pavement.

3.3 Curing

- .1 No hot mix shall be placed upon the tack coat until it has dried to a proper condition of tackiness, as determined by the Departmental Representative. The Contractor is advised that the period required for such drying will depend upon weather conditions.

3.3 Excavations

- .1 Excavate fill or bedrock to subgrade level in accordance with Section 31 23 10 - Excavating, Trenching and Backfilling.

3.5 Subgrade Compaction

- .1 After grading has been completed, scarify and mix subgrade surface to required depth of subgrade compaction.
 - .2 Remove unsuitable materials found during work. Replace with material approved by Departmental Representative.
 - .1 Bring moisture content of soil to level required to achieve specified compaction. Add water or
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aerate as required.

- 3.6 Finishing Tolerances
- .1 Shape and compact surfaces to within 30 mm of design elevations but not uniformly high or low.
 - .2 Do scarifying, grading, compacting or other methods of work as necessary to provide thoroughly compacted roadbed shaped to grades and cross sections as indicated or as directed by Departmental Representative.
 - .3 Finish edges and slopes of common material to neat condition, true to line and grade.
 - .1 Remove isolated boulders exposed in cut slopes and fill resulting cavities.
 - .2 Hand finish slopes that cannot be finished satisfactorily by machine.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

- .1 Section 01 35 43 - Environmental Procedures.
- .2 Section 31 05 17 - Aggregates: General.
- .3 Section 32 11 23 - Granular Base.
- .4 Section 32 17 23 - Painted Traffic Lines & Markings.
- .5 Section 32 12 13.16 - Asphalt Tack Coat.

1.2 References

- .1 ASTM International
 - .1 ASTM C 88-13, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.
 - .2 ASTM C 117-13, Standard Test Method for Material Finer Than 0.075mm (No.200) Sieve in Mineral Aggregates by Washing.
 - .3 ASTM C 123-12, Standard Test Method for Lightweight Particles in Aggregate.
 - .4 ASTM C 127-12, Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.
 - .5 ASTM C 128-12, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate.
 - .6 ASTM C 131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .7 ASTM C 136-06, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .8 ASTM C 207-06(2011), Standard Specification for Hydrated Lime for Masonry Purposes.
 - .9 ASTM D 995--95b(2002), Standard Specification for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
 - .10 ASTM D 2419-09, Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
 - .11 ASTM D 3203-11, Standard Test Method for Percent Air Voids in Compacted Dense and
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Open Bituminous Paving Mixtures.

- .12 ASTM D 4791-10, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
- .13 ASTM D 6373-13, Standard Specification for Performance Graded Asphalt Binder
- .14 ASTM D 6927-06, Standard Test Method for Marshall Stability and Flow of Bituminous Mixtures
- .15 ASTM D 6928-10, Standard Test Method for Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus
- .16 ASTM C 1252-06, Standard Test Methods for Uncompacted Void Content of Fine Aggregate (as Influenced by Particle Shape, Surface Texture, and Grading)
- .17 ASTM D 4867, Standard Test for Effect of Moisture on Asphalt Concrete Paving Mixtures (Lottman Test)

- .2 Government of Newfoundland and Labrador, Department of Transportation and works, Highway Design Division.
 - .1 The Department of Transportation and Works (DTW) specifications Book, latest edition.

1.3 Supply of Materials

- .1 Notify Departmental Representative of proposed date for use of materials; order and schedule shipments to coincide with construction schedule.

1.4 Source Sampling

- .1 At least 4 weeks prior to commencing work inform Departmental Representative of proposed source of aggregates and provide access for sampling.
 - .1 A copy of the location letter shall be forwarded to the Superintendent, Gros Morne National Park.
- .2 At least 4 weeks prior to commencing work submit samples of following materials proposed for use as requested by the Departmental Representative:
 - .1 One 5 L container of asphalt cement.

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|-------------------------------------|----|--|
| <u>1.5 Material Certification</u> | .1 | Submit manufacturer's test data and certification that asphalt cement meets requirements of this section. |
| <u>1.6 Submission of Mix Design</u> | .1 | Submit asphalt concrete mix design and trial mix test results to Departmental Representative for review at least 4 weeks prior to commencing work. |
| | .2 | All asphalt concrete mix supplied for the work shall conform to the requirements of the 'surface course' designation. |
| <u>1.7 Delivery and Storage</u> | .1 | Deliver and stockpile aggregates in accordance with Section 31 05 17 - Aggregates: General.
Stockpile minimum 50% of total amount of aggregate required before commencing asphalt mixing operation. |
| | .2 | When necessary to blend aggregates from one or more sources to produce required gradation, do not blend in stockpiles. |
| | .3 | Stockpile fine aggregate separately from coarse aggregate. |
| | .4 | Provide approved storage, heating tanks and pumping facilities for asphalt cement. |
| | .5 | Furnish copies of freight and weigh bills for asphalt cement as shipments are received.
Departmental Representative reserves right to check weights as material is received. |

PART 2 - PRODUCTS

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|----------------------|----|---|
| <u>2.1 Materials</u> | .1 | Asphalt cement: PG 58-28 in accordance with ASTM D6373. |
| | .2 | Aggregate material to following requirements:
.1 Crushed rock consisting of hard, durable, angular particles, free from clay lumps, cementation, organic material, and other deleterious |
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materials.

- .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117 and to have a smooth curve without sharp breaks when plotted on semi-log grading chart.

<u>Sieve Designation</u>	<u>Surface Course</u>
	<u>% Passing</u>

19.0	mm	100
12.5	mm	93 - 100
9.5	mm	75 - 92
4.75	mm	55 - 75
2.00	mm	32 - 55
0.425	mm	12 - 25
0.150	mm	5 - 12
0.075	mm	2 - 5

- .3 Coarse aggregate is aggregate retained on 4.75 mm sieve and fine aggregate is aggregate passing 4.75 mm when tested to ASTM C136.
- .4 When dryer drum plant or plant without hot screening is used, process fine aggregate through 4.75 mm sieve and stockpile separately from coarse aggregate.
- .5 Coarse aggregate stockpile shall contain no more than 15% passing 4.75 mm sieve.
- .6 Fine aggregate stockpile shall contain no more than 15% retained on 4.75 mm sieve.
- .7 Petrographic Number: CSA A23.2 - 15A, Max: 135.
- .8 Do not use aggregates having known polishing characteristics in mixes for surface courses.
- .9 Sand equivalent: ASTM D2419 Min: 50
- .10 Magnesium Sulphate Soundness: ASTM C88. Max.% loss by mass: Coarse aggregate, surface course: 12. Fine aggregate, surface course: 16
- .11 Los Angeles abrasion; Gradation B. to ASTM C131. Max. % loss by mass: Coarse aggregate, surface course: 35
- .12 Absorption: ASTM C127, max. % by mass: Coarse aggregate, surface course: 1.75
- .13 Loss by washing: to ASTM C117. Max. %

passing 0.075 mm sieve: Coarse
aggregate, surface course: 1.75

- .14 Flat and elongated particles with length
to thickness ratio greater than 4: Max.
% by mass: Coarse aggregate, surface
course: 20

- .15 Crushed fragments at least 100% of
particles by mass within each of
following sieve designation ranges to
have at least 2 freshly fractured faces.
Material to be divided into ranges using
methods of ASTM C136.

Passing		Retained on
19.0 mm	to	12.5 mm
12.5 mm	to	4.75 mm

- .16 Regardless of compliance with specified
physical requirements, fine aggregates
may be accepted or rejected on basis of
past field performance.
- .17 Micro - Deval abrasion, to ASTM D6928,
Coarse aggregate: Max. 20%.
- .18 Micro - Deval abrasion, to CSA A23.2 -
23A, Fine aggregate: Max 20%.
- .19 Fine aggregate angularity, to ASTM
C1252, Min. 45%.

.3 Mineral filler:

- .1 Finely ground particles of limestone,
hydrated lime, Portland cement or other
approved non- plastic mineral matter,
thoroughly dry and free from lumps.
- .2 Add mineral filler when necessary to meet
job mix aggregate gradation or as
directed to improve mix properties.
- .3 Mineral filler to be dry and free flowing
when added to aggregate.

2.2 Mix Design

- .1 Job mix formula to be provided by Contractor
and designed and certified by a Professional
Engineer licensed to practice in the Place of
Work. Job mix formula to be approved by
Departmental Representative.
- .2 Design of mix: by Marshall method to
requirements below and as directed by
Departmental Representative.

- .1 Compaction blows on each face of test specimens: 75.
- .2 Mix physical requirements: Marshall Stability at 60°C: 10000 N(minimum) Flow Value mm: 2 to 4.25 Air Voids in Mixture, %: 3-5 Voids in Mineral Aggregate, % min: 15 Index of Retained Stability % Minimum: 75
- .3 Measure physical requirements as follows:
 - .1 Marshall load and flow value: to ASTM D6927.
 - .2 Air voids: to ASTM D3203.
- .4 Do not change job-mix without prior approval of Departmental Representative. Should change in material source be proposed, new job-mix formula to be reviewed by Departmental Representative.
- .5 Return plant dust collected during processing to mix in quantities acceptable to Departmental Representative.
- .6 Asphalt content: 5.5-6.25% based on total weight.
- .7 Asphalt mixtures containing RAP shall be designed in accordance with the latest edition of the Asphalt Institute Manual Series No. 2.
- .8 The quality of the final pavement mixture shall meet all requirements set forth in this specification.
- .9 Use liquid type anti-stripping agent. Ensure compatibility with cement being used. Tensile Strength Ratio (TSR) required is 80% minimum.

PART 3 - EXECUTION

3.1 Plant and Mixing Requirements

- .1 Batch and continuous mixing plants:
 - .1 To ASTM D995.
 - .2 Heat asphalt cement and aggregate to mixing temperature directed by Departmental Representative. Do not
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- heat asphalt cement above 160°C.
- .3 Before mixing, dry aggregates to a moisture content not greater than 0.5% by mass or to a lesser moisture content if required to meet mix design requirements.
 - .4 Make available current asphalt cement viscosity data at plant. With information relative to viscosity of asphalt being used, Departmental Representative will direct temperature of completed mix at plant and at paver after considering hauling and placing conditions.
 - .5 Feed aggregates from individual stockpiles through separate bins to cold elevator feeders.
 - .6 Feed cold aggregates to plant in proportions that will ensure continuous operations.
 - .7 Immediately after drying, screen aggregates into hot storage bins in sizes to permit recombining into gradation meeting job-mix requirements.
 - .8 Store hot screened aggregates in a manner to minimize segregation and temperature loss.
 - .9 Calibrate bin gate openings and conveyor speeds to ensure mix proportions are achieved.
 - .10 Maintain temperature of materials within plus or minus 5°C of specified mix temperature during mixing.
 - .11 Mixing time:
 - .1 In batch plants, both dry and wet mixing times as directed by Departmental Representative. Continue wet mixing as long as necessary to obtain a thoroughly blended mix but not less than 30 s or more than 75 s.
 - .2 In continuous mixing plants, mixing time as directed by Departmental Representative but not less than 45 s.
 - .3 Do not alter mixing time unless directed by Departmental Representative.
- .2 Dryer drum mixing plant:
- .1 Feed aggregates to burner end of dryer

- drum by means of a multi-bin cold feed unit and blend to meet job-mix requirements by adjustments of variable speed feed belts and gates on each bin.
- .2 Meter total flow of aggregate by an electronic weigh belt system with an indicator that can be monitored by plant operator and which is interlocked with asphalt pump so that proportions of aggregate and asphalt entering mixer remain constant.
 - .3 Provide for easy calibration of weighing systems for aggregates without having material enter mixer.
 - .4 Calibrate individual feed bin conveyors to ensure mix proportions are achieved.
 - .5 Make provision for conveniently sampling the full flow of materials from the cold feed.
 - .6 Provide screens or other suitable devices to reject oversize particles or lumps of aggregate from cold feed prior to entering drum.
 - .7 Provide a system interlock which will stop all feed components if either asphalt or aggregate from any bin stops flowing.
 - .8 Accomplish heating and mixing of asphalt mix in an approved parallel flow dryer-mixer in which aggregate and asphalt enter drum at burner end and travel parallel to flame and exhaust gas stream. Control heating to prevent fracture of aggregate or excessive oxidation of asphalt. Equip system with automatic burner controls and provide for continuous temperature sensing of asphalt mixture at discharge, with a printing recorder that can be monitored by plant operator. Submit printed record of mix temperatures at end of each day.
 - .9 Mixing period and temperature to produce a uniform mixture in which particles are thoroughly coated, and moisture content of material as it leaves mixer to be less than 1%.

- .3 Temporary storage of hot mix:

- .1 Provide mix storage of sufficient capacity to permit continuous operation and designed to prevent segregation.
- .2 Do not store asphalt mix in storage bins in excess of 3 h.
- .4 While producing asphalt mix for this project, do not produce mix for other users unless separate storage and pumping facilities are provided for materials supplied to this project.
- .5 Mixing tolerances:
 - .1 Permissible variation in aggregate gradation from job mix (percent of total mass):

4.75 mm sieve and larger	5.0
2.00 mm sieve	4.0
0.425 mm sieve	2.5
0.075 mm sieve	1.0
 - .2 Permissible variation of asphalt cement from job mix, 0.30%.
 - .3 Permissible variation of mix temperature at discharge from plant, 10°C.

3.2 Equipment

- .1 Pavers: mechanical (grade controlled) self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.
 - .2 Rollers, general: sufficient number of rollers of type and weight to obtain specified density of compacted mix.
 - .3 Haul trucks: of adequate size, speed and condition to ensure orderly and continuous operation and as follows:
 - .1 Boxes with tight metal bottoms.
 - .2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.
 - .3 In cool weather or for long hauls, insulate entire contact area of each truck box.
 - .4 Trucks which cannot be weighed in a single operation on scales supplied will
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not be accepted.

- .4 Material Transfer Device: device to transfer all asphalt mixture from the haul trucks to the paver(s). The Material Transfer Device shall be utilized in conjunction with a hopper insert in the asphalt paver. The hopper insert on the asphalt paver shall be kept full at all times. Cycling the hopper wings of the asphalt paver shall be kept to a minimum. The Material Transfer Device shall be used at no extra cost.
- .5 Hand tools:
 - .1 Lutes or rakes with covered teeth for spreading operations.
 - .2 Provide tamping irons having mass not less than 12 kg and a bearing area not exceeding 310 cm² for compacting material along curbs, gutters and other structures inaccessible to roller. Mechanical compaction equipment, when approved by Departmental Representative, may be used instead of tamping irons.
 - .3 Straight edges, 4.5 m in length, to test finished surface.

3.3 Preparation

- .1 Reshape granular roadbed to Departmental Representative's approval.
- .2 Prior to laying mix, clean surfaces of loose and foreign material.
- .3 Saw cut adjacent asphalt surfaces and prior to placing new asphaltic pavement.
- .4 Tack coat existing asphalt surfaces and edges prior to placing new asphalt mix in accordance with Section 32 12 13.06 - Asphalt Tack Coat.
- .5 Construct key joint at locations where the new top lift of asphalt will meet existing asphalt as indicated on the drawings.

3.3 Transportation of Mix

- .1 Transport mix to job site in vehicles cleaned of foreign material in good mechanical working order, tight gates and with tarps.

- .2 Paint or spray truck beds with limewater, soap or detergent solution, or non-petroleum based commercial product at least once a day or as required. Elevate truck bed and thoroughly drain. No excess solution will be permitted.
- .3 Schedule delivery of material for placing in daylight, unless Departmental Representative approves artificial light.
- .4 Deposit mix from surge or storage silo into trucks in multiple drops and use methods necessary to prevent segregation.
- .5 Deliver materials to paver at a uniform rate and in an amount within capacity of paving and compacting equipment.
- .6 Deliver loads continuously in covered vehicles and immediately spread and compact. Deliver and place mixes at a temperature within range directed, but not less than 130°C.

3.5 Placing

- .1 Obtain Departmental Representative's approval of base prior to placing asphalt.
 - .2 Place asphalt concrete to thicknesses, grades and lines indicated or directed by Departmental Representative.
 - .3 Placing conditions:
 - .1 Place asphalt mixtures only when air temperature is above 5°C.
 - .2 When temperature of surface on which material is to be placed falls below 10°C, provide extra rollers as necessary to obtain required compaction before cooling.
 - .3 Do not place hot-mix asphalt when pools of standing water exist on surface to be paved, during rain, or when surface is damp.
 - .4 A material transfer device shall be used for the placement of all asphalt mix on the project. Prior to use, the material transfer device shall be approved by the Departmental Representative.
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- .4 Place asphalt concrete in compacted lifts of thickness as noted on the plans.
 - .5 Spread and strike off mixture with self-propelled mechanical finisher:
 - .1 Construct longitudinal joints and edges true to line markings. Lines for paver to follow will be established by Departmental Representative parallel to centerline of proposed pavement. Position and operate paver to follow established line closely.
 - .2 When using pavers in echelon, have first paver follow marks or lines, and second paver follow edge of material placed by first paver. Work pavers as close together as possible and in no case permit them to be more than 30 m apart.
 - .3 If segregation occurs, immediately suspend spreading operation until cause is determined and corrected.
 - .4 Correct irregularities in alignment left by paver by trimming directly behind machine.
 - .5 Correct irregularities in surface of pavement course directly behind paver. Remove by shovel or lute excess material forming high spots. Fill and smooth indented areas with hot mix. Do not broadcast material over such areas.
 - .6 Do not throw surplus material on freshly screeded surfaces.
 - .6 When hand spreading is used:
 - .1 Approved wood or steel forms, rigidly supported to assure correct grade and cross section, may be used. Use measuring blocks and intermediate strips to aid in obtaining required cross-section.
 - .2 Distribute material uniformly. Do not broadcast material.
 - .3 During spreading operation, thoroughly loosen and uniformly distribute material by lutes or covered rakes. Reject material that has formed into lumps and does not break down readily.
 - .4 After placing and before rolling, check
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surface with templates and straightedges and correct irregularities.

- .5 Provide heating equipment to keep hand tools free from asphalt. Avoid high temperatures which may burn material. Do not use tools at a higher temperature than temperature of mix being placed.

3.6 Compacting

- .1 Roll asphalt continuously to a density not less than 93% of the mix maximum theoretical density.
 - .2 General:
 - .1 Provide minimum three (3) rollers and as many additional rollers as necessary to achieve specified pavement density. One roller must be pneumatic-tired type.
 - .2 Start rolling operations as soon as placed mix can bear weight of roller without undue displacement of material or cracking of surface.
 - .3 Operate rollers slowly initially to avoid displacement of material. For subsequent rolling do not exceed 5 km/h for static steel- wheeled rollers and 8 km/h for pneumatic-tired rollers.
 - .4 For lifts 50 mm thick and greater, adjust speed and vibration frequency of vibratory rollers to produce minimum of 20 impacts per metre of travel.
 - .5 Overlap successive passes of roller by at least one half width of roller and vary pass lengths.
 - .6 Keep wheels of roller slightly moistened with water to prevent pick-up of material but do not over-water.
 - .7 Do not stop vibratory rollers on pavement that is being compacted with vibratory mechanism.
 - .8 Do to permit heavy equipment or rollers to stand on finished surface before it has been compacted and has thoroughly cooled.
 - .9 After traverse and longitudinal joints and outside edge have been compacted, start rolling longitudinally at low side and progress to high side.
 - .10 When paving in echelon, leave unrolled 50 to 75 mm of edge which second paver
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is following and roll when joint between
lanes is rolled.

- .11 .11 Where rolling causes
displacement of material, loosen
affected areas at once with lutes or
shovels and restore to original grade
of loose material before re-rolling.

.3 Breakdown rolling:

- .1 Commence breakdown rolling immediately
following rolling of transverse and
longitudinal joint and edges.
- .2 Operate rollers as close to paver as
necessary to obtain adequate density
without causing undue displacement.
- .3 Operate breakdown roller with drive roll
or wheel nearest finishing machine.
Exceptions may be made when working on
steep slopes or super-elevated sections.
- .4 Use only experienced roller operators
for this work.

.4 Second rolling:

- .1 Use pneumatic-tired, steel wheel or
vibratory rollers and follow breakdown
rolling as closely as possible and while
paving mix temperature allows maximum
density from this operation.
- .2 Rolling shall be continuous after
initial rolling until mix placed has been
thoroughly compacted.

.5 Finish rolling:

- .1 Accomplish finish rolling with two- axle
or three-axle tandem steel wheel rollers
while material is still warm enough for
removal of roller marks. If necessary
to obtain desired surface finish,
Departmental Representative shall
specify use of pneumatic-tired rollers.
- .2 Conduct rolling operations in close
sequence.

3.7 Joints

.1 General:

- .1 Trim vertical face by sawcutting to
provide true surface and cross section
against which new pavement may be laid.
Remove loose particles.

- .2 Paint joint face with thin coat of hot asphalt cement or cutback asphalt or preheat joint face with approved heater, prior to placing of fresh mix.
 - .3 Overlap previously laid strip with spreader by 100 mm.
 - .4 Remove surplus material from surface of previously laid strip. Do not dispose on surface of freshly laid strip.
 - .5 Construct joints between asphalt concrete pavement and portland cement concrete pavement as directed by Departmental Representative.
 - .6 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.
 - .2 Transverse joints:
 - .1 Construct and thoroughly compact transverse joints to provide a smooth riding surface.
 - .2 Stagger joint locations 2 m.
 - .3 Offset transverse joint in succeeding lifts by at least 600 mm.
 - .3 Longitudinal Joints:
 - .1 Before rolling, carefully remove and discard coarse aggregate in material overlapping joint with a lute or rake.
 - .2 Roll longitudinal joints directly behind paving operation.
 - .3 When rolling with static roller, shift roller over onto previously placed lane in order that 100 to 150 mm of drum width rides on newly laid lane, then operate roller to pinch and press fines gradually across joint. Continue rolling until thoroughly compacted neat joint is obtained.
 - .4 When rolling with static or vibratory roller, have most of drum width ride on newly placed lane with remaining 100 to 150 mm extending onto previously placed and compacted lane.
 - .5 Offset longitudinal joints in succeeding lifts by at least 150 mm.
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| <u>3.8 Finish Tolerances</u> | .1 | Finished asphalt surface to be within 5 mm of design elevation but not uniformly high or low. |
| | .2 | Finished asphalt surface not to have irregularities exceeding 5mm when checked with a 4.5 m straight edge place in any direction. |
| <u>3.9 Defective Work</u> | .1 | Correct irregularities which develop before completion of rolling by loosening surface mix and removing or adding material as required. If irregularities or defects remain after final compaction, remove surface course promptly and lay new material to form a true and even surface and compact immediately to specified density. |
| | .2 | Repair areas showing checking, rippling or segregation. |
| | .3 | Adjust roller operation and screed settings on paver to prevent further defects such as rippling and checking of pavement. |
| <u>3.10 Defective Work</u> | .1 | Unless specifically authorized otherwise by the Departmental Representative, all spreading of asphalt mix shall stop at least 1/2 hour before sunset and the paver shall be off the road by sunset. |
| <u>3.11 Pollution Control/site Clean-up</u> | .1 | Control emissions from equipment and plant to <u>Site Clean-up</u> Provincial emission requirements. |
| | .2 | Copies of the Contractor's current Provincial Asphalt Plant Approval Permit must be provided to PCA and the EPO. |
| | .3 | Excess asphaltic concrete material must be disposed of at approved locations. No material will be deposited outside the lines and grades indicated for asphalt paving, except as approved by the Departmental Representative. |
| | .4 | The EPO on behalf of Provincial Department of Environment and Conservation will be monitoring the Contractor's operation, including site cleanup. |
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Highway 430 (kms 39.9 to	Hot Mix Asphalt	Section 32 12 16
88.5) - Recapitalization	Concrete Paving	Page 17 of 17
Parks Canada		
Gros Morne National Park, Rocky Harbour, NL		February 23, 2016

END OF SECTION

PART 1 - GENERAL

1.1 Description

- .1 Contractor responsible for permanent lines and pavement markings to original conditions. Contractor is also responsible for all temporary line markings.
- .2 This standard applies to low temperature, water-borne, acrylic, fast drying traffic paints suitable for spray application with specialized equipment, to asphalt surfaces. Included are centre lines to match existing layout (double solid, solid/dash or single dash lines), two shoulder lines, as well as the two intersections, arrows, delineation, special markings and temporary markings, etc., for the full length of the highway 430 work area. Province will be completing permanent lines and markings on highway 430 with exception of the two intersections detailed on the drawings.
- .3 This specification includes a compound to be used as an additive in conjunction with water-borne traffic paint and glass spheres to provide a drying agent which accelerates the no-tack time of the water-borne traffic paint. No-tack time is to be increased by approximately 40% over the same paint without the compound.

All pavement markings to be in accordance with the Manual of Uniform Traffic Devices for Canada, latest edition.
- .4 Contractor is responsible to supply and perform all work necessary to paint temporary lines and pavement markings. The Province will supply and perform all work required to paint permanent lines and pavement markings.

1.2 References

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D 711, Test Method for No-Pick-Up Time of Traffic Paint.
 - .2 ASTM D 868, Test Method for Evaluating Degree of Bleeding of Traffic Paint
 - .3 ASTM D 869, Test Method for Evaluating
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- Degree of Settling of Paint
- .4 ASTM D 969, Test Method for Laboratory Determination of Degree of Bleeding of Traffic Paint
- .5 ASTM D 1155, Test Method for Roundness of Glass Spheres
- .6 ASTM D 1210, Test Method for Fineness of Dispersion of Pigment-Vehicle Systems
- .7 ASTM D 1214, Test Method for Sieve Analysis of Glass Spheres
- .8 ASTM D 1309, Test Methods for Settling Properties of Traffic Paints During Accelerated Storage.
- .9 ASTM D 2205, Guide for Selection of Tests for Traffic Paints
- .10 ASTM D 2243, Test Method for Freeze-Thaw Resistance of Water-Borne Coatings
- .11 ASTM D 3960, Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
- .12 ASTM E 97, Test Method for Directional Reflectance Factor of Opaque Specimens by Broad-Band Filter Reflectometry

- .2 Transportation Association of Canada (TAC), Manual of Uniform Traffic Control Devices For Canada.

1.3 Samples

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Mark samples with name of project, location, paint manufacturer's name and address, name of paint, CGSB specification number and formulation number and batch number.
- .3 The Departmental Representative reserves the right to test samples of paint at the point of delivery, from any or all batches of paint to be used. The samples will be tested and all paint from any batch tested that does not meet specifications, will not be permitted to be used on this project.

1.4 Temporary Line Striping

- .1 The Contractor shall ensure that the roadway is properly marked as the work progresses and

all cold planed sections and/or newly surfaced road is pre-marked at the completion of the day's operation, as described herein. Temporary pavement marking shall be clearly visible both day and night.

- .2 Should the pre-marking tape not adhere to the cold planed and/or newly treated surface, the Contractor shall use other means to adequately mark the roadway, such as painting the markings on the road.

PART 2 - PRODUCTS

2.1 Materials

- .1 General Requirements:
 - .1 The low temperature, water-borne (acrylic), lead free, fast drying traffic paints shall be designed to be applied in environmental conditions such that operational temperatures shall be in the range of 2 degrees Celsius and rising.
 - .2 Paint shall be well ground to a uniform smooth consistency and shall be free from skin, dirt and other foreign particles. The paint shall be capable of being sprayed at the temperature intended for the paint. It shall flow evenly and smoothly and cover solidly when applied to pavement. The paint shall be supplied ready-mixed for use without any addition of water.
 - .3 The paint mixture shall include the glass bead intermix system.
 - .4 The paint mixture is to be able to be applied under pneumatic pressure by a standard truck mounted dispensing machine moving at speeds of 8 to 24km/hr.

2.2 Paint

- .1 Paint to this standard shall comply with the following detail requirements when tested in accordance with the specified test methods:
- .2

Property		Specification		Test Method (1)
General:		Min.	Max.	
	Density	-	-	Method 2.1
	Consistency, KU (2)	85	95	Method 4.5
	Skinning Properties (3)	0	0	Method 10.1
	Contrast Ratio (5)	0.992		
	VOC (6)		150g/L	ASTM D3960
	Volatile Matter % (mass)(including water)		24	Method 17.1
	Freeze-thaw resistance	Pass		ASTM D2243
	Pigment Content, % (mass)	56	62	Method 21.2
	Binder solid,% of mass (7)	16.75		Method 19.1
	100% Acrylic Polymer, % (mass)	15	-	Method 57.1
	No-pick-up time, min. (4)	1	5	ASTM D711
	Non-tracking time, sec. (9)		60	
	Fineness of grind, HU	3	-	ASTM D1210
Coarse Particles:				
	#60 Sieve - 250um	nil	nil	ASTM D185 & ASTM D2205
	#100 Sieve - 150 mm	-	0.01	
	Bleeding	4	-	ASTM D868 & ASTM D2205
Settling Rate		6	-	ASTM D1309
		8	-	ASTM D869
White Paint:				
	Titanium Dioxide, g/L	150	-	Method 2.1, 21.1, 50.14
	Titanium Dioxide Pigment (8)			
	Reflectance	80	-	ASTM E97
	Colour	-	-	1-GP-12C 513-301
Yellow Paint:				
	Reflectance	60	-	ASTM E97
	Colour	-	-	505-308 (approx)

- .1 All tests to be performed by methods as per Canadian General Standards Board (CGSB), 1-GP-71 or American Society of Testing and Materials (ASTM) or as noted

herein.

- .2 Kneb units at 25°C
- .3 Paint shall be non-skinning. (See General Requirements, 2.1.1.2).
- .4 Perform field tests on a 15 mil wet film thickness of hot spray (maximum 50°C). Wait one minute, drive a passenger vehicle over the film and ensure no visible (from 15m) deposition of paint is deposited onto the adjacent pavement.
- .5 Contrast Ratio: apply a wet film thickness of 381 microns on Laneta Penopac form (1B) Drying Time: Minimum 24 hours at 23°C. (plus or minus 2°C)
- .6 Volatile organic compounds (VOC) (excluding water): max. 150g/L; method ASTM D3960.
- .7 Binder shall be FASTRACK Resin XSR or equivalent.
- .8 Titanium dioxide pigment shall be Rutile type and have a minimum TiO₂ content of 93%.
- .9 Non-tracking time based upon 375um (15 mils) wet film thickness applied when pavement temperature is greater than 10°C and humidity conditions of 80% or less on dry pavement.

2.3 Glass Bead
Intermix System

- .1 The compound shall be a mixture of glass beads and drying agent materials.
- .2 The compound shall meet the following gradation when tested according to ASTM D1214:

<u>Sieve Size</u>	<u>% Passing</u>
1.180 mm (#16)	100%
0.850 mm (#20)	90 - 100%
0.600 mm (#30)	65 - 95%
0.300 mm (#50)	10 - 35%
0.150 mm (#100)	0 - 5%

- .3 The glass bead component of the compound shall be colourless, clean, transparent, and free from milkiness and excessive air bubbles. They shall be spherical in shape, containing no more than 30% irregularly shaped particles and be the equivalent of an AASHTO Type I glass bead. The silica content of the glass spheres shall

not be less than 60% as per ASTM C169 testing. The component shall be manufactured of glass of a composition designed to be highly resistant to traffic wear, decomposition, etching under atmospheric conditions, dilute acids, alkalis, paint film constitutes, and to the effect of weathering, and should be composed of recycled glass (to the maximum extent possible).

- .4 The drying agent component shall be smooth and spherically shaped, amber to white in colour, and of a type that promotes accelerated coalescence of the latex polymer and as such reduces water-borne paint dry to touch time by approximately 40% (minimum).
- .5 The compound shall show no tendency to absorb moisture in storage and shall remain free of clusters and hard lumps. It shall flow freely from dispensing equipment at any time when applying with pavement marking.

PART 3 - EXECUTION

3.1 Equipment Requirements

- .1 Paint applicator to be an approved pressure type mobile distributor capable of applying paint in single, double and dashed lines. Applicator to be capable of applying marking components uniformly, at rates specified, and to dimensions as indicated, and to have positive shut-off.

3.2 Condition of Surfaces

- .1 Surface to be dry, free from ponded water, frost, ice, dust, oil, grease and other foreign materials.

3.3 Traffic Control

- .1 Traffic control to be in accordance with Section 01 55 26 - Traffic Regulation.

3.4 Application

- .1 Unless otherwise approved by Departmental Representative, apply paint only when air Temperature is above 10°C, wind speed is less
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than 60km/h and no rain is forecast within next 4h.

.2 Apply traffic paint evenly at rate of 3m/L.

.3 Do not thin paint unless approved by Departmental Representative.

.4 Symbols and letters to conform to dimensions indicated.

Paint lines to be of uniform colour and density with sharp edges.

.5 Thoroughly clean distributor tanks before refilling with paint of different colour.

3.5 Tolerance

.1 Paint markings to be within plus or minus 12mm of dimensions indicated.

.2 Remove incorrect markings to approval of Departmental Representative.

3.6 Protection of Works

.1 Protect pavement markings until dry.

END OF SECTION

15003PART 1 - GENERAL

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| <u>1.1 Related Sections</u> | .1 | Section 31 24 13 - Roadway, Excavation, Embankment and Compaction. |
| <u>1.2 Submittals</u> | .1 | Submit samples in accordance with Section 01 Product Data. <ul style="list-style-type: none">.1 Submit product data in accordance with 01 33 00 - Submittal Procedures..2 Provide product data for:<ul style="list-style-type: none">.1 Seed..2 Mulch..3 Tackifier..4 Fertilizer..3 Submit in writing to Departmental Representative fourteen (14) days prior to commencing work:<ul style="list-style-type: none">.1 Volume capacity of hydraulic seeder in litres..2 Amount of material to be used per tank based on volume..3 Number of tank loads required per hectare to apply specified slurry mixture per hectare. |
| <u>1.3 Quality Assurance</u> | .1 | Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties. |
| | .2 | Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements. |
| <u>1.4 Scheduling</u> | .1 | Schedule hydraulic seeding to coincide with preparation of soil surface. |
| | .2 | Hydroseeding shall be carried out as soon as possible after completion of the surface preparation in order to prevent erosion by wind and water. Hydroseeding shall take place no more than two (2) weeks after excavation and embankment construction is complete. |
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PART 2 - PRODUCTS

2.1 Materials

- .1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.
 - .1 Grass mixture: "Certified", "Canada No.1 Lawn Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".
 - .2 Mixture composition:
 - .1 60% Annual Rye.
 - .2 40% Creeping Red Fescue
- .2 Mulch: specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, with an environmentally acceptable dye, free of germination and growth inhibiting factors with following properties:
 - .1 Type I mulch:
 - .1 Made from wood cellulose fibre.
 - .2 Organic matter content: 95% plus or minus 0.5%.
 - .3 Value of pH: 6.0.
 - .4 Potential water absorption: 900%.
- .3 Tackifier: water dilutable, liquid dispersion water soluble vegetable carbohydrate powder.
- .4 Water: free of impurities that would inhibit germination and growth.
- .5 Fertilizer:
 - .1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
 - .2 The fertilizer is to have a plant food ratio of 10 nitrogen, 10 phosphorus, and 20 potash plus 2% Fritted Trace Elements.
 - .3 The fertilizer to be spread the following spring during the maintenance period shall have a plant food ratio of 5 nitrogen, 10 phosphorus, and 30 potash.
- .6 Inoculants: inoculant containers to be tagged with expiry date.

PART 3 - EXECUTION

3.1 Workmanship

- .1 Do not spray onto structures, signs, guide rails, fences, plant material, utilities, and other than surfaces intended.
- .2 Clean-up immediately, any material sprayed where not intended, to satisfaction of Departmental Representative.
- .3 Do not perform work under adverse field conditions such as wind speeds over 10 km/h, frozen ground or ground covered with snow, ice or standing water.
- .4 Protect seeded areas from trespass until plants are established.

3.2 Preparation of Surfaces

- .1 Fine grade areas to be seeded free of humps and hollows. Ensure areas are free of deleterious and refuse materials.
- .2 Ensure areas to be seeded are moist to depth of 150 mm before seeding.
- .3 In areas of hard earth, spread suitable excavated material at a minimum depth of 150mm to promote growth.
- .4 Obtain Departmental Representative's approval of grade before starting to seed.

3.3 Preparation of Slurry

- .1 Measure quantities of materials by weight or weight-calibrated volume measurement satisfactory to Departmental Representative. Supply equipment required for this work.
 - .2 Charge required water into seeder. Add material into hydraulic seeder under agitation. Pulverize mulch and charge slowly into seeder.
 - .3 After all materials are in the seeder and well mixed, charge tackifier into seeder and mix thoroughly to complete slurry.
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3.4 Slurry Application

- .1 Hydraulic seeding equipment:
 - .1 Slurry tank.
 - .2 Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and/or mechanical agitation method.
 - .3 Capable of seeding by 50 m hand operated hoses and appropriate nozzles.
- .2 Slurry mixture applied per hectare.
 - .1 Seed: Grass mixture 125kg.
 - .2 Mulch: Type I 1350kg.
 - .3 Tackifier: 300kg.
 - .4 Water: Minimum 30,000 L.
 - .5 Fertilizer: 375 kg.
- .3 Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
 - .1 Using correct nozzle for application.
 - .2 Using hoses for surfaces difficult to reach and to control application.
- .4 Blend application 300 mm into adjacent grass areas or sodded areas and previous applications to form uniform surfaces.
- .5 Re-apply where application is not uniform.
- .6 Remove slurry from items and areas not designated to be sprayed.
- .7 Protect seeded areas from trespass satisfactory to Departmental Representative.
- .8 Remove protection devices as directed by Departmental Representative.

3.5 Maintenance During
Establishment Period

- .1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
- .2 The Contractor shall be responsible for maintaining hydroseeded areas to ensure proper and adequate growth of the vegetation during the warranty period. The Contractor shall also be responsible for an additional application

of fertilizer the following spring after initial application. This application shall be by a method approved by the Department. The fertilizer shall be 5-10-30 and shall be applied at a rate of 300 kg/ha. No additional payment will be made for maintenance or the extra application of fertilizer.

3.6 Acceptance

- .1 Seeded areas will be accepted by the Departmental Representative provided evidence of growth and that plants are uniformly established.

3.7 Warranty Period

- .1 All areas hydroseeded under this contract shall have a warranty period of one (1) year starting from the date of initial acceptance. This warranty shall cover any defects in materials and workmanship, and damages caused by the elements of weather. During this period, any defect brought to the attention of the Contractor by the Departmental Representative shall be fixed, repaired or made good to the satisfaction of the Departmental Representative and at no additional cost to the Department.

3.8 Cleaning

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

15003PART 1 - GENERAL

- 1.1 Related Sections
- .1 Section 31 23 10 - Excavating, Trenching and Backfilling.
 - .2 Section 31 24 13 - Roadway Embankments.
 - .3 Section 31 37 00 - Riprap.
 - .4 Section 32 11 19 - Granular Subbase.
 - .5 Section 32 11 23 - Granular Base.
 - .6 Section 32 12 16 - Hot Mix Asphalt Concrete Paving.
- 1.2 References
- .1 ASTM International
 - .1 ASTM C 117-13, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D 698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ftn (600 kN-m/mn)).
 - .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
 - .3 CSA International
 - .1 CSA A23.1/A23.3-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA G401-07, Corrugated Steel Pipe Products.
 - .4 Government of Newfoundland and Labrador, Municipal Water, Sewer and Roads Master Construction Specification, latest edition.
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| <u>1.3 Samples</u> | .1 | Submit samples in accordance with Section 01 33 00- Submittal Procedures. |
| | .2 | Inform Departmental Representative at least 4 weeks prior to commencing work, of proposed source of bedding materials and provide access for sampling. |
| <u>1.4 Material Certification</u> | .1 | Submit manufacturer's test data and certification at least four weeks prior to commencing work. |
| | .2 | Certification to be marked on pipe. |
| <u>1.5 Delivery, Storage And Handling</u> | .1 | Contractor to deliver, store and handle materials in accordance with Product Requirements and manufacturer's instructions. |
| <u>1.6 Waste Management And Disposal</u> | .1 | Separate and recycle waste materials as indicated by Departmental Representative. |
| | .2 | Place materials defined as hazardous or toxic waste in designated containers. |
| | .3 | Ensure emptied containers are sealed and stored safely for disposal away from children. |

PART 2 - PRODUCTS

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| <u>2.1 Corrugated Steel Pipe</u> | .1 | All pipes to be gasketed. |
| | .2 | Aluminized corrugated steel pipe, couplers, wyes, tees, bends, adapters, nuts and bolts shall conform to the requirements of the most recent revisions of the following specifications: AASHTO M274 and M36, ASTM A819 and A760 and CSA G401. Wall thickness: 2.8 mm. |
| | .3 | For existing pipes being extended, wall thickness couplers, culvert material and dimensions to match existing. |
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| <u>2.2 Structural Plate Arch</u> | .1 | The structural plate arch shall be of the span, rise, and type as specified in the Contract. |
| | .2 | The Contractor will supply the plates, unbalanced channel, nuts, bolts, washers, ribs if required, and all necessary hardware including the bolts necessary to fasten the structural plate arch to the unbalanced channel. For steel pipes all materials shall be of galvanized steel and conform to CSA Standard CAN3-G401-M81, or latest edition thereof. |
| | .3 | Subject to the Engineer's approval, arch structures must conform to minimum dimensions as shown on drawings, and footing design as engineered by supplier. |
| | | |
| <u>2.3 Joints</u> | .1 | Couplers to be Annular Corrugated with a minimum width of 600mm. Couplers shall extend 360 degrees around the pipe, fastened with bolts, include a watertight gasket and match the pipe material. |
| | | |
| <u>2.4 End Treatments</u> | .1 | Rip rap: to Section 31 37 00 - Rip Rap and as indicated on the drawings. |
| | .2 | Concrete headwall:
.1 Concrete shall be 35 MPa, Class C-2 exposure, constructed and installed in accordance with CSA A23.1 and as indicated on the drawings. |
| | | |
| <u>2.5 Granular Bedding And Backfill</u> | .1 | Granular bedding and backfill material to Section 31 05 17 - Aggregates: General and following requirements:
.1 Section 32 11 19 - Granular Subbase. |

PART 3 - EXECUTION

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| <u>3.1 Trenching</u> | .1 | Do trenching work in accordance with Section 31 23 10 - Excavating, Trenching and Backfilling. |
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- .2 Obtain Departmental Representative's approval of trench line and depth prior to placing bedding material or pipe.

3.2 Bedding

- .1 Dewater excavation, as necessary, to allow placement of culvert bedding in the dry.
- .2 Place minimum thickness of 200 mm of approved granular material on bottom of excavation and compact to minimum 100% maximum density to ASTM D 698.
- .3 Shape bedding to fit lower segment of pipe exterior so that width of at least 25% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Departmental Representative, free from sags or high points.
- .4 Place bedding in unfrozen condition.

3.3 Laying Corrugated Steel Pipe Culverts

- .1 Commence pipe placing at downstream end.
- .2 Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length.
- .3 Lay pipe with outside circumferential laps facing upstream and longitudinal laps or seams at side or quarter points.
- .4 Do not allow water to flow through pipes during construction except as permitted by Departmental Representative.
- .5 Take special care and take all necessary precautions while handling installing aluminum culvert pipe to avoid damage.

3.4 Joints: Corrugated Steel Culverts

- .1 Corrugated steel pipe: joints/couplings shall be non-corroding, Steel Culverts aluminized Type II to manufacturer's standards.
- .2 Match corrugations or indentations of coupler with pipe sections before tightening.
 - .1 Tap couplers firmly as they are being

tightened, to take up slack and ensure snug fit.

.2 Insert and tighten bolts.

3.5 Backfilling

- .1 Place backfill material, rock borrow approved by Departmental Representative, in 300 mm layers to full width, alternately on each side of culvert, so as not to displace it laterally or vertically.
- .2 Compact each layer to 100% maximum density to ASTM D 698 taking special care to obtain required density under haunches.
- .3 Protect installed culvert with minimum 600 mm cover of compacted fill before heavy equipment is permitted to cross. During construction, width of fill, at its top, to be at least twice diameter or span of pipe and with slopes not steeper than 1:2.

3.6 End Treatments

- .1 Install concrete headwalls and rip-rap as indicated or as directed by Departmental Representative.
- .2 Obtain approval of Departmental Representative of culvert installation prior to installation of any end treatments.

3.6 Excavation for Footings

- .1 When excavating concrete footings for structural plate arch, when a footing is to rest on an excavated surface other than rock, special care shall be taken not to disturb the bottom of the excavation. In soft or wet conditions, the final removal of material to foundation level shall not be made until the Contractor is ready to proceed with the construction of the footing. When material at the foundation elevation has been over excavated, the elevation shall be re-established by replacing with suitable material and compacting it to the bearing capacity of the original material as approved by the culvert manufacturer's representative. When the founding material is solid rock and has been over excavated, concrete shall be placed to the foundation elevation and

shall fill the entire volume of the over excavation. Concrete shall be of a quality compatible with that used in the footing. No compensation will be provided for the cost of remedial measures required as a result of over excavation by the Contractor.

3.10 Structural Plate
Arch

- .1 Assembly and installation of the arch culvert shall be monitored by a qualified representative of the culvert manufacturer or designer. This representative will be responsible for approval of the footing excavations, location and depth; approval of backfill materials; approval of the procedures for placing and compacting backfill materials; supervising culvert assembly and installation; and generally ensuring that the culvert is installed in accordance with the requirements of the culvert designer and culvert manufacturer. This representative shall monitor the Contractor's operations on a full time basis during backfilling operations. The contractor shall be responsible for any costs associated with providing the qualified representative.
- .2 The Contractor shall load the plates, unbalanced channel, nuts, bolts, washers, ribs if required, and all necessary hardware at the point of supply and transport them to the installation site.
- .3 The Contractor shall allow the concrete footings to cure as required by footing designer before commencing the assembly of the structural plate and fastening to the footing.
- .4 The Contractor shall assemble the structure using procedures as recommended by the manufacturer and in accordance with the instructions of the Departmental Representative.
- .5 The cutting of plate(s) or the drilling of holes in new structural plate arch construction will not be permitted. Any defective plates must be reported to the supplier and corrective action taken by the supplier or manufacturer.

- .6 The channels shall be placed in the footings to the lines and grades required by the designer.
- .7 After complete assembly all bolts shall be tightened with a torque wrench to the manufacturer's specifications.

3.11 Structural Plate
Arch Backfilling

- .1 Backfilling shall not commence until footings have cured to designer's specifications.
- .2 Select backfill material shall be used for backfilling as recommended by designer.
- .3 The backfill material shall be carefully placed to designer's specifications.
- .4 When backfilling arches without head walls, the first fill shall be placed midway between the ends of the arch. This fill shall be kept in as narrow a strip as possible until the top of the arch is reached, or as otherwise specified by designer.
- .5 The backfill shall be spread with a light dozer running parallel to, not at right angles to the structure.
- .6 Each layer of select backfill material shall be placed and compacted to designer's specifications.
- .7 The span and rise of the arch shall not vary from the original dimensions by more than five percent during backfilling operations. Any arch which displays distortions greater than those stated above, shall be excavated and re-installed according to these specifications, at the Contractor's expense.

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| <u>3.12 Protection From Traffic</u> | .1 | Prior to allowing the movement of construction equipment or any vehicular traffic over the structural arch the depth of cover over the arch shall not be less than the manufacturer's recommended minimum cover for the particular loading condition. |
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END OF SECTION

APPENDIX A