



Public Works and Government Services Canada

Requisition No. _____
MERX I.D. No. _____
SPECIFICATIONS for
Highway Construction KM 555.64 to 560.78 and KM 563.1 to KM 563.1 to KM 570.2 Alaska Highway, Northeast, BC
Project No. R.017173.049
Jan/2014

APPROVED BY:	
_____	_____
Program Manager, Alaska Highway	Date
_____	_____
Construction Safety Coordinator	Date
TENDER:	
_____	_____
Project Manager	Date

<u>SECTION #</u>	<u>Description</u>	<u># of Pages in Section</u>
<u>Division 01</u>		
01 11 00	Summary of Work	3
01 14 00	Work Restrictions	4
01 25 20	Mobilization and Demobilization	1
01 31 00	Project Managing and Coordination	4
01 32 18	Construction Progress Schedule – BAR (GANTT) Chart	3
01 33 00	Submittal Procedures	4
01 35 31	Special Procedures: Traffic Control	4
01 35 32	Site Specific Health and Safety Plan	8
01 35 43	Environmental Protection	2
01 45 00	Quality Control	3
01 52 00	Construction Facilities	3
01 52 14	Departmental Representative Camp Trailer	3
01 56 00	Temporary Barriers and Enclosures	2
01 59 10	Construction Camp	1
01 71 00	Examination and Preparation	2
01 74 11	Cleaning	2
01 77 00	Closeout Procedures	1
01 78 00	Closeout Submittals	2
<u>Division 02</u>		
	<u>Existing Conditions</u>	
02 61 33	Hazardous Materials	3
<u>Division 31</u>		
	<u>Earthwork</u>	
31 05 17	Aggregates: General	3
31 11 00	Clearing and Grubbing	2
31 24 13	Roadway Excavation, Embankment and Compaction	6
31 37 00	Rock Rip Rap	3
<u>Division 32</u>		
	<u>Exterior Improvements</u>	
32 11 18	Select Granular Sub-grade Fill	4
32 11 19	Granular Sub-base	5
32 11 24	Granular Base	4
32 15 60	Calcium Chloride for Dust Control	2
<u>Division 33</u>		
	<u>Utilities</u>	
33 42 13	Pipe Culverts	3
<u>List of Standard Drawings</u>		
D01	Silt Fencing	1
D02	Typical Access Road Approach	1
D03	Standard Embankment Roadway Structure	1
D04	Benching for Earth Slopes	1
D05	Installation of Culverts	1
D06	Hand Placed Rock Rip-rap	1

D07	Protection of Culverts from Heavy Equipment	1
D08	Treatment of Transition Points Rock Cut to fill With or Without Overburden	1
D09	Slope Treatment Cuts & Fills	1
D10	Transition From Old to New Highway	1

Appendices

1	Geotechnical Investigations – Various Locations km 555 to km 571, Alaska Highway, BC, November 2003 prepared by GAEA Engineering Ltd.	161
2	Geotechnical Report, km 435 to km 443 and km 554(Mill Creek), Alaska Highway, British Columbia, Canada, January 2011, prepared by EBA Engineering	99
3	Culvert Locations and Inventory	1
4	Example Form for Recording Density	1

List of Drawings

C00	Cover Sheet	1
C01	Site Plan, Location Map, Legend and Drawing Index	1

Sta. 555+640 to Sta. 560+789.7

C02	Plan –Profile, Sta 555+640 to Sta 556+400	1
C03	Plan-Profile, Sta 556+400 to Sta 557+500	1
C04	Plan-Profile, Sta 557+500 to Sta 558+600	1
C05	Plan-Profile, Sta 558+600 to Sta 559+700	1
C06	Plan-Profile, Sta 559+700 to Sta 560+800	1
C07	Cross-sections Sta 555+640 to Sta 555+940	1
C08	Cross-sections Sta 555+960 to Sta 556+260	1
C09	Cross-sections Sta 556+280 to Sta 556+580	1
C10	Cross-sections Sta 556+600 to Sta 556+860	1
C11	Cross-sections Sta 556+880 to Sta 557+180	1
C12	Cross-sections Sta 557+200 to Sta 557+500	1
C13	Cross-sections Sta 557+520 to Sta 557+820	1
C14	Cross-sections Sta 557+840 to Sta 558+120	1
C15	Cross-sections Sta 558+140 to Sta 558+440	1
C16	Cross-sections Sta 558+445 to Sta 558+720	1
C17	Cross-sections Sta 558+740 to Sta 559+040	1
C18	Cross-sections Sta 559+060 to Sta 559+360	1
C19	Cross-sections Sta 559+380 to Sta 559+680	1
C20	Cross-sections Sta 559+700 to Sta 559+980	1
C21	Cross-sections Sta 560+000 to Sta 560+280	1
C22	Cross-sections Sta 560+300 to Sta 560+560	1
C23	Cross-sections Sta 560+580 to Sta 560+780	1

Sta. 563+100 to Sta. 570+200

C24	Plan –Profile, Sta 563+100 to Sta 564+000	1
C25	Plan –Profile, Sta 564+000 to Sta 565+000	1
C26	Plan –Profile, Sta 565+000 to Sta 566+000	1
C27	Plan –Profile, Sta 566+000 to Sta 567+000	1
C28	Plan –Profile, Sta 567+000 to Sta 568+000	1
C29	Plan –Profile, Sta 568+000 to Sta 569+000	1

C30	Plan –Profile, Sta 569+000 to Sta 570+200	1
C31	Cross-sections Sta 563+100 to Sta 563+400	1
C32	Cross-sections Sta 563+402 to Sta 563+700	1
C33	Cross-sections Sta 563+708 to Sta 564+000	1
C34	Cross-sections Sta 564+020 to Sta 564+193	1
C35	Cross-sections Sta 564+300 to Sta 564+600	1
C36	Cross-sections Sta 564+603 to Sta 564+880	1
C37	Cross-sections Sta 564+900 to Sta 565+198	1
C38	Cross-sections Sta 565+200 to Sta 565+500	1
C39	Cross-sections Sta 565+520 to Sta 565+800	1
C40	Cross-sections Sta 565+820 to Sta 566+100	1
C41	Cross-sections Sta 566+120 to Sta 566+400	1
C42	Cross-sections Sta 566+420 to Sta 566+720	1
C43	Cross-sections Sta 566+740 to Sta 567+020	1
C44	Cross-sections Sta 567+040 to Sta 567+300	1
C45	Cross-sections Sta 567+320 to Sta 567+600	1
C46	Cross-sections Sta 567+620 to Sta 567+920	1
C47	Cross-sections Sta 567+940 to Sta 568+220	1
C48	Cross-sections Sta 568+240 to Sta 568+540	1
C49	Cross-sections Sta 568+560 to Sta 568+860	1
C50	Cross-sections Sta 568+880 to Sta 569+180	1
C51	Cross-sections Sta 569+200 to Sta 569+500	1
C52	Cross-sections Sta 569+509 to Sta 569+780	1
C53	Cross-sections Sta 569+800 to Sta 570+100	1
C54	Cross-sections Sta 570+120 to Sta 570+200	1
<u>Both Sections</u>		
C55	Mass Haul Diagram	1
C56	km 568 Gravel pit Plan	1
C57	Mill Creek Gravel Pit Plan	1
C58	Details	1
C59	Soils Logs TH01 – TH12	1
C60	Soils Logs TH13 – TH24	1
C61	Soils Logs TH25 – TH36	1
C62	Soils Logs TH37 – TH45	1
C63	Soils Logs TH46 – TH57	1
C64	Soils Logs TH58 – TH61 & TA01 – TA06	1
C65	Soils Logs TA07 – TA18	1
C66	Soils Logs TA19 – TA30	1
C67	Soils Logs TA31 – TA37 & TS01 – TS05	1
C68	Soils Logs TS06 – TS17	1
C69	Soils Logs TS18 – TS29	1
C70	Soils Logs TS30 – TS41	1
C71	Soils Logs TS42 – TS53	1
C72	Soils Logs TS54 – TS63	1

PART 1 - GENERAL1.1 Section Includes

- .1 Precedence.
- .2 Related Sections.
- .3 Title and description of Work.
- .4 Contract Method.
- .5 Work Schedule and Limitations of Funds.
- .6 Access to Site.
- .7 Contractor use of Premises.
- .8 Owner Occupancy.
- .9 Setting out of Work.
- .10 Work by Others.
- .11 Owner Furnished Items.
- .12 Measurement for Payment.

1.2 Precedence □

- .1 For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.3 Related Section

- .1 Section 01 14 00: - Work Restrictions.
- .2 Section 01 33 00:- Submittal Procedures.

1.4 Description of Work and Project Location □

- .1 Work under this Contract is for the improvement of the Highway from km 555.64 to km 560.78 and km 563.1 to km 570.2 of the Alaska Highway in Northeast B.C. Town of Fort Nelson is at km 455 of the Alaska Highway. work includes but is not limited to the following:
 - .1 Repair of frost heaves and soft sections on Highway.
 - .2 Excavate, haul, place and compact material for Roadway embankment widening and re-profiling.
 - .3 Supply, haul, place and compact Select Granular Subgrade Fill, Sub-base gravels and Base Gravels.
 - .4 Haul culvert materials from various PWGSC maintenance compounds.
 - .5 Install culverts.
 - .6 Provide and run a construction camp as necessary.
 - .7 Supply Certified Independent Testing and Survey Services.
 - .8 Supply dust control in the Mill Creek Gravel Pit.
 - .9 Other related work.

-
- 1.5 Contract Method .1 Construct Work under unit price contract.
- 1.6 Work Schedule and Limitation of funds .1 Work under this Contract to be completed by Sept 01, 2015.
.2 PWGSG has only \$6.0 Million available for Fiscal year 2014/15 and the Contractor is to plan and schedule his construction work accordingly with least impact on the driving Public.
- 1.7 Access to Site .1 Maintain and control Public traffic through construction zone in accordance with Section 01 35 31 Special Procedures: Traffic Control.
.2 Allow Departmental Representative and its Consultant(s) unrestricted access to inspect all phases of the Work.
.3 Maintain fire, police and emergency access on the Highway at all times.
.4 Maintain access to Private, Public and Commercial facilities for Contract duration.
- 1.8 Contractor Use of Premises .1 With the exception of items detailed in Section 01 14 00, Contractor has unrestricted use of site until Contract Completion.
.2 Contractor shall limit use of premises for Work, for storage, and for access, to allow:
.1 Owner occupancy.
.2 Public Usage.
- 1.9 Owner Occupancy .1 Owner will occupy premises during entire construction period for execution of normal operations.
.2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.
- 1.10 Setting Out of Work .1 Departmental Representative has established control monuments and will provide:
.1 List of control monuments.
.2 Detailed cross-section templates showing design centerline and shoulder elevations.
.3 Complete set of Construction Drawings.
.4 Alignment notes showing curve data and control point coordinates.
.2 Contractor to:
.1 Set additional control points as necessary.
.2 Set all layout and work stakes necessary to complete work.
.3 Provide measurements for Payment in paper format.
.4 Not damage control monuments.
- 1.11 Work by Others .1 Underground utilities in the work zone to be relocated by Others.
.2 Contractor to arrange utility locates.
- 1.12 Owner Furnished Items .1 Designated areas of the km 568 Gravel Pit will be made available to the Contractor for:
.1 Common Excavation material.
.2 Select Granular Sub-grade Fill material production.

Highway Construction
 Km 555.64 to Km 560.78 and Km 563.1 to Km 570.2

- .3 Production of Sub-base gravels.
- .4 Production of Base Gravels.
- .5 Disposal of waste/unsuitable excavation material.
- .6 Laydown area for materials and equipment.

.2 Designated areas of the Mill Creek Pit km 554 will be made available to the Contractor for:

- .1 Common Excavation material.
- .2 Select Granular Sub-grade Fill material production.
- .3 Production of Sub-base gravels.
- .4 Disposal of waste/unsuitable excavation material.
- .5 Laydown area for other materials and equipment.
- .6 Approximately 30,000 m³ Crushed Base gravels in stockpile.

1.12 Measurement for Payment

- .1 For any work listed in Division One Sections there will be no separate payment but is considered incidental unless noted otherwise.

PART 2 - PRODUCTS

2.1 Not Used

- .1 Not used.

PART 3 - EXECUTION

3.1 Not Used

- .1 Not used. □

END OF SECTION

PART 1 GENERAL

- 1.1 Precedence
- .1 For Federal Government Projects, Division 1 Sections take precedence over technical specification Sections in other Divisions of this Project Manual.
- 1.2 Related Sections
- .1 Section 01 32 18 – Construction Progress Schedules – Bar (GANNTT) Chart.
 - .2 Section 01 35 31 – Special Procedures: Traffic Control.
 - .3 Section 01 35 43 – Environmental Protection.
- 1.3 Existing Services
- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
 - .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions to a minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.
 - .3 Provide for pedestrian and vehicular traffic.
- 1.4 Use of the Work Site
- .1 The Work Site will be specified by the Departmental Representative and shall only be used for the purposes of the Work. The Work Site will be made available to the Contractor for its exclusive use for the duration of the Work, unless otherwise provided in the Contract Documents.
 - .2 Departmental Representative office trailer may be set up at the Mill Creek Gravel Pit, km 554 of the Alaska Highway. Contractor may set up an office trailer in this pit.
 - .3 While the Work Site is under the Contractor's control, the Contractor shall be entirely responsible for the security of the Work Site and of the Work.
 - .4 The Contractor shall keep the Work Site clean and free from accumulation of waste materials and rubbish regardless of the source. Snow/ice shall be removed by the Contractor as necessary for the performance and inspection of the Work.
 - .5 The Contractor shall provide sanitary facilities for work force in accordance with governing regulations and the Environmental Procedures for this project. The Contractor shall post notices and take such precautions as required by local health authorities and keep area and premises in sanitary condition.
 - .6 Any damage to the Work Site caused by the Contractor shall be repaired by the Contractor at its expense.
 - .7 The Contractor may work 24 hours per day, seven days per week with the following restrictions:
 - .1 No hauling of material during inclement weather.
- 1.5 Work Conducted in and Adjacent to Waterways
- .1 All components of the Work shall be conducted in accordance with Section 01 35 43 Environmental Protection.
 - .2 The Contractor is responsible for the development and supply of construction access to the Work as approved by the Departmental Representative.

1.6 Access to Adjacent Properties

- .1 Construction operations shall be conducted so as to cause minimal inconvenience to the Public and to owners of adjoining property. Existing access to property shall be maintained as far as possible and if new access must be provided, every effort shall be taken to provide the new access before the existing access is removed.

1.7 Utilities

- .1 There are active utilities within the Highway Right of Way.
- .2 The locations of Utilities shown are not necessarily exact nor is there any guarantee that all Utilities in existence within the limits of the Work Site have been shown on the Drawings.
- .3 If it is determined by the Departmental Representative that Utilities affected by the permanent Work will be relocated by Other Contractors, the Contractor shall cooperate and coordinate as required with Other Contractors engaged in Utility relocation operations on the Work Site.
- .4 The Contractor shall establish and maintain direct and continuous contact with the owners or operators of any Utilities which may interfere with the Work. The Contractor shall cooperate with them at all times and in all places of Work. The Contractor shall keep the Departmental Representative informed of all communications with the Utility companies and authorities.
- .5 The Contractor shall notify the Departmental Representative and the Utility companies at least seven (7) Days in advance of any activities which may interfere with the operation of such Utilities.
- .6 Whenever working in the vicinity of Utilities, the Contractor shall locate such Utilities and expose those that may be affected by the Work, using hand labour as required.
- .7 The Contractor shall assess the possible impact of its operation on all utilities and shall protect, divert, temporarily support or relocate, or otherwise appropriately treat such Utilities to ensure that they are preserved.
- .8 The Contractor shall immediately report any damage to Utilities to the Departmental Representative and to the Utility company or authority affected, and shall promptly undertake such remedial measures as are necessary at no additional cost to the Owner.

1.8 Survey of Existing Property Conditions

- .1 Submission of tender is deemed to be confirmation that the Contractor has inspected the site and is conversant with all conditions affecting execution and completion of work.
- .2 The Contractor shall regularly monitor the condition of the Work Site and of property on and adjoining the Work Site throughout the construction period, and shall immediately notify the Owner if any deterioration in condition is detected. Such monitoring shall cover all pertinent features and property including, but not limited to, buildings, structures, roads, walls, fences, slopes, sewers, culverts and landscaped areas.
- .3 The Departmental Representative may, but shall not be obligated to, survey and record the condition of the Work Site and of property on or adjoining the Work Site prior to the commencement of construction by the Contractor. If requested, the Departmental Representative will provide a copy of the survey

records to the Contractor for reference.

- .4 Whenever supplied with survey records, the Contractor shall satisfy itself as to the accuracy and completeness of the survey records provided by the Departmental Representative for any area before commencing construction in that area. Commencement of construction in any area shall be interpreted to signify that the Contractor has accepted such survey records as being a true record of the existing conditions prior to construction.
- .5 The provision of the records of a survey of existing conditions by the Departmental Representative shall in no way limit or restrict the Contractors responsibility to exercise proper care to prevent damage to all property within or adjacent to the Work Site, whether all such property is covered by the survey or not.

1.9 Protection of Persons and Property

- .1 The Contractor shall comply with all applicable safety regulations of the Workers Compensation Board of British Columbia (WCB) including, but not limited to, WCBs Industrial Health and Safety Regulations, Industrial First Aid Regulations, and Workplace Hazardous Materials Information System Regulations.
- .2 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or near the Work Site.
- .3 The Contractor shall promptly take such measures as are required to repair, replace or compensate for any loss or damage caused by the Contractor to any property.

1.10 Use of Public Areas

- .1 The Contractor shall ensure that its vehicles and equipment do not cause nuisance in public areas. All vehicles and equipment leaving the Work Site and entering public roadways shall be cleaned of mud and dirt clinging to the body and wheels of the vehicle. All vehicles arriving at or leaving the Work Site and transporting materials shall be loaded in a manner which will prevent dropping of materials or debris on the roadways, and, where contents may otherwise be blown off during transit, such loads shall be covered by tarpaulins or other suitable covers. Spills of material, including rocks and debris from loaded trucks, shall be removed or cleaned immediately by the Contractor at no cost to the Owner. All activities shall be in accordance with Section 01 35 43 - Environmental Protection and the Environmental Protection Plan prepared by the contractor for the project. Hauling units on Alaska Highway not to exceed legal highway load limits. The traveled lanes of the Alaska Highway shall remain a Public Highway subject to the rules and laws of Public Highways in the Province of British Columbia. The Contractor is responsible for ensuring all equipment accessing the Highway meets all requirements for vehicles traveling on Public Highways in the Province.

1.11 Supervisory Personnel

- .1 Within five Days after award notification, the Contractor shall submit to the Departmental Representative confirmation of the names of the supervisory personnel and other key staff designated for assignment on the Contract.

The following personnel shall be included in the list:

- .1 Project Superintendent.
- .2 Safety Representative.
- .2 The above personnel shall perform the following duties:
 - .1 The Project Superintendent shall be employed full time and shall be present on the Work Site each and every work day that Work is being performed, from the commencement of Work to Total Performance of the Work.
 - .2 Project Superintendent shall nominate a Deputy Project Superintendent who shall have the authority of the Project Superintendent during the latter's absence.
 - .3 Safety Representative shall possess safety experience in general construction. Duties shall encompass all matters of safety activities from commencement of Work until Total Completion of the Work.

1.12 Construction Signage

- .1 No Signs or advertisements, other than regulatory or warning signs, are permitted on site.
- .2 Signs and notices for Safety and instruction shall be provided by the Contractor. Graphic symbols shall be diamond grade and 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 as directed by the Departmental Representative.
- .4 Signage shall be coordinated with other Contractors.

PART 2 PRODUCTS

- 2.1 Not Used .1 Not Used.

PART 3 EXECUTION

- 3.1 Not Used .1 Not Used

END OF SECTION

PART 1 GENERAL

- 1.1 Section Includes .1 Mobilization and Demobilization.
- 1.2 Related Sections .1 Section 01 59 10 Construction Camp.
.2 Section 01 52 14 Departmental Representative Camp Trailer.
- 1.3 Description .1 Consists of preparatory work and operations including but not limited to those necessary for the movement of personnel, equipment, camp, buildings, shops, offices, supplies and incidentals to and from the work site.
- 1.4 Measurement for Payment .1 50% of Lump Sum Price for Mobilization and Demobilization which is not to exceed 5% of the Total Contract price for all contract components to be paid when mobilization to site is complete.
.2 Remainder of Lump Sum Contract Price for Mobilization and Demobilization to be paid when work is complete and all materials, equipment, camp, buildings, shops, offices, and other facilities have been removed from site and site cleaned and left in condition to the satisfaction of the Departmental Representative and all other Agencies having Jurisdiction.

PART 2 PRODUCTS

- 2.1 Not Used .1 Not Used.

PART 3 EXECUTION

- 3.1 Not Used .1 Not Used

END OF SECTION

Highway Construction
km 555.64 to km 560.78 and km 563.1 to km 570.2PART 1 GENERAL

- 1.1 Section Includes
- .1 Related Section.
 - .2 Co-ordination.
 - .3 Project Meetings – General.
 - .4 Construction Organization and Start-up Meeting.
 - .5 On-Site Documents.
 - .6 Schedules.
 - .7 Construction Progress Meetings.
 - .8 Submittals.
 - .9 Closeout Procedures.
- 1.2 Related Sections
- .1 Section 01 11 00 – Summary of Work.
 - .2 Section 01 32 18 - Construction Progress Schedules – Bar (GANTT) Chart.
 - .3 Section 01 33 00 – Submittal Procedures.
 - .4 Section 01 35 43 – Environmental Protection.
 - .5 Section 01 52 00 – Construction Facilities.
 - .6 Section 01 52 14 – Departmental Representative Camp Trailer.
- 1.3 Coordination
- .1 Perform coordination of progress schedules, submittals, use of site, temporary utilities, construction facilities, and construction work, with progress of work of Other Contractors, and work by Owner, under instructions of the Departmental Representative.
- 1.4 Project Meetings - General
- .1 Schedule and administer bi- weekly project meetings throughout progress of Work as determined by Departmental Representative.
 - .2 Schedule and administer pre-installation meetings when specified in Sections and when required to coordinate related or affected work.
 - .3 Prepare agenda for meetings.
 - .4 Distribute written notice of each meeting in advance of meeting date to Departmental Representative.
 - .5 Provide physical space and make arrangements for meetings.
 - .6 Preside at meetings.
 - .7 Record minutes. Include significant proceedings and decisions. Identify action by parties.
 - .8 Reproduce and distribute copies of minutes within three (3) days after each meeting and transmit to meeting participants, affected parties not in attendance and Departmental Representative.
- 1.5 Construction Organization and Start-up
- .1 Within seven (7) days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
 - .2 Departmental Representative, senior representatives of the Contractor, major Subcontractors, field inspectors and supervisors are to be in attendance.
 - .3 Establish the time and location of meeting and notify parties concerned minimum five (5) days before meeting.

Highway Construction
km 555.64 to km 560.78 and km 563.1 to km 570.2

-
- .4 Incorporate mutually agreed variations to Contract Documents into agreement, prior to signing.
 - .5 Agenda to include the following:
 - .1 Appointment of official representative of participants in Work.
 - .2 Schedule of Work, progress scheduling in accordance with Section 01 32 18.
 - .3 Schedule of submissions in accordance with Section 01 33 00 Submittal Procedures.
 - .4 Requirement for temporary facilities, offices, storage sheds, utilities, fences in accordance with Section 01 35 43 – Environmental Protection.
 - .5 Owner furnished materials.
 - .6 Site safety and security in accordance with Section 01 52 00 – Construction Facilities.
 - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, working hours, and administrative requirements.
 - .8 Monthly progress claims, administrative procedures, photographs and holdbacks.
 - .9 Take-over procedures, acceptance and Warranties in accordance with Section 01 77 00 – Closeout Procedures.
 - .10 Appointment of Inspection, Survey and Testing Agencies or firms.
 - .11 Insurance and transcript of policies.
 - .6 Comply with Departmental Representative's allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.
 - .7 Comply with instructions of the Departmental Representative for use of temporary utilities and construction facilities.
 - .8 Coordinate field engineering and layout work with Departmental Representative.

1.6 On-Site Documents

- .1 Maintain at job site, one copy each of the following:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 Manufacturer's Installation and Application instructions.
 - .6 Change Orders.
 - .7 Other modifications to Contract.
 - .8 Traffic Management Plan.
 - .9 Safety Plan.
 - .10 WHMIS.
 - .11 Field Test Reports.
 - .12 Copy of approved Work Schedule.
 - .13 Labour Conditions and Wage schedules.
 - .14 Applicable current editions of municipal regulations and by-laws.
 - .15 All applicable Federal Permits and Licenses.
 - .16 All Applicable Provincial Permits and Licenses.

Highway Construction
km 555.64 to km 560.78 and km 563.1 to km 570.21.7 Schedules

- .1 Submit preliminary construction progress schedule in accordance with Section 01 32 18 to Departmental Representative.
- .2 After review, revise and resubmit schedule to comply with comments given.
- .3 During progress of Work revise and resubmit as directed by the Departmental Representative.

1.8 Construction Progress Meetings

- .1 During course of Work prior to project completion, schedule bi-weekly progress meetings.
- .2 Contractor, major subcontractors involved in the Work and Departmental Representative are to be in attendance.
- .3 Notify parties a minimum of seven (7) days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within five (5) calendar days after meeting.
- .5 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain project schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule for next work period.
 - .9 Review Submittal schedules: expedite as required.
 - .10 Maintenance of Quality standards, review of test results.
 - .11 Review proposed changes for affect on construction schedule and on completion date.
 - .12 Review site Safety and Security issues.
 - .13 Other business.
 - .14 Schedule next meeting.

1.9 Submittals

- .1 Submit product data in accordance with Section 01 33 00 for review for compliance with Contract Documents.
- .2 Submit requests for payment for review, and for transmittal to the Departmental Representative.
- .3 Submit requests for interpretation of Contract Documents, and obtain instructions through the Departmental Representative.
- .4 Process any proposed substitutions through Departmental Representative.
- .5 Process Change Orders through the Departmental Representative.
- .6 Deliver Closeout submittals for review and preliminary inspections, for transmittal to Departmental Representative.

1.10 Closeout Procedures

- .1 Notify Departmental Representative when Work is considered ready for Substantial Performance.
- .2 Accompany Departmental Representative on preliminary inspection to

- determine items listed for completion or correction.
- .3 Comply with Departmental Representative’s instructions for correction of items of Work listed in executed Certificate of Substantial Performance.
- .4 Notify Departmental Representative of instructions for completion of items of Work determined in Departmental Representative’s Final Inspection.

PART 2 PRODUCTS

2.1 Not Used .1 Not Used.

PART 3 EXECUTION

3.1 Not Used .1 Not Used

END OF SECTION

Highway Construction
km 555.64 to km 560.78 and km 563.1 to Km 570.2PART 1 GENERAL1.1 Precedence

- .1 For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.2 Measurement Procedures

- .1 Cost of providing Construction Progress Schedules will be considered incidental to the work and no additional payment will be made.

1.3 Definitions

- .1 Activity: An element of Work performed during course of Project. An activity normally has an expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart). A graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Bar Chart should be derived from MS Project or compatible software.
- .3 Baseline: Original approved plan for Project, plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Sunday, inclusive, will provide seven day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: Number of work periods (not including holidays or other nonworking periods) required to complete an activity or other Project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: A summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: A significant event in Project, usually completion of major deliverable.
- .8 Project Schedule: The planned dates for performing activities and the planned dates for meeting milestones. A dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: Overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.4 Requirements

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately 20 working days, to

Highway Construction
km 555.64 to km 560.78 and km 563.1 to Km 570.2

allow for progress reporting.

- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Substantial Completion Certificate and Final Certificate as defined times of completion are of essence of this contract.
- .5 Include the requirements of Section 01 14 00, Work Restrictions.

1.5 Submittals

- .1 Submit to Departmental Representative within Seven (7) working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .2 Submit Project Schedule to Departmental Representative within ten (10) working days of receipt of acceptance of Master Plan. Within seven (7) days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

1.6 Project Milestones

- .1 Project milestones form interim targets for Project Schedule:
 - .1 Substantial Completion by Sept 01, 2015.

1.7 Master Plan

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Departmental Representative will review and return revised schedules within five (5) working days.
- .3 Revise impractical schedule and resubmit within 5 working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.8 Project Schedule

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and Activity types as follows:
 - .1 Award.
 - .2 Submission of:
 - .1 Shop Drawings.
 - .3 Permits.
 - .4 Mobilization and preparation of staging area(s).
 - .5 Clearing & Grubbing.
 - .6 Stripping.
 - .7 Common Excavation/Roadway Embankment construction.
 - .8 Production of Select Granular Sub grade Fill, Sub-base and Base gravels.
 - .9 Graveling.
 - .10 Site Clean-up and demobilization.

1.9 Project Schedule Reporting

- .1 Update Project Schedule on monthly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible

mitigation.

1.10 Project Meetings

- .1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not Used.

PART 3 EXECUTION

3.1 Not Used

- .1 Not Used

END OF SECTION

PART 1 GENERAL

1.1 Section Includes

- .1 Shop Drawings and Product Data.
- .2 Samples.
- .3 Certificate and transcripts.

1.2 Related Sections

- .1 Section 01 14 00 - Work Restrictions.
- .2 Section 01 32 18 - Construction Progress Schedules.
- .3 Section 01 35 32 – Site Specific Health and Safety Plan.
- .4 Section 01 35 31 - Special Procedures for Traffic Control.
- .5 Section 01 35 43 - Environmental Protection.
- .6 Section 01 45 00 - Quality Control.
- .7 Section 01 78 00 - Closeout Submittals.

1.3 Administrative

- .1 Submit to Departmental Representative submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Work affected by submittal shall not proceed 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 coordinated 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 shall be 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 field measurements and affected adjacent Work are coordinated.
- .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 review.
- .10 Keep one reviewed copy of each submission on site.

1.4 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 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 coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .3 Allow seven (7) calendar days for Departmental Representative's review of each submission.
- .4 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.
- .5 Make change in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of any revisions other than those requested.
- .6 Accompany submissions with transmittal letter containing:
 - .1 Date.
 - .2 Project Title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .7 Submissions shall include:
 - .1 Date and revision dates.
 - .2 Project Title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .8 Submit the following:
 - .1 Mill certificate for CSP.
 - .2 Product Data sheets for Geotextiles.
 - .3 Health & Safety submittals as per Section 01 35 32.
 - .4 Quality Control Plan as per Section 01 45 00.
 - .5 Quality Control Test Results.
 - .6 Sediment Control Plan as per Section 01 35 43.
 - .7 Traffic Control Plan as per Section 01 35 31.

.8 Environmental Protection Plan

- .9 After Departmental Representative's review, distribute copies.
- .10 Submit 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.
- .11 Submit six (6) copies and one (1) electronic copy 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 Delete information not applicable to project.
- .13 Supplement standard information to provide details applicable to project.
- .14 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, 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.
- .15 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept. This review shall not mean that PWGSC 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 all requirements of construction and Contract Documents. 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 all sub-trades.

1.5 Samples

- .1 Submit for review samples as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Departmental Representative's site office.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where color, 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.

1.6 Certificates and Transcripts

- .1 Immediately after award of Contract, submit Advance Notification of Project letter as sent to the Authority Having Jurisdiction, copies of all necessary permits, notifications and related documents and a site specific Health and Safety Plan which is acceptable to the Authority Having Jurisdiction.

PART 2 PRODUCTS

- 2.1 Not Used .1 Not Used.

PART 3 EXECUTION

- 3.1 Not Used .1 Not Used

END OF SECTION

PART 1 GENERAL

- 1.1 Section Includes
- .1 Related Sections.
 - .2 Requirements of Regulatory Agencies.
 - .3 Measurement of Payment.
 - .4 Reference Standards.
 - .5 Traffic Management Plan.
 - .6 Informational and Warning Devices.
 - .7 Protection and Control of Public Traffic.
 - .8 Operational Requirements.
 - .9 Weight Restrictions.
- 1.2 Related Sections
- .1 Section 31 24 13 - Roadway Excavation, Embankment and Compaction.
 - .2 Section 32 11 24 - Granular Base.
 - .3 Section 32 11 18 – Select Granular Sub-grade Fill.
 - .4 Section 32 11 19 - Granular Sub-base.
 - .5 Section 33 42 13 - Pipe Culverts.
- 1.3 Requirements of Regulatory Agencies
- .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.
- 1.4 Measurement Procedures
- .2 Measurement for payment will be Lump Sum.
- 1.5 Reference Standards
- .1 “Traffic Control Manual for Work on Roadways” distributed by Province of British Columbia, Ministry of Transportation. Ensure current copy of manual is available on site at all times.
 - .2 Nothing in this Section limits the Contractor’s responsibility to safely accommodate traffic through unique or varied construction situations.
- 1.6 Traffic Management Plan
- .1 Provide for review and acceptance a Traffic Management Plan to the Departmental Representative. The Traffic Management Plan shall provide a complete and unambiguous plan of the traffic accommodation strategies proposed for use during the work at each stage. The Traffic Management Plan shall be fully integrated with the Contractor’s plans and schedule for carrying out the work, shall be developed in accordance with the latest version of the “Traffic Control Manual for Work on Roadways” and the requirements of this Section.
 - .2 The Traffic Management Plan to be submitted to the Departmental Representative for review and acceptance at least ten (10) days prior to the start of any work effecting traffic flows. The Departmental Representative

Highway Construction
km 555.64 to km 560.78 and km 563.1 to km 570.2

will review the Traffic Management Plan (first submission and if required subsequent re-submissions) within seven (7) days of submission. Upon review of the Plan the Departmental Representative will either:

- .1 Reject the Plan and provide comments outlining required changes or details of additional information needed. Following completion of edits, re-submit the Plan for review.
- .2 Accept the Plan.

If the Plan is rejected, the Contractor shall make edits and re-submit the Plan for review and acceptance. Any review or comments provided by the Departmental Representative does not in any way relieve the Contractor of any of its responsibilities for ensuring safe and appropriate Traffic Management. No work that affects the flow of traffic will be permitted until the Traffic Management Plan has been accepted by the Departmental Representative.

- .3 The Contractor shall allow time in its schedule for the reviews, and subsequent edits/re-submissions.

PART 2 PRODUCTS

2.1 Information and Warning Devices

- .1 Supply new signs, delineators, barricades, traffic cones and miscellaneous warning devices as specified in “Traffic Control Manual for Work on Roadways”.
- .2 Supply two (2) portable electrically illuminated message signs.
- .3 Supply two (2) portable electrically illuminated stop light signs.

2.2 Traffic Markers

- .1 Provide Type D traffic cones as specified in Traffic Control Manual for Work on Roadways. Have a minimum of one hundred (100) traffic cones for use on site prior to start of work.

PART 3 EXECUTION

3.1 Protection of Public Traffic

- .1 When working on traveled way:
 - .1 Position equipment to present minimum of interference and hazard to travelling Public.
 - .2 Keep equipment units as close together as working conditions permit and preferably on same side of traveled way.
 - .3 Do not leave equipment parked on Highway shoulders or on the travelled way overnight.
- .2 Do not close any lanes of road or highway without prior approval of Departmental Representative. Before rerouting traffic erect suitable signs and devices in accordance with instructions contained in Traffic Control Manual for Work on Roadways.
- .3 Keep traveled way graded, free of pot holes and of sufficient width for

Highway Construction
km 555.64 to km 560.78 and km 563.1 to km 570.2

required number of lanes of traffic.

- .1 Provide dedicated minimum 7m wide temporary roadway for traffic in two-way sections through Work and on detours. Widen roadway as necessary in curves to provide adequate room for transport trucks to meet safely.
- .2 Provide dedicated minimum 5m wide temporary roadway for traffic in one-way sections through Work and on detours.
- .4 Provide well-graded, signed, and maintained detours or temporary roads to facilitate passage of traffic around restricted construction area(s).
- .5 Provide Dust control.
- .6 Provide and maintain reasonable access to property in vicinity of work under contract and in other areas as indicated, unless other reasonable means of road access exist that meet approval of Departmental Representative.
- .7 Complete new grade as soon as practical after disturbing existing roadway surface.

3.2 Informational and Warning Devices

- .1 Provide, erect, and maintain signs, flashing warning lights, and other devices required to indicate construction activities and other temporary and unusual conditions resulting from project work which requires road user response as specified in “Traffic Control Manual for Work on Roadways”.
- .2 Place signs and other devices in locations recommended in the “Traffic Control Manual for Work on Roadways”.
- .3 Signs shall be wind resistant.
- .4 Meet with the Departmental Representative prior to commencement of work to prepare list of signs and other devices required for the project. If situation on site changes, revise list to approval of Departmental Representative.
- .5 Continually maintain traffic control devices in use by:
 - .1 Checking signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
 - .2 Removing or covering signs which do not apply to conditions existing from day to day.
 - .3 Stop lights may be used in conjunction with pilot vehicles only if all equipment is not working and off road and adequate signage is in place.
 - .4 Posting all finished sections longer than two (2) km at 80km/h.
- .6 Ensure that necessary traffic cones and signs are in place prior to interference with traffic on existing roadways.

3.3 Control of Public Traffic

- .1 Provide traffic control in accordance with “Traffic Control Manual for Work on Roadways”.
- .2 Flag persons:
 - .1 Provide trained, competent flag persons with valid Certificate of Competency recognized by Worker’s Compensation Board.
 - .2 Provide flag persons with proper equipment and clothing as specified in “Traffic Control Manual for Work on Roadways”.
 - .3 Flag persons are required in following situations:
 - .1 When Public Traffic is required to pass working vehicles or

Highway Construction
km 555.64 to km 560.78 and km 563.1 to km 570.2

- equipment which 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 workmen, 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 When 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.
- .7 At each end of restricted sections where pilot vehicles are required.
- .8 When construction traffic is crossing roadway.
- .3 Maximum delays to Public Traffic due to Contractor's operations: 15 minutes at Flag Person station.
- .4 Pilot vehicles:
 - .1 Provide pilot vehicles. Equip pilot vehicles with orange flashing lights and signs clearly designating vehicles as pilot vehicles in following situations:
 - .1 Where equipment is working on section of roadway longer than 300m or shorter if visibility is limited.
 - .2 Where traffic is required to travel on partially completed roadway or on detours longer than 300m or shorter if visibility is limited.
 - .3 Where it is necessary to institute one-way traffic.
 - .4 Where access through work would be otherwise dangerous.
- 3.4 Operational Requirements
 - .1 Maintain existing conditions for traffic throughout period of Contract except when required for construction under contract and when measures have been taken as specified herein and approved by the Departmental Representative to protect and control Public traffic. Existing conditions for traffic may be restricted as follows:
 - .1 Single lane alternating traffic.
 - .2 Speed limit reduced to 50km/h.
- 3.5 Weight Restrictions
 - .1 British Columbia Highway Traffic Act pertaining to registered weight limits and vehicle size will control loads to be hauled over highway, both within and outside contract limits.

END OF SECTION

PART 1 GENERAL

- 1.1 Site Specific Health and Safety Requirements
- .1 Maintain and complete all health and safety, fire safety, and environmental compliance activities in accordance with applicable sections and Authorities Having Jurisdiction (AHJ).
 - .2 Schedule a compliance meeting on an as required basis, as directed by Departmental Representative. Compliance meetings may be held in conjunction with regular meetings.
 - .3 Compliance meetings to be held at the work site.
 - .4 Departmental Representative will record minutes, chair the meeting and distribute minutes to parties of record prior to the next Scheduled meeting.
- 1.2 Related Sections
- .1 Section 01 33 00 – Submittal Procedures.
- 1.3 Submittals
- .1 Submit three (3) hard copies and one (1) electronic copy of the Site Specific Health and Safety Plan no later than 5 days after contract award to the Departmental Representative for review. Any items, which are identified as missing, will be added and the plan revised, so as to incorporate the additional items.
 - .2 All submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .3 The Site Specific Health and Safety Plan will include, but is not limited to the following sections:
 - .1 A Statement of Contractor's Safety Policy.
 - .2 Safety Responsibilities of all on-site personnel.
 - .3 Safe Work Practices and/or Job Procedures.
 - .4 Procedures for confined space entry.
 - .5 Name and telephone number of Contractor's Corporate Safety Officer and on-site Safety Representative.
 - .6 Emergency Response Plan.
 - .7 Fire Safety Plan.
 - .8 Spill Contingency Plan.
 - .9 Wildlife Management Plan.
 - .4 Conduct and submit to Departmental Representative a site assessment of deficiencies in health, safety and medical/first aid supplies. Submit to Departmental Representative a Schedule for upgrading deficiencies to meet requirements of AHJ.
- 1.4 Construction Safety Measures
- .1 Observe and enforce construction safety measures required by the latest revisions of: Canada Labour Code, National Building Code of Canada, National Fire Code of Canada, Workers' Compensation Board, the applicable Occupational Health and Safety Regulations, and provincial and local statutes and authorities.

- .2 In the event of discrepancies between any requirements of the above listed authorities, the more stringent requirements will govern.
- .3 Arrange regular safety meetings, to be held no less frequently than once per week. Record the minutes of such meetings and maintain a complete file for review by the appropriate authorities. Submit a copy of these meeting minutes to Departmental Representative within three (3) days of the meeting.
- .4 Maintain at the site, five safety hats with liners, and five safety hi-visibility vests for use by Departmental Representative and visitors. Maintain a supply of ear plugs.
- .5 Comply with all applicable health and safety policies and procedures of Departmental Representative.
- .6 Departmental Representative or Health and Safety Representative has the authority to stop Work on the contract if, in his/her opinion, the Work is being performed in an unsafe manner as required by the applicable safety legislation.
- .7 Prepare and coordinate a Contingency and Emergency Response Plan with contributions from appropriate authorities including British Columbia provincial government, Safety Act, Hospitals, RCMP, Ministry of Transportation, and Ministry of Health. Plan will identify off site Emergency Response Coordinator through whom all information and coordination will flow in the event of an incident.
- .8 Verify that emergency procedures including appropriate First aid facilities and First Aid personnel are in place at the Work Site. First aid facilities and First Aid personnel must be in compliance with the British Columbia Safety Act.
- .9 Verify that procedures meet the WCB and HRSDC requirements.

1.5 Regulatory Requirements

- .1 Comply with specified standards, regulations and orders of AHJ to ensure safe operations at sites containing hazardous or toxic materials and other hazards (such as wildlife encounters, falls, etc.).
- .2 All equipment brought to the site must meet the Health and Safety Act, equipment must have rotating beacons and vehicles should have beacons and buggy whips.

1.6 Responsibility

- .1 Be responsible for safety of persons and property on site and for protection of public off site and environment to extent that they may be affected by the site and conduct of Work.
- .2 Control access to the site. Persons with business at the site and who are not Contractor's employees must be briefed on site specific health and safety

Highway Construction
km 555.64 to km 560.78 and km 563.1 to km 570.2

issues, and provided with a copy of the site specific health and safety plan.

- .3 Contractor may refuse access to the site to any person not complying with site specific health and safety standards.
- .4 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, territorial, and local statutes, regulations, and ordinances, and with Site-Specific Health and Safety Plan:
 - .1 Conduct appropriate safety training for all personnel working on the site.
 - .2 Conduct Work place safety inspections for all Work activities.
 - .3 Maintain a log of first aid and safety supplies, and notify appropriate personnel for restocking after each incident, and periodical restocking to replace out dated or consumable (bandages) products.

1.7 Hazard Communication Requirements

- .1 Comply with Work Site Hazardous Materials Information System Regulations of the AHJ.
- .2 Provide Departmental Representative with Material Safety Data Sheets (MSDS) and documentation on any "hazardous" chemical that Contractor or Contractor Representatives plan to bring onto site; bound in one place and stored in accordance with the Site Specific Health and Safety Plan.

1.8 Unforeseen Hazards

- .1 Should any unforeseen or peculiar safety related factor, hazard, or condition become evident, stop Work, assess, take steps to mitigate if necessary at that time and immediately advise Departmental Representative verbally and in writing.
- .2 Monitor potential low oxygen and Lower Explosive Limits areas with oxygen/LEL monitor if workers are working in and around area. These areas include but are not limited to trenches, excavations and areas near machinery exhaust.

1.9 Safety and Hygiene

- .1 Provide training for all persons entering the site in accordance with specified personnel training requirements, maintain log of who was trained, what training was provided and by whom the training was conducted.
- .2 Personal Protective Equipment (PPE):
 - .1 Furnish site personnel with appropriate PPE as required by legislation.
 - .2 Verify that safety equipment and protective clothing is kept clean and well maintained.
 - .3 Ensure all clothing and personal protective equipment used on site, must remain on site, to be either decontaminated or disposed of. No Work clothing is to leave Work site without having been properly decontaminated. This includes, but is not limited to working coveralls.
 - .4 Outline and designate PPE for each site and Work activity in accordance with AHJ.
- .3 Develop written PPE care and use procedures to be included in the Site Specific Health and Safety Plan and verify that procedures are strictly followed by site personnel including, but not limited to, the following:

- .1 Provisions for prescription eyeglasses with side shields worn as safety glasses and do not permit contact lenses on site within Work zones.
- .2 Provisions, for footwear, are steel toed safety shoes or boots and are covered by rubber overshoes when entering or working in potentially contaminated Work areas.

1.10 Site Communications

- .1 Post emergency numbers near site telephones.
- .2 Train personnel in the use of “buddy” system.
- .3 Provide alarm system to notify employees of site emergency situations or to stop Work activities if necessary. Identify emergency stations.

1.11 Safety Meeting

- .1 Conduct task specific safety meetings (toolbox) as per Project requirements and as directed by Departmental Representative.
- .2 Conduct safety meetings with workers engaged in outdoor Work under summer or winter conditions. Topics must include hot and cold stress, exhaustion, snowmobile safety, buddy systems, and any other items inherent in working outdoors in winter in isolated environments.
- .3 Conduct mandatory daily safety meetings for personnel, and additionally as required by special or Work related conditions; include refresher training for existing equipment and protocols, review ongoing safety issues and protocols, and examine new site conditions as encountered. Hold additional safety meetings on an as needed basis or as specified by the AHJ. Keep records of meetings on file.

1.12 Fuel Management

- .1 All vehicle and equipment refueling must be conducted by appropriately trained personnel using the effective personal protective equipment in a manner which meets or exceeds regulatory requirements including using drip pans.
- .2 Records of fuel usage by activity must be maintained.
- .3 All fuel transports including mobile refueling trucks and fuel transport to stationary equipment such as generators or pumps or distributed storage areas, must occur in approved (CSA) containers with the notification and consent of site safety personnel.

1.13 Vehicle and Equipment Usage

- .1 Seatbelts must be worn at all times vehicle or equipment is in operation.
- .2 Speed limits must be set and obeyed.
- .3 If road conditions are unsafe or marginally unsafe, maintain roads to acceptable standards. Do not risk property damage or injury.
- .4 Vehicles are to not be idled for longer than 10 minutes (warm up) unless explicitly used as a place of refuge during animal encounters or for personnel working outdoors during winter operations. Exceptions are to be made in consultation with Departmental Representative.
- .5 Perform vehicle maintenance and lubrication of equipment in a manner that avoids spillage of fuels, oils, grease and coolants. When refueling equipment, use leak free containers and reinforced rip and puncture proof hoses and nozzles. Remain in attendance for duration of refueling operation, and ensure that all storage container outlets are properly sealed after use.

Highway Construction
km 555.64 to km 560.78 and km 563.1 to km 570.2

- .6 Place drip pans under stationary equipment with potential leaks.
- .7 All equipment brought to the site must have rotating beacons and vehicles should have two way radios.

1.14 Flammable Liquids

- .1 The handling, storage and use of flammable liquids will be governed by the current National Fire Code of Canada.
- .2 Flammable liquids such as gasoline, kerosene and naphtha may be kept for ready use in quantities not exceeding 45 litres provided they are stored in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable liquids exceeding 45 litres for Work purposes requires the permission of the permitting authority.
- .3 Do not transfer flammable liquids in the vicinity of open flames or any type of heat-producing devices.
- .4 Do not use flammable liquids having a flash point below 38°C such as naphtha or gasoline as solvents or cleaning agents.
- .5 Store flammable waste liquids, for disposal, in approved containers located in a safe ventilated area. Quantities are to be kept to a minimum and Departmental Representative is to be notified when disposal is required.
- .6 Dispose of all flammable liquids in accordance with all applicable environmental regulations and with the requirements of Section 02 61 33 - Hazardous Waste Material.

1.15 Storage and Handling of Fuel

- .1 Locate fuel storage areas as approved by Departmental Representative.
- .2 Inspect fuel storage and dispensing facilities daily. Make available fire fighting and spill response equipment for immediate access at each fuel storage location.
- .3 Store all barrels containing fuel and /or hazardous materials in an elevated position, either on their side with bungs facing 9 and 3 o'clock position, or on pallets, upright, and banded.
- .4 All barrels to be individually identified. Label will be to industry standards and will provide all information necessary for health and safety and environmental purposes. Make available, to all personnel, Material Safety Data Sheets for all materials maintained at site or along right-of-ways.
- .5 All barrels/fuel containers to be labeled with the Contractor's.
- .6 Treat all waste petroleum products, including used oil filters as hazardous materials.
- .7 Conduct regular inspections of all machinery hydraulic, fuel and cooling systems. Repair leaks immediately.
- .8 Pre-assemble and maintain emergency spill equipment, including at least two fuel pumps , empty 200 L barrels and absorbent material sufficient to clean up a 1000 litre spill at all fuel storage sites. Maintain spill mats or pan under mobile fuelling containers and a spill kit at the refueling area.
- .9 Remove all full and empty barrels, fuel storage facilities and associated materials and equipment from site at conclusion of Work.

1.16 Spill Contingency

- .1 Submit to Departmental Representative for approval, detailed Spill

Plan

Contingency Plan. Identify response capabilities by detailing response times, and types and volumes of spills to which Contractor can respond. Following information is required as a minimum:

- .1 A description of pre-emergency planning.
- .2 Personnel roles, lines of authority and communication, emergency phone numbers.
- .3 Emergency alerting and response procedures.
- .4 Evacuation routes and procedures, safe distances and places of refuge.
- .5 Directions/methods of getting to nearest medical facility.
- .6 Emergency decontamination procedures.
- .7 Emergency medical treatment and First-Aid.
- .8 Emergency equipment and materials.
- .9 Emergency protective equipment.
- .10 Procedures for reporting incidents.
- .11 Spill response and containment plans for all materials that could potentially be spilled.

1.17 Medical

- .1 Provide and maintain first aid facilities for all workers as required by the Safety Act.
- .2 Provide the appropriate first aid kit, based on the number of workers, in accordance with the Safety Act.
- .3 Establish an emergency response plan acceptable to Departmental Representative, for the removal of any injured person to medical facilities or a doctor's care in accordance with applicable legislative and regulatory requirements.
- .4 Provide proof of First Aid credentials to Departmental Representative prior to the start of construction. Provide the appropriate number of first aid attendants on site in accordance with WCB Regulations.
- .5 Emergency and First Aid Equipment:
 - .1 Locate and maintain emergency and first aid equipment in appropriate location on site including first aid kit to accommodate number of site personnel; portable emergency eye wash; fire protection equipment as required by legislation.
 - .2 Locate sufficient; blankets and towels; stretcher; and 1 hand held emergency siren in all confined access locations.
 - .3 Provide a minimum of 1 qualified first aid attendant as per WCB Regulations on site at all times when Work activities are in progress; duties of first aid attendant may be shared with other light duty Work related activities.

1.18 Accidents and Accident Reports

- .1 Immediately report, verbally, followed by a written report within 24 hours, to Departmental Representative, all accidents of any sort arising out of or in connection with the performance of the Work, giving full details and statements of witnesses. If death or serious injuries or damages are caused, report the accident promptly to Departmental Representative by telephone or facsimile in addition to any report required under federal and territorial laws and regulations.

-
- 1.19 Security
- .2 If a claim is made by anyone against Contractor or Sub-Contractor on account of any accident, promptly report the facts in writing to Departmental Representative, giving full details of the claim.
 - .1 Limit site access only to persons employed on the Project. Unauthorized persons will be permitted on site only with the approval of Departmental Representative or Contractor.
- 1.20 Wildlife Management
- .1 Develop a wildlife management plan, as part of the Site Specific Safety Plan, that includes bear and large mammal safety and as a minimum meets the following requirements:
 - .1 Firearms must be stored and used in accordance with all AHJ. Terms of Use for firearms must be submitted to Departmental Representative for review.
 - .2 All wildlife encounters and sightings must be reported to Departmental Representative as part of the weekly report.
- 1.21 Fire Safety
- .1 Provide all fire prevention, fire protection and fire fighting services at the Project site.
 - .2 Implement a fire safety program that includes fire prevention, fire protection and fire fighting requirements. Submit details of the fire safety program in writing to Departmental Representative for review prior to start of construction. Such review does not relieve Contractor from any obligations or responsibilities required by the Contract.
 - .3 Ensure that any Sub-Contractors and other Contractor personnel on-site are briefed on fire safety requirements and are familiar with the fire prevention, fire protection and fire fighting program.
 - .4 The fire safety program to meet or exceed the most recent editions of the following codes and standards:
 - .1 British Columbia Safety Act.
 - .2 National Fire Code of Canada.
 - .3 Canada Labour Code.
 - .5 Personnel designated for firefighting services must be provided with training for any special hazards that may be present. These personnel must also be provided with protective equipment as required by the Canada Labour Code.
- 1.22 Reporting Fires
- .1 A person discovering a fire and all fire related incidents shall report immediately, by fastest available means, to Departmental Representative and site superintendent.
 - .2 A person discovering a fire will if possible, remain in the vicinity to direct fire fighting personnel.
- 1.23 Rubbish and Waste Materials
- .1 Rubbish and waste materials are to be kept to a minimum.
 - .2 Storage:
 - .1 Extreme care is required where it is necessary to store oily waste in Work areas to ensure maximum possible cleanliness and safety.
 - .2 Greasy or oily rags or materials subject to spontaneous combustion will be disposed of as hazardous material in accordance with British

Columbia regulations.

- 1.24 Hazardous Substances
- .1 If the Work entails the use of any toxic or hazardous materials or chemicals, or otherwise creates a hazard to life, safety or health, Work will be in accordance with the National Fire Code of Canada, Occupational Health and Safety Legislation, and WHMIS.
 - .2 Departmental Representative is to be advised, and a "Hot Work" permit issued by Contractor's designated representative in all cases involving welding, burning or the use of blow torches and salamanders, in buildings or facilities. Special precautions are necessary to safeguard life and property from damage by fire or explosives.
 - .3 Wherever Work is being carried out in dangerous or hazardous areas involving the use of heat, fire watchers, equipped with sufficient fire extinguishers, will be provided. The determination of dangerous or hazardous areas along with the level of precaution necessary for Fire Watch will be at the discretion of Contractor. Notify Departmental Representative prior to that determination.
 - .4 Provide proper ventilation and eliminate all sources of ignition where flammable liquids, such as lacquers or urethanes are used.
- 1.25 Questions and Clarifications
- .1 Direct any questions or clarification to Departmental Representative.

PART 2 PRODUCTS

- 2.1 Not Used
- .1 Not Used.

PART 3 EXECUTION

- 3.1 Not Used
- .1 Not Used

END OF SECTION

PART 1 GENERAL

- 1.1 Fires
- .1 Comply with Forest Practices Code of British Columbia when burning. Fires and burning of rubbish on site permitted only when approved by Departmental Representative.
 - .2 Where fires or burning permitted, prevent staining or smoke damage to structures, materials or vegetation which is to be preserved. Restore, clean and return to new condition stained or damaged work.
 - .3 Provide supervision, attendance and fire protection measures as directed.
- 1.2 Disposal of Wastes
- .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.
- 1.3 Measurement Procedures
- .1 No separate payment under Environmental Protections.
- 1.4 Drainage
- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
 - .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
 - .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
- 1.5 Site Clearing and Plant Protection
- .1 Protect trees and plants on site and adjacent properties where indicated.
 - .2 Protect roots of designated trees to drip line during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
 - .3 Minimize stripping of topsoil and vegetation.
 - .4 Restrict tree removal to areas indicated or designated by Departmental Representative.
- 1.6 Work Adjacent to Waterways
- .1 Do not operate construction equipment in waterways unless indicated by the Departmental Representative.
 - .2 Do not use waterway beds for borrow material.
 - .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.
 - .7 Do not blast under water within 100m of indicated spawning beds.
- 1.7 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.
- .5 Equipment shall be refueled and serviced at least 100m away from the water. Equipment operating near any watercourse shall contain only environmentally friendly hydraulic fluids, and be free of external grease, oil and mud. Appropriate precautions shall be taken to ensure that deleterious substances do not enter the watercourse.
- .6 During construction, all deleterious substances including, but not limited to, sand, gravel, rubble, sealant, paint, rust and debris should be captured and properly disposed of. No construction or demolition debris shall be allowed to enter the stream.

PART 2 PRODUCTS

2.1 Not Used .1 Not Used.

PART 3 EXECUTION

3.1 Not Used .1 Note Used

END OF SECTION

PART 1 GENERAL

1.1 Inspection

- .1 Contractor is responsible for all Quality Control under this specification. Departmental Representative will audit and monitor Contractor's operation and implementation of Contractor's Quality Control Plan.
- .2 Departmental Representative will not take samples for quality control testing and will in no manner assist in any degree or in any respect of Contractor's operation from beginning of work to completion of the Base Gravel course.
- .3 Quality Control Plan:
 - .1 Prepare and submit detailed written Quality Control Plan to Departmental Representative.
 - .2 Contractor to submit Quality Control Plan ten (10) working days before proposed work on site begins.
 - .3 Departmental Representative will review Contractor's Quality Control Plan and respond in writing within five (5) days.
 - .4 Any change to Quality Control Plan must be submitted to Departmental Representative for approval 24 hours prior to implementing change.
 - .5 Plan to include but not limited to following:
 - .1 Identification of source and proof of quality of aggregates in general and standard protector testing for all types of material to be used.
 - .2 Stockpile management.
 - .3 Compaction testing of the various materials to be placed.
 - .4 Name of Quality Control Testing Agency and its proven capability to provide specific services required for project.
 - .5 List roles of dedicated technical staff, their qualifications and experience.
 - .6 List of testing equipment, date last calibrated and by whom.
- .4 Quality Control Testing and Inspection:
 - .1 Contractor shall provide and maintain equipment and qualified personnel to perform all laboratory testing, field testing and inspection necessary to determine and monitor the characteristics and properties of all materials excavated, produced and incorporated into work. Contractor shall monitor workmanship of final product in accordance with Quality Control Plan as most recently submitted and approved.
 - .2 Contractor's Quality Control testing and inspection shall utilize qualified registered member of the Association of Professional Engineers and Geoscientists of British Columbia or a qualified, registered member of the Applied Science Technologists and Technicians of British Columbia who shall oversee all aspects of the Quality Control and Inspection. This person shall be designated as Quality Control Manager for the purpose of these specifications. Quality Control Manager shall be responsible for preparation and sign off of the Quality Control Plan, approving all quality control staff, all quality control testing and inspections and for signing submission, within five (5) working days, of all Quality Control testing and inspection records to Departmental Representative.
 - .3 Contractor to maintain a fully equipped and operational field laboratory on site for all stages of work, complete with heat and water.

-
- .4 Contractor's Quality Control testing equipment and laboratory shall be well maintained and in good working condition. All testing equipment shall be calibrated and evidence of calibration shall be provided when requested by the Departmental Representative.
 - .5 Minimum number of compaction tests required per material placed is specified in the applicable Section(s).
 - .6 Additional Standard Proctor tests to determine the optimum moisture and density of a material shall be performed if there any change in source and/or characteristic of the material being excavated for use on this work.
 - .7 Quality Control Records:
 - .1 Results from Quality Control testing shall be reported on test logs and plotted on charts immediately after each test is completed. Contractor shall report all test results on supplied forms available from Departmental Representative. Reports and forms shall be available for viewing within 24 hours of the end of each working shift.
 - .8 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative's instruction, or law of Place of Work.
 - .9 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
 - .10 Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If upon examination such work is found not in accordance with Contract Documents, then Contractor shall correct such Work and pay cost of examination and correction. If Such Work is found in accordance with Contract Documents, then Departmental Representative will pay cost of examination and replacement.
- 1.2 Measurement Procedures
- .1 Only Payment made for Quality Control will be by the Unit Price bid for "Provide Independent Certified Testing Services and Survey Crew".
 - .2 Departmental Representative will appoint and pay for services of testing laboratory except as follows:
 - .1 Where specified otherwise in the text of these specifications.
 - .2 Contractor's Quality Control Testing.
 - .3 Inspection and testing required by laws, ordinances, rules, regulations or orders of Public Authorities.
 - .4 Inspection and testing performed exclusively for Contractor's convenience.
 - .5 Mill tests and certificates of compliance.
 - .6 Tests specified to be carried out by Contractor under the supervision of Departmental Representative.
 - .3 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected Work.
 - .4 Provide equipment and field laboratory required for executing inspection and testing.

- .5 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .6 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Contractor shall pay costs for retesting and reinspection and no separate payment will be made.

1.3 Access to Work

- .1 Allow Departmental Representative and inspection/testing agencies access to Work and quality control testing facilities. If part of Work is in preparation at location other than Contract Project Limits, allow Departmental Representative access to such Work whenever it is in progress.
- .2 Cooperate to provide reasonable facilities for such access.

1.4 Procedures

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
- .3 Provide labour and facilities that meet requirements necessary to carry out all tests listed within this specification.

1.5 Rejected Work

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removal or replacements promptly.
- .3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Departmental Representative may deduct from Contract Price, difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Departmental Representative.

1.6 Reports

- .1 Submit four (4) copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to Subcontractor of Work being inspected or tested, to manufacturer or fabricator of material being inspected or tested.

1.7 Test Results

- .1 Furnish test and Proctor results when requested.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not Used

PART 3 EXECUTION

3.1 Not Used

- .1 Not Used

PART 1 GENERAL

- 1.1 Section Includes
- .1 Related Sections.
 - .2 Measurement Procedures.
 - .3 References.
 - .4 Installation and Removal.
 - .5 Construction Signage.
 - .6 Fencing.
 - .7 Scaffolding.
 - .8 Cranes.
 - .9 Construction Parking.
 - .10 Security.
 - .11 Site Storage/Loading.
 - .12 Construction Laydown area and Office.
 - .13 Sanitary Facilities.
 - .14 Fire Protection.
- 1.2 Related Sections
- .1 Section 01 11 00 - Summary of Work.
 - .2 Section 01 33 00 – Submittal Procedures.
 - .3 Section 01 35 31 – Special Procedures: Traffic Control.
 - .4 Section 01 35 43 – Environmental Protection.
- 1.3 Measurement Procedures
- .1 Cost for providing Construction Facilities will be considered incidental to the Work and no additional payment will be made.
- 1.4 References
- .1 Canadian Standards Association (CSA):
 - .1 CAN/CSAZ32196, Signs and Symbols for the Occupational Environment.
- 1.5 Installation and Removal
- .1 Provide construction facilities in order to execute work expeditiously.
 - .2 Remove from site all such work after use.
- 1.6 Construction Signage
- .1 No signs or advertisements, other than those required by Section 01 35 31 Special Procedures: Traffic Control permitted on site.
 - .2 Signs and notices for safety and instruction shall be in both official languages Graphic symbols shall conform to CAN3Z321.
 - .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.

-
- 1.7 Fencing .1 Provide fences around trees and plants designated to remain. Protect from damage by equipment and construction procedures.
- 1.8 Scaffolding .1 Scaffolding or temporary platforms supporting workers shall be designed by a Professional Engineer registered in British Columbia.
.2 Stamped drawings showing all details and erection procedure shall be provided 2 weeks prior to erecting scaffolding for workers.
.3 The Engineer of Record or his representative shall inspect the scaffolding or temporary platform to ensure conformance to the design.
- 1.9 Cranes .1 Cranes shall be operated by qualified operators. Proof of the operator's certification shall be made available to the Departmental Representative.
- 1.10 Construction Parking .1 Provide and maintain adequate access and parking at the project site, which complies with Section 01 35 43 Environmental Protection.
.2 Build and maintain temporary access road(s) with the approval of the Departmental Representative and provide snow removal during periods of Work.
- 1.11 Security .1 If required by the Contractor, provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays. For extended shut downs the Contractor shall provide the level of Security as required to protect the Work.
- 1.12 Site Storage/Loading .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
.2 Do not load or permit to load any part of work with a weight or force that will endanger the work or existing infrastructure.
- 1.13 Construction Laydown area and Offices .1 Confine construction laydown area and office/Equipment trailer to the locations indentified below.
.1 PWGSC's Mill Creek Gravel Pit, km 554.0 of the Alaska Highway.
.2 Other areas as pre-approved by the Departmental Representative.
.2 Contractor need not provide a Field office for the Departmental Representative, but it shall be required to load PWGSC's Office Trailer in the Fort Nelson Gravel Pit, km 445.3 and safely haul and set-up with power and propane in the Mill Creek Gravel Pit.
- 1.14 Sanitary Facilities .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.
- 1.15 Fire Protection .1 Provide and maintain temporary fire protection equipment during performance of work.

PART 2 PRODUCTS

2.1 Not Used .1 Not Used.

PART 3 EXECUTION

3.1 Not Used .1 Not Used

END OF SECTION

Highway Construction
km 555.64 to km 560.78 and km 563.1 to km 570.2

PART 1 GENERAL

1.1 Description

- .1 The trailers specified are for remote camp set-ups in all areas of British Columbia and therefore must be 'Four-Season Rated' or 'Winter Rated'. Trailers to be in new or near new condition and suitably furnished.
- .2 The trailers must be fully functional as stand-alone units (i.e., 12 volt/propane only) or with full hook-ups.
- .3 At times the trailers will be towed for long distances off-highway and must be equipped to handle the extra wear and tear.
- .4 The trailer length must be in the range of 30-34 feet (excluding tongue) and must meet CAN/CSA - Z240 RV SERIES-08 standards.

1.2 Measurement for Payment

- .1 Payment for Departmental Representative's Camp and Trailer to be lump sum.

PART 2 SPECIFICATIONS

2.1 General

- .1 The trailers must be equipped with a suitable number of pull-outs to maximize useable interior living space. They are expected to be equipped with what is considered standard amenities for the travel trailer industry and must include and meet or exceed the following specifications.

2.2 Exterior

- .1 Laminated fibreglass construction.
- .2 Minimum insulation values R7 walls, R14 ceiling and floor.
- .3 Double pane windows.
- .4 Seamless one piece roof.
- .5 Fully enclosed underbelly.
- .6 Fender skirts.
- .7 Gravel protection on front of trailer (e.g., check plate, gravel guard).
- .8 Leveling devices at all 4 corners (e.g., scissor jacks).
- .9 Television antenna/Satellite Dish and Receiver.
- .10 Awning.
- .11 Ladder at rear for roof access.

2.3 Fuel

- .1 Minimum 2 x 30lb propane tanks with cover.

Highway Construction
km 555.64 to km 560.78 and km 563.1 to km 570.2

- 2.4 Plumbing
- .1 Heated and enclose potable water tanks: minimum 60 gallons.
 - .2 Heated and enclosed grey and black water tanks: minimum 60 and 35 gallons respectively.
 - .3 Black water tank flush.
 - .4 Minimum 6 gallon quick recovery propane/electric water heater with bypass.
- 2.5 Towing
- .1 Must be easily towed with a ¾ ton truck with a class 4 hitch.
 - .2 Breakaway emergency disconnect brake.
 - .3 Safety chains.
 - .4 Clearance lights.
- 2.6 Tires/Axles
- .1 Minimize D range radial tires, suitable for off highway use.
 - .2 Full size matching spare tire and rim.
 - .3 Heavy duty suspension suitable for off-highway use.
 - .4 Grease nipple type fixture on axles.
 - .5 4 wheel electric brakes.
- 2.7 Interior
- .1 Two bedrooms with close-able entrances (one at each end of trailer), one room with a queen bed, the other with bunks.
 - .2 Mattresses for all beds.
 - .3 Kitchen: propane/electric fridge (7 cubic feet), propane stove/oven, sink, microwave.
 - .4 Private bathroom with toilet, sink and shower with minimum standing height of 76”.
 - .5 Propane furnace suitable for the size of trailer (min. 30,000 British Thermal Unit).
 - .6 Roof mount A/C unit suitable for the size of trailer (min. 13,500 British Thermal Unit).
 - .7 Solid Wood cabinets.
 - .8 Pantry.
 - .9 Full extension ball bearing drawer glides.
 - .10 Dinette that folds into a bed.
 - .11 Sofa bed.
 - .12 Window blinds or shades.
 - .13 32" Flat screen television in living area.
 - .14 12-volt stereo.
- 2.8 Safety
- .1 120 volt ground Fault Interrupt outlets in kitchen, bathroom and exterior areas.
 - .2 Carbon Monoxide detector/alarm.
 - .3 Smoke/detector/alarm.
 - .4 Fire extinguisher.
 - .5 Propane detector/alarm.

Highway Construction
km 555.64 to km 560.78 and km 563.1 to km 570.2

PART 3 EXECUTION

- 3.1 Duties to perform
- .1 Contractor supplies linens and bedding. Provide with 3 blankets, two sheets, two pillows and pillow cases and two towels.
 - .2 Contractor changes sheets and pillow cases once per week or whenever change of personnel occurs. Change towels weekly.
- 3.2 Camp Installation
- .1 Locate Departmental Representative's camp in area occupied by construction camp, but separate from Contractor's staff accommodation, subject to Departmental Representative's approval. Arrange housing facilities to provide privacy to Departmental Representative.
 - .2 Departmental Representative's Camp and Trailers to be available for occupancy prior to commencing work until Departmental Representative completes final measurement.
 - .3 Provide heat and electricity to all trailers. Provide water and sewage system to house trailer.
 - .4 Provide satellite television and hookup to house trailer.
- 3.3 Camp Maintenance
- .1 Maintain trailer unit's water lines, sewage system and garbage disposal containers in good operating condition and make necessary repairs.
 - .2 Provide required fuel for trailer and ensure heating units are kept supplied with fuel and maintained in good operating condition.
 - .3 Clean following weekly: walkways, all trailers sinks, toilets and showers.
- 3.4 Service Facilities
- .1 Install, connect, test and make necessary repairs to sewage disposal system, water supply, heating and electrical services.
 - .2 Situate power plant in camp area in such place as to minimize noise and prevent exhaust fumes from blowing through camp during prevailing winds.

END OF SECTION

PART 1 GENERAL

- | | |
|---|---|
| 1.1 <u>Section Includes</u> | .1 Related Sections.
.2 Measurement Procedures.
.3 Installation and Removal.
.4 Hoarding.
.5 Guiderail and Barricades.
.6 Access to Site.
.7 Public Traffic Flow.
.8 Fire Routes.
.9 Protection for Off-site and Public Property.
.10 Protection of Structure Finishes. |
| 1.2 <u>Related Sections</u> | .1 Section 01 35 31 Special Procedures: Traffic Control.
.2 Section 01 52 00 Construction Facilities. |
| 1.3 <u>Measurement Procedures</u> | .1 No separate payment under Temporary Barriers and Enclosures. |
| 1.4 <u>Installation and Removal</u> | .1 Provide temporary controls in order to execute Work expeditiously.
.2 Remove from site all such work after use. |
| 1.5 <u>Hoarding</u> | .1 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures. |
| 1.6 <u>Guiderails and Barricades</u> | .1 Provide secure, rigid guiderails and barricades around deep excavations and open shafts.
.2 Provide as required by governing authorities. |
| 1.7 <u>Access to Site</u> | .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work. |
| 1.8 <u>Public Traffic Flow</u> | .1 Provide and maintain competent signal flag persons, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the Public. |
| 1.9 <u>Fire Routes</u> | .1 Maintain access to property for use by emergency response vehicles. |
| 1.10 <u>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. |
| 1.11 <u>Protection of Structure Finishes</u> | .1 Provide protection for finished and partially finished structure finishes and equipment during performance of Work.
.2 Provide necessary screens, covers and hoardings.
.3 Confirm with Departmental Representative locations and installation schedule three (3) day prior to installation. |

- .4 Be responsible for damage incurred due to lack of or improper protection.

PART 2 PRODUCTS

- 2.1 Not Used .1 Not used

PART 3 EXECUTION

- 3.1 Not Used .1 Not Used

END OF SECTION

PART 1 GENERAL

- 1.1 Section Includes
- .1 Measurement for Payment.
 - .2 General Requirements.
 - .3 Requirements of Regulatory Agencies.
- 1.2 General Requirements
- .1 The Contractor to provide its own construction camp and office as necessary. The construction camp and office may be set up in PWGSC's km 554 Mill Creek Gravel Pit in a location and layout pre-approved by the Departmental Representative.
 - .2 The Contractor shall be responsible for all utility services to the construction camp. The construction camp to be established and operated in accordance with local regulations.
- 1.3 Requirements of Regulatory Agencies
- .1 Obtain necessary licenses and approvals required by Authority having Jurisdiction for authorized use of water and disposal of domestic sewage and other waste.
 - .2 Comply with Environmental regulations.
- 1.4 Measurement for Payment
- .3 Implementation, maintenance, removal and all other incidental costs associated with the Construction Camp is to be included in the Mobilization and Demobilization Lump Sum Item Price in the Unit Price Table.
 - .4 No additional payment will be made under Construction Camp.

PART 2 PRODUCTS

- 2.1 Not Used
- .1 Not Used.

PART 3 EXECUTION

- 3.1 Mobilization
- .1 Mobilize equipment, personnel, and materials as necessary to establish temporary construction camp and offices. Obtain necessary licenses and approvals from Authorities having Jurisdiction prior to mobilization. Camp and service area location and layout plan to be submitted to Departmental Representative for review and acceptance.
 - .2 Temporary construction camps to be established and operated in accordance with local regulations.
- 3.2 Maintenance
- .1 Maintain construction camp and offices in a neat and tidy condition.
- 3.3 Demobilization
- .1 Upon vacating construction camp, offices and temporary services, clean-up and leave site in a condition satisfactory to the Departmental Representative and the Authorities having Jurisdiction.

END OF SECTION

PART 1 GENERAL

- 1.1 Section Includes
- .1 Related Sections.
 - .2 Measurement Procedures.
 - .3 Qualification of Surveyors.
 - .4 Survey Reference Points.
 - .5 Survey Requirements.
 - .6 Records.
 - .7 Submittals.
- 1.2 Related Sections
- .1 Section 01 11 00 - Summary of Work.
 - .2 Section 01 33 00 – Submittal Procedures.
- 1.3 Measurement Procedures
- .1 Cost for providing Surveys and Site preparation will be paid for under the unit price for “Provide Independent Certified Testing Services and Survey Crew”.
- 1.4 Qualifications of Surveyor
- .1 A qualified registered surveyor licensed to practise in British Columbia, acceptable to the Departmental Representative, shall perform the required surveying for the Contractor.
- 1.5 Survey Reference Points
- .1 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 Require surveyor to replace control points in accordance with original survey control.
- 1.6 Survey Requirements
1. Establish centre line and working points based on control points provided.
 2. Stake for work to be performed by the Contractor.
 3. Establish pipe invert elevations and locations.
 4. Provide As Built surveys of the Work including x-sections of the finished subgrade surface, select Granular Sub-grade Fill, Granular Sub-base and Granular Base Course.
 5. The Departmental Representative may elect to verify surveys. Verification of the survey by the Departmental Representative does not abdicate the Contractor’s responsibility for the correctness and accuracy of the survey.
 6. Contractor shall complete all measurement surveys for payment and submit cross sections and other requirements for payment by the end of the month in

which they were taken.

1.7 Records

1. Maintain a complete, accurate log of control and survey work as it progresses.
2. Record locations of maintained, re-routed and abandoned service lines.

1.8 Submittals

1. Submit name and address of Surveyor to Departmental Representative.
2. On request of the Departmental Representative, submit documentation to verify accuracy of field engineering work.
3. Submit certificate signed by Surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform to Contract Documents.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not Used.

PART 3 EXECUTION

3.1 Not Used

- .1 Not Used

END OF SECTION

PART 1 GENERAL

- 1.1 Section Includes
- .1 Related Sections.
 - .2 Measurement Procedures.
 - .3 Project Cleanliness.
 - .4 Final cleaning.
- 1.2 Related Sections
- .1 Section 01 35 43 - Environmental Protection.
 - .2 Section 01 77 00 – Closeout Procedures.
- 1.3 Measurement Procedures
- .1 Cost for Cleaning will be considered incidental to the Work and no additional payment will be made.
- 1.4 Project Cleanliness
- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Departmental Representative 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 Clear snow and ice from access to road and bridge sites during active construction periods and when access to environmental protection facilities required outside active construction times.
 - .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
 - .5 Provide at least one (1) bear proof container on site for collection of waste materials and debris.
 - .6 Remove waste material and debris from site at end of each working day.
 - .7 Dispose of waste materials and debris off site.
 - .8 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
 - .9 Provide adequate ventilation during use of volatile or noxious substances.
 - .10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- 1.5 Final Cleaning
- .1 When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
 - .2 Prior to final review, remove surplus products, tools, construction machinery and equipment.
 - .3 Remove waste products and debris including that caused by Departmental Representative or other Contractors.

- .4 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 Inspect finishes, and ensure specified workmanship and operation.
- .7 Remove dirt and other disfiguration from exterior surfaces.
- .8 Sweep and wash clean paved areas.
- .9 Clean drainage systems.

PART 2 PRODUCTS

- 2.1 Not Used .1 Not Used.

PART 3 EXECUTION

- 3.1 Not Used .1 Not Used

END OF SECTION

PART 1 GENERAL

- 1.1 Section Includes .1 Related Sections.
.2 Inspection and Declaration.
.3 Measurement Procedures.
- 1.2 Related Sections .1 Section 01 33 00 - Submittal Procedures.
.2 Section 01 74 11 – Cleaning.
.3 Section 01 78 00 – Closeout Submittals.
- 1.3 Inspection and Declaration .1 Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection, 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:
.1 Work has been completed and inspected for compliance with Contract Documents.
.2 Defects have been corrected and deficiencies have been completed.
.3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
.4 Operation of systems has been demonstrated to Owner's personnel.
.5 Work is complete and ready for Final Inspection.
.4 Final Inspection: when items noted above are completed, request final inspection of Work by Departmental Representative and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.
- 1.4 Measurement Procedures .1 No separate payment for Closeout Procedures

PART 2 PRODUCTS

- 2.1 Not Used .1 Not Used

PART 3 EXECUTION

- 3.1 Not Used .1 Not Used

END OF SECTION

PART 1 GENERAL**1.1 Section Includes**

- .1 Related Sections.
- .2 As-built, samples, and specifications.
- .3 Recording Actual Site Conditions.
- .4 Final Survey.
- .5 Materials and Finishes.
- .6 Warranties and bonds.

1.2 Related Sections

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 – Quality Control.
- .3 Section 01 71 00 – Examination and Preparation.
- .4 Section 01 77 00 – Closeout Procedures.

1.3 As-built, Samples and Specifications

- .1 In addition to requirements in General Conditions, 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.
 - .9 Quantity measurements.
 - .10 As Built Records.
- .2 Store record documents and samples in field office apart from documents used for construction.
- .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.

1.4 Recording Actual Site Conditions

- .1 Record information on set of black line opaque Drawings and in copy of the Project Manual.
- .2 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .3 Contract Drawings and shop drawings: legibly mark each item to

record actual construction, including:

- .1 Field changes of dimension and detail.
- .2 Changes made by change orders.
- .3 Details not on original Contract Drawings.
- .4 References to related shop drawings and modifications.
- .4 Specifications: legibly mark each item to record actual construction.
 - .1 Changes made by Addenda and Change Orders.

1.5 Final Survey

- .1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.
- .2 Submit "AS BUILT" drawings.

1.6 Materials and Finishes

- .1 Provide specifications for applied materials and finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for reordering custom manufactured products.

1.7 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 Owner'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.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not Used.

PART 3 EXECUTION

3.1 Not Used

- .1 Not Used

END OF SECTION

PART 1 GENERAL

- 1.1 Related Sections
- .1 Section 01 33 00 Submittal Procedures.
 - .2 Section 01 35 43 Environmental Protection.
- 1.2 References
- .1 Export and Import of Hazardous Waste Regulations (EIHWR Regulations), SOR/92-637.
 - .2 National Fire Code of Canada 1995.
 - .3 Transportation of Dangerous Goods Act (TDG Act) 1992, (T19.01)
 - .4 Transportation of Dangerous Goods Regulations (TDGR), (SOR/85-77, SOR/85-585, SOR/85-609, SOR/86-526).
- 1.3 Definitions
- .1 Dangerous Goods: Product, substance, or organism that is specifically listed or meets the hazard criteria established in Transportation of Dangerous Goods Regulations.
 - .2 Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.
 - .3 Hazardous Waste: Any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.
 - .4 Workplace Hazardous Materials Information System (WHMIS): A Canada wide system designed to give employers and workers information about hazardous materials used in the workplace. Under WHMIS, information on hazardous materials is to be provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by a combination of federal and provincial laws.
- 1.4 Submittals
- .1 Submit product data in accordance with Section 01 33 00 Submittal Procedures.
 - .2 Submit to Departmental Representative current Material Safety Data Sheet (MSDS) for each hazardous material required prior to bringing hazardous material on site.
 - .3 Submit hazardous materials management plan to Departmental Representative that identifies all hazardous materials, their use, their location, personal protective equipment requirements, and disposal arrangements.
- 1.5 Measurement Procedures
- .1 No separate payment for work identified under Hazardous Materials.
- 1.6 Storage and Handling
- .1 Coordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labelling and storage of material and wastes.
 - .2 Store and handle hazardous materials and wastes in accordance with applicable Federal and Provincial laws, regulations, codes and guidelines.
 - .3 Store and handle flammable and combustible materials in accordance with current National Fire Code of Canada requirements.
 - .4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use. Store all flammable and

combustible liquids in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.

- .5 Transfer of flammable and combustible liquids is prohibited within buildings.
- .6 Transfer of flammable and combustible liquids will not be carried out in the vicinity of open flames or any type of heat-producing devices.
- .7 Flammable liquids having a Flash point below 38°C, such as naphtha or gasoline, will not be used as solvents or cleaning agents.
- .8 Store flammable and combustible waste liquids for disposal in appropriate containers located in a safe, ventilated area. Keep quantities to a minimum.
- .9 Observe smoking regulations at all times. Smoking is prohibited in any area where hazardous materials are stored, used or handled.
- .10 Abide by the following storage requirements for quantities of hazardous materials and wastes in excess of 5kg for solids, and 5 litres for liquids:
 - .1 Store hazardous materials and wastes in closed and sealed containers that are in good condition.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Segregate incompatible materials and wastes.
 - .5 Ensure that different hazardous materials or hazardous wastes are not mixed.
 - .6 Store hazardous materials and wastes in a secure storage area with controlled access.
 - .7 Maintain a clear egress from storage area.
 - .8 Store hazardous materials and wastes in a manner and location that shall prevent them from spilling into the environment.
 - .9 Have appropriate emergency spill response equipment available near the storage area, including personal protective equipment.
 - .10 Maintain an inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
 - .11 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
 - .12 Report spills or accidents immediately to Departmental Representative and the ESO. Submit a written spill report to Departmental Representative within 24 hours of incident.

1.7 Transportation

- .1 Transport hazardous materials and wastes in accordance with Federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable Provincial regulations.
- .2 If exporting hazardous waste to another country, ensure compliance with Federal Export and Import of Hazardous Waste Regulations.

PART 2 PRODUCTS

2.1 Materials

- .1 Only bring on site the quantity of hazardous materials required to perform Work.
- .2 Maintain MSDS's in proximity to where the materials are being used.
Communicate this location to personnel who may have contact with hazardous materials.

PART 3 EXECUTION

3.1 Disposal

- .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
- .2 Recycle hazardous wastes for which there is an approved, cost effective recycling process available.
- .3 Send hazardous wastes only to authorized hazardous waste disposal or treatment facilities.
- .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
- .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.
- .6 Dispose of hazardous wastes in a timely fashion in accordance with applicable provincial regulations.

END OF SECTION

PART 1 GENERAL

- 1.1 Section Includes
- .1 Related Sections.
 - .2 Measurement for Payment.
 - .3 References.
 - .4 Sampling by Departmental Representative.
 - .5 Materials.
 - .6 Aggregate Source.
 - .7 Preparation.
 - .8 Processing.
 - .9 Handling and Transporting.
 - .10 Stockpiling.
 - .11 Cleanup.
- 1.2 Related Sections
- .1 Section 32 11 19 – Granular Sub-base.
 - .2 Section 32 11 24 – Granular Base.
- 1.3 Measurement for Payment
- .1 Cost of Processing aggregate will be incidental to the unit price of measurement in Section for which aggregate is being produced.
 - .2 Crushed material supplied to construct 300mm base for stockpiles will be incidental to the unit price of measurement in section for which aggregate is being produced.
 - .3 Stripping and stockpiling of overburden to be paid for under the Unit Price bid for Stripping.
 - .4 All costs associated with repairing and maintaining haul roads will be the responsibility of the Contractor and all costs will be incidental to the unit price of measurement in Section for which aggregate is being produced.
 - .5 Contractor to obtain authorization in writing from the Departmental Representative prior to removing aggregate from Government Pits for purpose of repairing, surfacing or maintaining haul roads.
 - .6 Surplus aggregates produced in PWGSC Sources shall remain property of PWGSC and will not be paid for separately. Only material incorporated into work will be paid for at applicable Unit rates.
- 1.4 References
- .1 ASTM D4791-99, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
 - .2 ASTM C117-03, Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing.
 - .3 ASTM C136-01, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 CGSB Spec.8-GP-2M, Sieves Testing, Woven Wire, Metric Series.
 - .5 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 - .6 ASTM C131-01, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

1.5 Sampling by Departmental Representative

- .1 Contractor is responsible for Quality Control Testing during production.
- .2 Allow continual sampling for Quality Assurance by Departmental Representative during production.
- .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 directed by Departmental Representative to permit full cross section sampling.
- .5 Aggregates that do not meet specified tolerances for intended use are subject to rejection by Departmental Representative.

PART 2 PRODUCTS

2.1 Materials

- .1 Available PWGSC sources are listed in Section 01 11 00 – sub-section 1.12.
- .2 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.
- .3 Flat and elongated particles of coarse aggregate: to ASTM D4791-99.
 - .1 Flat and elongated particles are those whose greatest dimension exceeds five times their least dimension.
- .4 Fine aggregates satisfying requirements of applicable section to be one or blend of following:
 - .1 Natural sand.
 - .2 Manufactured sand.
 - .3 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
- .5 Coarse aggregates satisfying requirements of applicable section to be one or blend of following:
 - .1 Crushed rock.
 - .2 Gravel composed of naturally formed particles of stone.
 - .3 Light weight aggregate, including slag and expanded shale.

PART 3 EXECUTION

3.1 Aggregate Source

- .1 As noted in sub-Section 2.1.1.

3.2 Preparation

- .1 Prior to excavating materials for aggregate production, strip off and stockpile unsuitable surface material. Stockpile overburden in area(s) designated by the Departmental Representative.
- .2 Strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious material.

3.3 Processing

- .1 Process aggregate uniformly using methods that prevent contamination, segregation, and degradation.
- .2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment

approved by Departmental Representative.

- .3 Dry and or wash aggregates, if required to meet specifications. Use only equipment approved by Departmental Representative. No separate payment for this will be paid.
- .4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate.
- .5 When producing crushed aggregates, all material encountered up to 300mm in diameter is to be crushed and incorporated into work.

3.4 Handling & Transporting

- .1 Avoid segregation, contamination, and degradation of aggregate during handling and transporting.
- .2 Load limit restrictions will be in accordance with British Columbia Highway Traffic Act pertaining to registered weight limits and vehicle size.

3.5 Stockpiling

- .1 Stockpile aggregates in locations directed by Departmental Representative. Do not stockpile on completed BST surfaces.
- .2 Stockpile aggregates in sufficient quantities to meet project schedules.
- .3 Stockpile 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 crushed gravel base not less than 300 mm in depth to prevent contamination of aggregate. Do not incorporate compacted base 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.
- .7 Stockpile aggregates in uniform layers 1 m thick.
- .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 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 the Departmental Representative.
- .3 When excavation is completed dress sides of excavation to nominal 3:1 slope.
- .4 Trim off and dress slopes of overburden piles and leave site in neat condition.

END OF SECTION

PART 1 GENERAL

- 1.1 Section Includes
- .1 Related Sections.
 - .2 Measurement Procedures.
 - .3 Definitions.
 - .4 Storage and Protection.
 - .5 Preparation.
 - .6 Clearing.
 - .7 Grubbing.
 - .8 Removal and Disposal.
 - .9 Finished Surface.
- 1.2 Related Sections
- .1 Section 31 05 17 – Aggregates General.
 - .2 Section 31 24 13 – Roadway Excavation, Embankment and Compaction.
 - .3 Section 32 11 18 – Select Granular Sub-grade Fill.
 - .4 Section 32 11 19 – Granular Sub-base.
 - .5 Section 32 11 24 – Granular Base.
- 1.3 Measurement Procedures
- .1 Grubbing will be paid for under the unit price bid for Grubbing.
 - .2 Highway Right of Way and pits have been recently cleared and any minor trees/brush which must be removed as part of the grubbing work will be considered incidental to other unit prices paid.
 - .3 Departmental Representative to obtain approvals from Authorities Having Jurisdiction.
- 1.4 Definitions
- .1 Clearing: cutting off trees, brushing vegetative growth to ground level and disposing of felled trees, previously uprooted trees and stumps, and surface debris.
 - .2 Grubbing: excavating and disposing stumps and roots to 150mm below existing ground surface.
 - .3 License to Cut: License required by Contractor under Province of British Columbia's Forest Act that authorizes a Contractor to salvage and remove timber from Crown Land.
 - .4 Stumpage: Payment by Contractor to Province of British Columbia for timber harvested under License to Cut. Stumpage is required as condition of License to Cut by Province of British Columbia's Forest Act.
- 1.5 Storage and Protection
- .1 Prevent damage to natural features and man-made structures which are to remain.

PART 2 PRODUCTS

- 2.1 Not Used
- .1 Not Used

PART 3 EXECUTION

- 3.1 Preparation
- .1 Inspect site and verify with Departmental Representative, items designated to

-
- remain.
- .2 Departmental Representative provides the License to Cut.
 - .3 Locate and protect utility lines.
- 3.2 Clearing
- .1 Clear minor trees and brush as directed by the Departmental Representative as part of the grubbing operation.
- 3.3 Grubbing
- .1 Grub out stumps, roots and embedded logs.
- 3.4 Removal and Disposal
- .1 Dispose of cleared and grubbed materials by chipping or burning.
 - .2 Chip or mulch and spread cleared and grubbed vegetative materials that is on site as directed by the Departmental Representative.
 - .3 Burning:
 - .1 Burn inside Clearing Limits.
 - .2 Comply with Forest Practice Code of British Columbia Act when burning.
 - .4 Material that cannot be chipped or burned to be buried in areas designated by the Departmental Representative.
 - .5 Bury to approval of the Departmental Representative by:
 - .1 Consolidating.
 - .2 Covering with minimum 500mm of mineral soil.
 - .3 Finishing surface.
- 3.5 Finished Surface
- .1 Leave ground surface in condition suitable for topsoil stripping to approval of Departmental Representative.

END OF SECTION

PART 1 GENERAL

1.1 Section Includes

- .1 Definitions.
- .2 Related Sections.
- .3 Measurement Procedures.
- .4 References.
- .5 Requirements of Regulatory Agencies.
- .6 Materials.
- .7 Compaction.
- .8 Water Distributors.
- .9 Stripping.
- .10 Excavating.
- .11 Embankments.
- .12 Subgrade Compaction.
- .13 Testing Subgrade Compaction.
- .14 Finishing.
- .15 Protection.

1.2 Definitions

- .1 Stripping Excavation: excavation of topsoil covering original ground.
- .2 Rock Excavation: excavation of:
 - .1 Material from solid masses of igneous, sedimentary or metamorphic rock which, prior to removal, was integral with parent mass. Material that cannot be ripped with reasonable effort from Caterpillar D9L or equivalent to be considered integral with parent mass.
 - .2 Boulder or rock fragments measuring in volume one cubic metre or more.
- .3 Common Excavation: excavation of materials that are not Rock Excavation, Stripping, or Select Granular Sub-grade Fill.
- .4 Select Granular Sub-grade Fill: Material excavated from within right-of-way and from designated borrow locations that meets specified gradation and material requirements as per Section 32 11 18 and will be incorporated into the embankment as the designated Select Granular Sub-grade Fill horizon.
- .5 Embankment: material derived from usable excavation and placed above original ground or stripped surface up to top of subgrade.
- .6 Waste material: material other than Stripping Excavation that is unsuitable for embankment construction or material surplus to requirements.
- .7 Borrow material: material obtained from areas outside right-of-way and required for construction of embankments or for other portions of work. Borrow material is paid for as Common Excavation if not acceptably used as part of the Select Granular Sub-grade Fill horizon.

1.3 Related Sections

- .1 Section 01 35 31 - Special Procedures: Traffic Control.
- .2 Section 31 11 00 - Clearing and Grubbing.
- .3 Section 31 05 17 - Aggregates General.
- .4 Section 32 11 18 - Select Granular Sub-grade Fill.
- .5 Section 32 11 19 - Granular Sub-base.
- .6 Section 32 11 24 - Granular base.

1.4 Measurement Procedures

- .1 Contractor will be responsible for all survey requirements including slope staking, second grading, measurement for payment and no separate payment will be made for surveys as it is considered incidental to the Unit Price bid for “Provide Independent Certified Testing Services and Survey Crew”. Contractor to engage a registered independent Survey Company.
- .2 Stripping Excavation and Waste Excavation: to be measured in cubic metres calculated from cross-sections taken in areas of excavation. Initial cross sections to be taken after necessary Clearing and Grubbing. Unit price for Stripping Excavation includes cost of initial removal and cost of placing material on slopes upon completion of excavation and embankment but does not include hauling.
- .3 Common Excavation: to be measured in cubic metres calculated from cross sections taken by Contractor in areas of excavation and/or sub-excavation. Initial cross sections to be taken after necessary Clearing, Grubbing and Stripping Excavation, and immediately prior to excavation of material.
- .4 Rock Excavation:
 - .1 Volume excavated from solid rock masses to be calculated in cubic metres from cross sections of original rock surface and design grade line for excavation. Initial cross sections to be taken by Contractor after necessary Clearing, Grubbing, Stripping Excavation, and Common Excavation, and immediately prior to excavation of material to be incorporated into work.
 - .2 Rock excavated beyond design grade to be measured as Common Excavation when placed in embankment within established lines and grades.
 - .3 Excavated boulders and rock fragments to be measured individually. Volume of excavated boulders and rock fragments will be determined by measuring three maximum mutually perpendicular dimensions.
- .5 No Separate Payment for:
 - .1 Excavating beyond lines established by Departmental Representative, with exception of unavoidable slide material. Slide material not to be measured when attributable to Contractor's negligence.
 - .2 Ripping, drilling, and blasting of material.
 - .3 Scarifying or benching existing slopes or existing road surfaces within work stakes.
 - .4 Removing and disposing of roots, stumps and other materials excavated during waste operation.
 - .5 Burying existing culverts from road.
 - .6 Removing unsuitable material from embankment attributable to Contractor's negligence.
 - .7 Shattering rock to 300 mm below subgrade elevation.
 - .8 Scaling and removing loose rock from rock face.
 - .9 Placing, watering, drying and compacting.
 - .10 Finishing.
 - .11 Hauling Material.
 - .12 All survey layout including slope staking, second grades and measurement for payment.
 - .13 Quality Control Testing.
 - .14 Locating and moving utilities.

-
- 1.5 References
- .1 ASTM D4318-10 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 - .2 ASTM D698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
 - .3 ASTM D1556-07 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
 - .4 ASTM D2167-08 Standard Test Methods for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
 - .5 ASTM D6938-10 Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods.

- 1.6 Requirements of Regulatory Agencies
- .1 Adhere to regulations of Authority having jurisdiction if blasting is required.

PART 2 PRODUCTS

- 2.1 Materials
- .1 Material used for embankment not to contain more than 3% organic matter by mass, frozen lumps, weeds, sod, roots, logs, stumps or any other unsuitable material unless otherwise directed by Departmental Representative.
 - .2 Borrow material:
 - .1 Obtain from sources as indicated or as designated by Departmental Representative.

PART 3 EXECUTION

- 3.1 Compaction
- .1 Compaction equipment must be capable of obtaining required densities in materials on project. Equipment that does not achieve specified densities must be replaced or supplemented.
 - .2 Operate minimum equivalent of one 12 tonne vibratory packer continuously in each embankment when placing material.
- 3.2 Water Distributors
- .1 Apply water uniformly.
- 3.3 Stripping
- .1 Commence Stripping Excavation after Clearing and Grubbing.
 - .2 Strip to depths directed by Departmental representative.
 - .3 Stockpile in locations directed by Departmental representative.
 - .4 Dispose of unused stripped topsoil as directed by Departmental Representative.
 - .5 Remove clearing and grubbing debris from stripped topsoil.
 - .6 Spread stripped topsoil on slopes and trim following completion of excavation and embankment construction.
- 3.4 Excavating
- .1 General:
 - .1 Notify Departmental Representative whenever waste materials are encountered and remove to depth and extent directed.
 - .2 Sub-excavate 500mm below design subgrade in excavations and embankments unless otherwise directed. Compact top 150 mm below sub-excavate to minimum 95% maximum dry density, ASTM D698-12. Replace

Highway Construction

km 555.64 to km 560.78 and km 563.1 to km 570.2

-
- with approved embankment material and compact.
- .3 Excavate existing road to remove culverts as directed by Departmental Representative.
 - .4 Where subgrade is on transition from excavation to embankment treat ground slopes at grade points as directed by Departmental Representative.
- .2 Drainage:
 - .1 Maintain profiles, crowns and cross slopes to provide good surface drainage.
 - .2 Provide ditches as work progresses to provide drainage.
 - .3 Construct interceptor ditches as shown on plans or as directed before excavating or placing embankment in adjacent area.
 - .3 Rock Excavation:
 - .1 If, during excavation, material appearing to conform to classification for rock is encountered, notify Departmental Representative and provide sufficient time to enable measurements to be made to determine volume of rock.
 - .2 Shatter rock to 300 mm below subgrade elevation or as indicated on plans.
 - .3 Reduce over break and increase stability of all rock faces by using smooth blasting techniques, such as pre-shearing, cushion blasting, buffer blasting, perimeter blasting and line drilling.
 - .4 If Departmental Representative requests, smooth blast and excavate short sections in rock excavations to determine optimum spacing of holes.
 - .5 Charge back line holes with appropriate blasting agent in sufficient quantity to effectively shear rock along wall face between adjacent drill holes without causing further damage. Stem each hole as necessary to contain blast. Do not use prilled type ammonium nitrate and fuel oil (ANFO) explosives within 4 m of final excavation line.
 - .6 Form back wall by pre-splitting on instantaneous delay at least 10 m in advance of production blasting unless Departmental representative determines that burden is too light or rock is so fractured that pre-splitting prevents proper production drilling or loading. Smooth wall blast just prior to or just after production blast if Departmental Representative so determines.
 - .7 Drill back line holes 50 mm to 75 mm in diameter parallel to each other along slope face. Maximum spacing to be 750 mm. Drill second line of holes parallel to back line holes. Spacing to be 1.5 times spacing of back line holes and same distance away.
 - .8 Maximum deviation from slope face and parallelism to be 150 mm. Do not drill smooth blast holes more than 500 mm below ditch grade. Holes to be max 6 m long for first lift and max. 8 m long for subsequent lifts. Reduce length of holes to achieve specified deviation, if required.
 - .9 Scale rock backslopes to achieve smooth, stable face, free of loose rock and overhangs to design backslope.
 - .10 Control blasting to minimize flying particles.
 - .4 Borrow excavation:
 - .1 Obtain embankment materials from designated borrow areas only after suitable right-of-way excavations have been exhausted.
 - .2 Departmental Representative to designate extent of borrow areas and depth of excavation.
 - .3 Remove waste and stripping material from borrow pits to designated

Highway Construction

km 555.64 to km 560.78 and km 563.1 to km 570.2

locations.

- .4 Slope edges of borrow areas to minimum 3:1 and provide drainage as directed.
- .5 Trim and leave borrow pits in condition to permit accurate measurement of material removed.

3.5 Embankments

- .1 When directed, scarify or bench existing slopes in side hill or sloping sections to ensure proper bond between new materials and existing surfaces. Method used to be subject to prior approval of Departmental Representative.
- .2 Break up or scarify existing road surface prior to placing embankment material.
- .3 Do not place material which is frozen nor place material on frozen surfaces except in areas authorized.
- .4 Maintain crowned surface during construction to ensure ready run-off of surface water.
- .5 Drain low areas before placing materials.
- .6 Place and compact to full width in layers not exceeding 200 mm loose thickness. Departmental Representative may authorize thicker lifts if specified compaction can be achieved and if material contains more than 25% by volume stone and rock fragments larger than 100 mm.
- .7 Where material consists of rock:
 - .1 Place to full width in layers of sufficient depth to contain maximum sized rocks, but in no case is layer thickness to exceed 1 m.
 - .2 Carefully distribute rock material to fill voids with smaller fragments to form compact mass.
 - .3 Fill surface voids at subgrade level with rock spalls or selected material to form earth-tight surface.
 - .4 Do not place boulders and rock fragments with dimensions exceeding 150 mm within 300 mm of subgrade elevation.
- .8 Deductions from excavation will be made for overbuild of embankments.

3.6 Subgrade Compaction

- .1 Break material down to sizes that enable required compaction and mix for uniform moisture to full depth of layer.
- .2 Compact each layer to minimum 95% maximum dry density, ASTM D698-12 except top 150 mm of subgrade or granular backfill. Compact top 150 mm to 100% maximum dry density, ASTM D698-12.
- .3 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction.

3.7 Testing Subgrade Compaction

- .1 The maximum density and optimum moisture content for each soil type shall be determined by ASTM D698.
 - .1 The field density of soils shall be determined by ASTM D6938-10.
 - .2 For spot checks, the following methods are also acceptable ASTM D1566 and ASTM D2167.
- .2 Material used for backfill/embankment construction shall be within $\pm 3\%$ of its optimum moisture content.
- .3 Field tests for density and moisture content shall be taken by the Contractor and will be paid for under the lump sum unit price for "Provide Independent Certified Testing Services and Survey Crew".

-
- .4 Non-conformity with the specified density or moisture content shall constitute sufficient grounds for rejection of the work.
 - .5 Compaction and moisture results shall be based on a minimum of two density/moisture tests per 1000m² of surface area for each lift of material placed. Regardless of the aforementioned there is to be a minimum of two density tests per lift for each sub-excavation/backfill area. All field tests must pass before the placed material is accepted and installation of next lift of material if any can commence.
 - .6 If a density test indicates insufficient compaction at any depth, the material shall be re-excavated and re-compacted.
 - .7 This testing in no way relieves the Contractor of his maintenance responsibilities with respect to settlements as specified. The Contractor shall repair any settlement and damaged surface improvements due to the settlement which occurs during the maintenance period.
 - .8 The following shall be the minimum acceptable standard for Testing Services and Reports:
 - .1 Tests shall be taken within 24 hours of the material being placed and the material must pass before the next lift of material can be placed.
 - .2 Tests shall be so distributed that they are representative of the entire area of the embankment operations.
 - .3 Each test shall include the soil density and moisture content of material, location of the test, lift depth, and date when test was taken and type of material placed and source of material.
 - .9 Contractor to provide Certification that fill and compaction work have been completed in accordance with the contract documents and specifications prior to the issuance of the Substantial Completion.

3.8 Finishing

- .1 Shape entire roadbed to within 50 mm of design elevations.
- .2 Finish slopes, ditch bottoms and borrow pits to neat condition, true to lines, grades and drawings where applicable. Scale excavation slopes in bedrock steeper than 1:1 by removing loose fragments.
- .3 Remove rocks over 150 mm in any dimension from slopes and ditch bottoms.
- .4 Hand finish slopes that cannot be finished satisfactorily by machine.
- .5 Round top of backslope 1.5 m on both sides of top of slope.
- .6 Run dozer tracks over slopes exceeding 3 m in height to leave growser tracks parallel to centreline of highway.
- .7 Trim between constructed slopes and edge of Clearing to provide drainage free of humps, sags, ruts, and protruding stones.

3.8 Protection

- .1 Maintain finished surfaces in condition conforming to this Section until acceptance by Departmental Representative.

END OF SECTION

PART 1 GENERAL

- 1.1 Section Includes
- .1 Related Work.
 - .2 References.
 - .3 Measurement for Payment.
 - .4 Stone.
 - .5 Geotextile Filter.
 - .6 Placing.
- 1.2 Related Work
- .7 Section 01 35 31 - Special Procedures: Traffic Control.
 - .8 Section 31 24 13 - Roadway Excavation, Embankment, and Compaction.
 - .9 Section 33 42 13 - Pipe Culverts.
- 1.3 References
- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D4632-91(1996), Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
 - .2 ASTM D4533-91(1996), Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
 - .3 ASTM D4833-00, Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
 - .4 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
- 1.4 Potential Source for Rip-Rap Production
- .1 Contractor may produce Rip-rap from the Highway Right of Way at km 533 of the Alaska Highway, Left Hand Side of the highway facing in direction of Watson Lake, Yukon Territories.
- 1.5 Measurement for Payment
- .1 Supply and placement of Rock Rip-rap will be paid for by the cubic metre placed to the Departmental Representative's approval.
 - .2 Payment includes supply and placement of geotextile, general excavation, and fine-grade excavation, preparation of rip-rap base, hauling, traffic control, and any other related labour and material.
 - .3 Hand Placed Rip-rap size to be used for placement of Rip-rap at inlet and outlet of Culverts.
 - .4 Random Rip-rap size to be used for ditch lining.

PART 2 PRODUCTS

- 2.1 Stone
- .1 Hard, dense, with relative density not less than 2.65, durable stone, free from seams, cracks or other structural defects, to meet following size distribution for use intended.
 - .1 Armour rip-rap:
 - .1 Not more than 10% of total volume of stones with individual volume less than 30dm³

- .2 Not less than 50% of total volume of stones with individual volume of 225dm^3 or more.
- .3 Remaining percentage of total volume to have uniform distribution of stones between 30 and 225dm^3 size.
- .2 Heavy rip-rap:
 - .1 Not more than 10% of total volume of stones with individual volume less than 30dm^3 .
 - .2 Not less than 50% of total volume of stones with individual volume of 140dm^3 or more.
 - .3 Remaining percentage of total volume to have uniform distribution of stones between 30 and 140dm^3 size.
- .3 Random rip-rap:
 - .1 Not more than 10% of total volume of stones with individual volume less than 15dm^3 .
 - .2 Not less than 50% of total volume of stones with individual volume of 85dm^3 or more.
 - .3 Remaining percentage of total volume to have uniform distribution of stones between 15 and 85dm^3 size.
- .4 Hand placed rip-rap:
 - .1 Minimum size of individual stone 10dm^3 .
 - .2 Not less than 75% of total volume of stones with individual volume of 25dm^3 or more.
 - .3 Supply rock spalls or cobbles to fill open joints.

2.2 Geotextile Filter

- .1 Synthetic Fibre: rot proof, unaffected by action of oil or salt water and not subject to attack by insects or rodents.
- .2 Fabric: non-woven construction supplied in roll of minimum 4m width and 50m length, minimum thickness of 2mm and minimum weight of 275g/m^2 .
- .3 Seams: in accordance with manufacturer's recommendations.
- .4 Physical properties:
 - .1 Breaking load and elongation: 70% to 80% at break, 350 to 450N tear strength, tensile strength 1100 to 1300N to ASTM 01682-64 grab test method 25mm square jaws, constant rate of 300mm/minute.
 - .2 Bursting strength: 2400 to 2800kPa to ASTM D751-79.
 - .3 Permeability: $2.5 \times 10^{-1}\text{cm/s}$.
 - .4 Equivalent opening in size: .125mm, to ASTM sieve size 30 to 80. Determine by sieving successively coarser oven dried sand fractions of sand composed of sound, rounded particles. EOS is "retained on" sieve size fraction of which, less than 5% by weight passes filter fabric.

PART 3 EXECUTION

3.1 Placing

- .1 Where rip-rap is to be placed on slopes, excavate trench at toe of slope to dimensions indicated.
- .2 Fine grade area to be rip-rapped to uniform, even surface. Fill depressions with suitable material and compact to provide firm bed.
- .3 Place geotextile on prepared surface, place rip-rap on geotextile so as to avoid

- puncturing geotextile. Do not drive vehicles directly on geotextile.
- .4 Place rip-rap to thickness and details as indicated on “Hand Placed Rock Rip-Rap” drawing.
 - .5 Place stones in manner to secure surface and create a stable mass. Place larger stones at bottom of slopes.
 - .6 Hand placing:
 - .1 Use larger stones for lower courses and as header for subsequent courses.
 - .2 Stagger vertical joints and fill voids with rock spalls or cobbles.
 - .3 Finish surface even, free of large openings and neat in appearance.

END OF SECTION

PART 1 GENERAL

- 1.1 Section Includes
- .1 Related Work.
 - .2 References.
 - .3 Measurement for Payment.
 - .4 Definitions.
 - .5 Materials.
 - .6 Inspection and Survey of sub-grade Surface.
 - .7 Placing.
 - .8 Compacting.
 - .9 Testing for Compaction.
 - .10 Site Tolerances.
 - .11 Protection.
- 1.1 Related Work
- .1 Section 01 35 31 - Special Procedures: Traffic Control.
 - .2 Section 31 05 17 - Aggregates: General.
 - .3 Section 31 11 00 – Clearing and Grubbing.
 - .4 Section 31 24 13 – Roadway Excavation, Embankment and Compaction.
 - .5 Section 32 11 19 – Granular Sub-base.
- 1.2 References
- .1 ASTM C117-03, Standard Test Method for Materials Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136-01, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - .4 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
 - .5 ASTM D1556-07 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
 - .6 ASTM D6938-10 Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
 - .7 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- 1.3 Measurement for Payment
- .1 Select Granular Sub-grade Fill will be measured in cubic metres of material excavated, processed, and compacted by cross section in place. Initial cross sections to be taken by Contractor prior placement of material and final cross sections at completion of the work. Horizon cross section shall be taken as required for month end payments or to separate materials. Only material incorporated into work and accepted by Departmental Representative is included. Payment includes: all survey work including second grading, excavating, processing, stockpiling, loading, hauling, placing, shaping, watering and/or drying, and compacting.
 - .2 Costs for pit development activities are described in:

- .1 Section 31 05 17 - Aggregates: General.
- .3 Constructing temporary stockpiles and rehandling Select Granular Sub-grade Fill will be considered incidental to price for Select Granular Sub-grade Fill.
- .4 Maintenance of Select Granular Sub-grade Fill surface and application of dust control measures will be considered incidental to prices for Select Granular Sub-grade Fill and Calcium Chloride.
- .5 Contractor shall be responsible for construction surveys to layout and second grade surface to within plus or minus 30mm of established grade and cross section.
- .6 Overbuild of embankment beyond neat lines shown on cross sections will not be paid.
- .7 Cost of testing and surveys is considered incidental to the unit price bid to “Provide Independent Certified Testing Services and Survey Crew”.

1.4 Definitions

- .1 Select Granular Sub-grade Fill: Material excavated from within right-of-way and from designated borrow locations that meets specified gradation and material requirements and incorporated into the designated Select Granular Sub-grade Fill horizon of the embankment.

PART 2 PRODUCTS

2.1 Materials

- .1 Select Granular Sub-grade Fill: native materials selected, processed or blended to following requirements:
 - .1 Gradation to:

<u>Sieve Designation</u>	<u>% Passing</u>
150mm	100
0.075mm	0 - 10
 - .2 Material passing 0.425 mm sieve size to have:
 - .1 Liquid Limit: to ASTM D4318-00, maximum 25
 - .2 Plasticity Index: to ASTM D4318-00, maximum 6
 - .3 Regardless that the material meets the above gradation, it will be rejected if the compacted material ruts when a loaded tandem truck is passed over it.

PART 3 EXECUTION

3.1 Inspection and Survey of sub-grade Surface

- .1 Place Select Granular Sub-grade Fill after underlying surface is surveyed by the Contractor and is inspected and approved by Departmental Representative.

3.2 Placing

- .1 Replace material removed from undercut excavation with Select Granular Sub-grade Fill.
- .2 Place Select Granular Sub-grade Fill to depths and grades directed by Departmental Representative.

- .3 Ensure no frozen material is placed.
- .4 Place material only on clean unfrozen surface, properly shaped and compacted, and free from snow and ice.
- .5 Begin spreading Select Granular Sub-grade Fill material on crown line or on high side of one way slope.
- .6 Place material in uniform layers not exceeding 200mm 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 segregated material.

3.3 Compacting

- .1 Compact to density not less than 95% maximum dry density in accordance with ASTM D698 -00a for material placed lower than 200mm below top of finished Select Granular Sub-grade Fill course. Compact to 100% maximum dry density within top 200mm.
- .2 Shape and roll alternately to obtain smooth, even and uniformly compacted structure.
- .3 Apply water as necessary during compacting to obtain specified density. If Select Granular Sub-grade Fill is excessively moist, take remedial action as directed by Departmental Representative.
- .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.
- .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.4 Testing for Compaction

- .1 The maximum density and optimum moisture content for Select Granular Sub-grade Fill shall be determined by ASTM D698.
 - .1 The field density of soils shall be determined by ASTM D6938-10.
 - .2 For spot checks, the following method is also acceptable ASTM D1566.
- .2 Material used for Select Granular Sub-grade Fill course construction shall be within $\pm 3\%$ of its optimum moisture content.
- .3 Field tests for density and moisture content shall be taken by the Contractor and will be paid for under the lump sum unit price for "Provide Independent Certified Testing Services and Survey Crew".
- .4 Non-conformity with the specified density or moisture content shall constitute sufficient grounds for rejection of the work.
- .5 Compaction and moisture results shall be based on a minimum of two density/moisture tests per 1000m² of surface area for each lift of material placed. Regardless of the aforementioned there is to be a minimum of two density tests per lift for each sub-excavation/backfill area. All field tests must pass before the placed material is accepted and installation of next lift of material if any can commence.
- .6 If a density test indicates insufficient compaction at any depth, the material shall be re-excavated and re-compacted.
- .7 This testing in no way relieves the Contractor of his maintenance responsibilities

with respect to settlements as specified. The Contractor shall repair any settlement and damaged surface improvements due to the settlement which occurs during the maintenance period.

- .8 The following shall be the minimum acceptable standard for Testing Services and Reports:
 - .1 Tests shall be taken within 24 hours of the Select Granular Sub-grade Fill being placed and the material must pass before the next lift of material can be placed.
 - .2 Tests shall be so distributed that they are representative of the entire area of the Select Granular Sub-grade Fill course operation.
 - .3 Each test shall include the soil density and moisture content of material, location of the test, lift depth, and date when test was taken and type of material placed and source of material.
- .9 Contractor to provide Certification that Select Granular Sub-grade Fill placement and compaction work have been completed in accordance with the contract documents and specifications prior to the issuance of the Substantial Completion.

3.5 Site Tolerances

- .2 Finished base surface to be within plus or minus 50 mm of established grade and cross section.

3.6 Protection

- .1 Maintain finished base in condition conforming to this section until succeeding material is applied or until acceptance by Departmental Representative. No separate payment will be made for maintenance or dust control.

END OF SECTION

PART 1 GENERAL

1.1 Section Includes

- .1 Related Sections.
- .2 References.
- .3 Measurement for Payment.
- .4 Stockpile Handling.
- .5 Waste Management and Disposal.
- .6 Material Size Requirements.
- .7 Inspection and Survey of Select Granular Sub-grade Fill.
- .8 Placing.
- .9 Compaction.
- .10 Testing of Compaction.
- .11 Site Tolerances.
- .12 Protection.

1.2 Related Sections

- .1 Section 01 35 31 – Special Procedures: Traffic Control.
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 31 05 17 - Aggregates: General.
- .4 Section 31 24 13 - Roadway Excavation, Embankment and Compaction.
- .5 Section 32 11 18 – Select Granular Sub-grade Fill.
- .6 Section 32 11 24 - Granular Base Course.

1.3 References

- .1 American Society for Testing and Materials (ASTM):
 - .1 ASTM C117-03, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136-01, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D422-63(1998), Standard Test Method for Particle Size Analysis of Soils.
 - .4 ASTM D698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ftlbf/ft³) (600kNm/m³).
 - .5 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ftlbf/ft³) (2,700kNm/m³).
 - .6 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
 - .7 ASTM D1556-07 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
 - .8 ASTM D2167-08 Standard Test Methods for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
 - .9 ASTM D6938-10 Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

.10 CAN/CGSB8.1 88, Sieves, Testing, Woven Wire, Inch Series.

.11 CAN/CGSB8.2M88, Sieves, Testing, Woven Wire, Metric.

1.4 Measurement for Payment

- .1 Granular Sub-Base will be measured in cubic metres of material hauled, placed, and compacted by cross section in place. Initial cross sections to be taken by Contractor prior to placement of material and final cross sections at completion of the work. Horizon cross section shall be taken as required for month end payments or to separate materials. Only material incorporated into work and accepted by Departmental Representative is included. Payment includes: all survey work including second grading, excavating, processing, stockpiling, loading, hauling, placing, shaping, watering and/or drying, and compacting.
- .2 Costs for pit development activities are described in:
 - .1 Section 31 05 17 - Aggregates: General.
- .3 Constructing temporary stockpiles and rehandling Granular Sub-Base will be considered incidental to price for Granular Sub-Base.
- .4 Maintenance of Granular Sub-Base surface and application of dust control measures will be considered incidental to prices for Granular Sub-Base and Calcium Chloride.
- .5 Contractor shall be responsible for construction surveys to layout and second grade surface to within plus or minus 30mm of established grade and cross section.
- .6 Overbuild of embankment beyond neat lines shown on cross sections will not be paid.
- .7 Cost of testing and surveys is considered incidental to the unit price bid to “Provide Independent Certified Testing Services and Survey Crew”.

1.5 Stockpile Handling

- .1 Stockpile aggregates in accordance with Section 31 05 17 – Aggregates: General.
- .2 Handle and transport aggregate to avoid segregation, contamination, and degradation.
- .3 Leave stockpile in tidy, well-drained condition, free of standing surface water.
- .4 Leave any unused aggregates in neat compact stockpiles as directed.
- .5 Stockpile minimum 50% of total aggregate required prior to commencing hauling operation to the road.

1.6 Waste Management and Disposal

- .1 Separate and recycle waste materials in accordance with Section 01 35 43 – Environmental Procedures.

PART 2 PRODUCTS

2.1 Material Size Requirements

- .1 Granular sub-base material: in accordance with Section 31 05 17 – Aggregate General and following requirements:
 - .1 Crushed stone or gravel consisting of clean, hard, durable particles free from

clay lumps, cemented particles and organic material.

- .2 Gradations to be within limits specified in Table 1 when tested to ASTM C 136 and ASTM C117. Sieve sizes to CAN/CGSB 8.1 88 and CAN/CGSB 8.2M88.

- .3 Table 1

<u>Sieve Designation</u>	<u>%Passing</u>
100mm	100
4.75mm	20 - 65
0.075mm	0 - 8

- .4 Grading of Material shall not show marked fluctuations from opposite extremes of the limits given in Table 1, and the curve plotted from the sieve analysis shall flow in a manner free from acute changes in direction.
- .5 Even though particle sizes are within the limits of the grading sizes herein provided, materials will be considered unsuitable if particle shapes are thin or elongated or exhibit other characteristics precluding satisfactory compaction to create a roadbed acceptable to the Departmental Representative.
- .2 Other Properties as Follows:
- .1 Liquid Limit: to ASTM D 4318, Maximum 25
- .2 Plasticity Index: to ASTM D 4318, Maximum 6
- .3 At least 20% of material retained on 4.75 mm sieve to have one or more fractured face.

PART 3 EXECUTION

3.1 Inspection and Survey of Select Granular Sub-grade Fill

- .1 Place granular subbase after the Select Granular Sub-grade Fill surface has been surveyed by the Contractor and is inspected and approved by the Departmental Representative.

3.2 Placing

- .1 Construct granular subbase to depth and grade in areas indicated.
- .2 Ensure no frozen material is placed.
- .3 Place material only on clean unfrozen surface, free from snow or ice.
- .4 Begin spreading subbase material on crown line or high side of one-way slope.
- .5 Place granular subbase materials using methods which do not lead to segregation or degradation.
- .6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
- .7 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts if specified compaction can be achieved.
- .8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .9 Remove and replace portion of layer in which material has become segregated during spreading.

3.3 Compaction

- .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Compact to density of not less than 98% maximum dry density in accordance with ASTM D698-12.
- .3 Shape and roll alternately to obtain smooth, even and uniformly compacted subbase.
- .4 Apply water as necessary during compaction to obtain specified density.
- .5 Dry as necessary to obtain specified density.
- .6 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.
- .7 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.4 Testing of Compaction

- .1 The maximum density and optimum moisture content for Sub-base Gravels shall be determined by ASTM D698.
 - .1 The field density of soils shall be determined by ASTM D6938-10.
 - .2 For spot checks, the following methods are also acceptable ASTM D1566 and ASTM D2167.
- .2 Material used for Sub-base Gravel course construction shall be within $\pm 3\%$ of its optimum moisture content.
- .3 Field tests for density and moisture content shall be taken by the Contractor and will be paid for under the lump sum unit price for “Provide Independent Certified Testing Services and Survey Crew”.
- .4 Non-conformity with the specified density or moisture content shall constitute sufficient grounds for rejection of the work.
- .5 Compaction and moisture results shall be based on a minimum of two density/moisture tests per 1000m² of surface area for each lift of material placed. Regardless of the aforementioned there is to be a minimum of two density tests per lift for each sub-excavation/backfill area. All field tests must pass before the placed material is accepted and installation of next lift of material if any can commence.
- .6 If a density test indicates insufficient compaction at any depth, the material shall be re-excavated and re-compacted.
- .7 This testing is no way relieves the Contractor of his maintenance responsibilities with respect to settlements as specified. The Contractor shall repair any settlement and damaged surface improvements due to the settlement which occurs during the maintenance period.
- .8 The following shall be the minimum acceptable standard for Testing Services and Reports:
 - .1 Tests shall be taken within 24 hours of the Gravel Sub-base being placed and the material must pass before the next lift of material can be placed.
 - .2 Tests shall be so distributed that they are representative of the entire area of the Gravel Sub-base course operation.
 - .3 Each test shall include the soil density and moisture content of material, location of the test, lift depth, and date when test was taken and type of material placed and source of material.
- .9 Contractor to provide Certification that Sub-base Gravels placement and compaction work have been completed in accordance with the contract

documents and specifications prior to the issuance of the Substantial Completion.

3.5 Site Tolerances

- .1 Finished subbase surface to be within 50 mm of elevation as indicated but not uniformly high or low.

3.6 Protection

- .1 Maintain finished subbase in condition conforming to this Section until succeeding material is applied or until acceptance by Departmental Representative. No separate payment will be made for maintenance. Dust control paid for under unit price bid for “Calcium Chloride”.

END OF SECTION

PART 1 GENERAL

- 1.1 Section Includes
- .1 Related Sections.
 - .2 References.
 - .3 Measurement for Payment.
 - .4 Stockpile Handling
 - .5 Materials.
 - .6 Sequence of Operation.
 - .7 Site Tolerances.
 - .8 Protection.
- 1.2 Related Sections
- .9 Section 01 35 31 - Special Procedures: Traffic Control.
 - .10 Section 31 05 17 - Aggregates: General.
- 1.3 References
- .1 ASTM C117-03, Standard Test Method for Materials Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131-01, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C136-01, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - .5 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - .6 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 - .7 ASTM D1556-07 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
 - .8 ASTM D2167-08 Standard Test Methods for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
 - .9 ASTM D6938-10 Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
 - .10 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .11 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- 1.4 Measurement for Payment
- .1 Base Gravels to be measured in cubic metres of material hauled, placed, and compacted by cross section in place. Initial cross sections to be taken by Contractor prior to placement of material and final cross sections at completion of the work. Only material incorporated into work and accepted by Departmental Representative is included. Payment includes: all survey work including second grading, excavating, crushing, stockpiling, loading, hauling, placing, shaping, watering, and compacting.
 - .2 Costs for pit development activities are described in:

- .1 Section 31 05 17 - Aggregates: General.
- .3 19 mm Granular Base material will be used for the Base Gravel Course and as designated by the Departmental Representative. No payment for overbuild of base beyond neat lines shown on cross section.
- .4 Contractor shall be responsible for construction surveys to layout and second grade surface to within plus or minus 30mm of established grade and cross section.
- .5 Cost of testing and surveys incidental to the Unit Price bid for “Provide Independent Certified Testing Services and Survey Crew”.

1.5 Stockpile Handling

- .1 Stockpile aggregates in accordance with Section 31 05 17 - Aggregates: General.
- .2 Handle and transport aggregate to avoid segregation, contamination, and degradation.
- .3 Leave stockpile in tidy, well-drained condition, free of standing surface water.
- .4 Leave any unused aggregates in neat compact stockpiles as directed.
- .5 Stockpile 50% of total aggregate required prior to commencing operation.

PART 2 PRODUCTS

2.1 Materials

- .1 Granular base: material to Section 31 05 17 Aggregates: General and following requirements:
 - .1 Crushed stone or gravel.
 - .2 Gradations to be within limits specified when tested to ASTM C136-01 and ASTM C117-95. Sieve sizes to CAN/CGSB-8.1.
 - .3 Gradation to

Sieve Designation	% Passing
19mm	100
12.5mm	70 - 100
9.5mm	-
4.75mm	40 - 70
2.00mm	23 - 50
0.425mm	7 - 25
0.180mm	-
0.075mm	3 - 8

- .4 Liquid limit: to ASTM D4318-00, maximum 25.
- .5 Plasticity index: to ASTM D4318-00, maximum 6.
- .6 Los Angeles degradation: to ASTM C131-01. Max. % loss by weight: 35.
- .7 Crushed particles: at least 60% of particles by mass retained on 4.75 mm sieve to have at least one freshly fractured face.

PART 3 EXECUTION

3.1 Sequence of Operation

- .1 Stockpile Granular Base as specified under Section 31 05 17 – Aggregates: General.

-
- .2 Place Granular Base after underlying surface is surveyed by the Contractor and is inspected and approved by Departmental Representative.
 - .3 Placing:
 - .1 Construct granular base to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed.
 - .3 Place material only on clean unfrozen surface, properly shaped and compacted, and free from snow and ice.
 - .4 Begin spreading base material on crown line or on high side of one-way slope.
 - .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.
 - .4 Compaction Equipment:
 - .1 Compaction equipment to be capable of obtaining required material densities.
 - .5 Compacting:
 - .1 Compact to density not less than 100% maximum dry density in accordance with ASTM D698-12.
 - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
 - .3 Apply water as necessary during compacting to obtain specified density. If granular base is excessively moist, take remedial action as directed by Departmental Representative.
 - .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.
 - .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
 - .6 Testing of Compaction:
 - .1 The maximum density and optimum moisture content for Base Gravels shall be determined by ASTM D698.
 - .1 The field density of soils shall be determined by ASTM D6938-10.
 - .2 For spot checks, the following methods are also acceptable ASTM D1566 and ASTM D2167.
 - .2 Material used for Base Gravel course construction shall be within $\pm 3\%$ of its optimum moisture content.
 - .3 Field tests for density and moisture content shall be taken by the Contractor and will be paid for under the lump sum unit price for “Provide Independent Certified Testing Services”.
 - .4 Non-conformity with the specified density or moisture content shall constitute sufficient grounds for rejection of the work.
 - .5 Compaction and moisture results shall be based on a minimum of two

density/moisture tests per 1000m² of surface area for each lift of material placed. Regardless of the aforementioned there is to be a minimum of two density tests per lift for each sub-excavation/backfill area. All field tests must pass before the placed material is accepted and installation of next lift of material if any can commence.

- .6 If a density test indicates insufficient compaction at any depth, the material shall be re-excavated and re-compacted.
- .7 This testing in no way relieves the Contractor of his maintenance responsibilities with respect to settlements as specified. The Contractor shall repair any settlement and damaged surface improvements due to the settlement which occurs during the maintenance period.
- .8 The following shall be the minimum acceptable standard for Testing Services and Reports:
 - .1 Tests shall be taken within 24 hours of the Gravel Base being placed and the material must pass before the next lift of material can be placed.
 - .2 Tests shall be so distributed that they are representative of the entire area of the Gravel Base course operation.
 - .3 Each test shall include the soil density and moisture content of material, location of the test, lift depth, and date when test was taken and type of material placed and source of material.
- .9 Contractor to provide Certification that Base Gravels placement and compaction work have been completed in accordance with the contract documents and specifications prior to the issuance of the Substantial Completion.

3.2 Site Tolerances

- .1 Finished base surface to be within plus or minus 30 mm of established grade and cross section.

3.3 Protection

- .1 Maintain finished base in condition conforming to this section until succeeding material is applied or until acceptance by Departmental Representative. No separate payment will be made for maintenance or dust control.

END OF SECTION

PART 1 GENERAL

- 1.1 Section Includes
- .1 Related Sections.
 - .2 Description.
 - .3 Definition.
 - .4 Measurement Procedures.
 - .5 Delivery, Storage and Handling.
 - .6 Calcium Chloride Flakes.
 - .7 Aqueous Calcium Chloride.
 - .8 Preparation of Surfaces.
 - .9 Application.
- 1.2 Related Sections
- .1 Section 31 24 13 – Roadway Excavation, Embankment and Compaction.
 - .2 Section 32 11 18 – Select Granular Sub-grade Fill.
 - .3 Section 32 11 19 – Granular Sub-base.
 - .4 Section 32 11 24 – Granular Base.
- 1.3 Description
- .1 This section specifies requirements for supplying and applying Calcium Chloride.
- 1.4 Definition
- .1 Flake equivalent Tonne: method used to convert aqueous Calcium Chloride to its equivalent mass of Type 1 Regular flake Calcium chloride, is as follows:

$$FE = \frac{M \times C}{77,000}$$

Where FE = Number of flake equivalent tonnes
M = Mass of solution in kilograms
C = Percentage of Calcium Chloride in solution
- 1.5 Measurement Procedures
- .1 Calcium Chloride to be measured in Flake Equivalent tonnes of Calcium Chloride applied.
- 1.6 Delivery, Storage and Handling
- .1 Provide Departmental Representative with name of product, name of manufacturer, net weight or mass, and percentage of Calcium Chloride guaranteed by manufacturer.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

PART 2 PRODUCTS

- 2.1 Calcium Chloride Flakes
- .1 To CGSB Specification 15-GP-1M Calcium Chloride Type 1 Regular (77%).
- 2.2 Aqueous Calcium Chloride
- .1 To CGSP 15-GP-1M Calcium Chloride – 35% concentration by weight of anhydrous produce.

PART 3 EXECUTION

3.1 Preparation of Surfaces

- .1 Apply Calcium Chloride after fine grading of surface.

3.2 Application

- .1 Apply Calcium Chloride uniformly over centre 7 m of roadway at rate of 5 Flake Equivalent tonnes/km unless otherwise directed by Departmental Representative.
- .2 Immediately after applying Calcium Chloride flakes, apply water at rate of 15 tonnes/km or until Calcium Chloride spreads to edge of roadway.

END OF SECTION

PART 1 GENERAL

- 1.1 Section Includes
- .1 Related Sections.
 - .2 References.
 - .3 Measurement for Payment.
 - .4 Delivery, Storage and Handling.
 - .5 Material Certification.
 - .6 CSP.
 - .7 Granular Bedding and Backfill.
 - .8 Rock Rip-Rap.
 - .9 Cut-ends.
 - .10 Laying CSP Culverts.
 - .11 Joints: CSP Culverts.
 - .12 Backfilling.
- 1.2 Related Sections
- .1 Section 01 33 00 - Submittal Procedures.
 - .2 Section 01 35 43 - Environmental Protection.
 - .3 Section 31 24 13 - Roadway Excavation, Embankment and Compaction.
 - .4 Section 31 37 10 – Rock Rip-Rap.
 - .5 Section 32 11 24 – Granular Base.
- 1.3 References
- .1 Canadian Standards Association (CSA International).
 - .1 CSA-G401-01, Corrugated Steel Pipe Products.
 - .2 CSA-B182.8-02, Profile Polyethylene Storm Sewer and Drainage Pipe and Fittings.
- 1.4 Measurement for Payment
- .1 Installation of CSP culverts will be measured in metres of steel pipe acceptably installed at site.
 - .1 No separate measurement will be made for couplings, fittings or end sections for CSP.
 - .2 Gravel Base material used for bedding and backfill will be paid for under the unit price bid for Granular Base and include all costs for excavating, crushing, loading, hauling, placement and compaction of granular bedding and backfill material.
 - .2 Culvert excavation shall be measured in accordance with Section 31 24 13 - Roadway Excavation, Embankment and Compaction.
 - .3 Culvert installation must be coordinated with embankment construction. No payment will be made for re-excavation of embankment material required to install culverts.
 - .4 Cost of installation will include any necessary dewatering prior to placing of bedding.
 - .5 Supply and placement of Rock Rip-Rap and geotextile at inlet and outlet of culverts will be paid for in accordance with Section 31 37 00 Rock Rip-Rap.
 - .6 Contractor to use culvert material available from various PWGSC Compounds or Pit as listed in Appendix 3.
 - .1 Cost of loading, hauling culvert material to the job site is considered incidental to the applicable unit price for Install Galvanized Corrugated Steel

Pipe Culvert.

- .2 Contractor to supply all required couplers and associated hardware. Cost will be considered incidental to applicable unit price for Install Galvanized Corrugated Steel Pipe Culvert..

1.5 Delivery, Storage and Handling

- .1 Handle and store pipe products in a manner to avoid damage, alteration, deterioration and soiling.
- .2 Where the material supplied is damaged, the Contractor shall immediately separate nested sections of the plate or pipe to facilitate more detailed inspection. Culvert material designated by the Departmental Representative as unacceptable, due to damage or failure to meet specified requirements, shall be immediately repaired or replaced by the Contractor.

1.6 Material Certification

- .1 Submit manufacturer's test data and certification at least one (1) week prior to commencing work.
- .2 Certification to be marked on pipe.

PART 2 PRODUCTS2.1 CSP

- .1 Corrugated steel pipe: to CSA-G401.
- .2 Culverts to be annular or spiral with annular ends. Coupling bands to be two piece annular bolted with minimum width of nine corrugations.
- .3 Minimum wall thickness to be 2.0 mm.
- .4 Corrugations to be 68 mm x 13 mm.
- .5 For all exposed culvert ends, 3:1 mitred end sections will be required

2.2 Granular Bedding and Backfill

- .1 Supply Crushed Base gravels to be used as culvert bedding and backfill.

2.3 Rock Rip-Rap

- .1 Rock Rip-Rap shall be installed in accordance with Section 31 37 00 - Rock Rip-Rap.
- .2 The type of Rock Rip-Rap shall be hand placed Rock Rip-Rap.

2.4 Cut Ends

- .1 All exposed ends of CSP culverts to have sloped end sections.
- .2 All cut edges shall be made smooth by grinding so that all the burrs are removed. Any damaged galvanizing shall be restored by zinc metallizing in accordance with CSA G401.
- .3 Where an existing culvert is extended, up to 2 m of the existing culvert end shall be removed as directed by the Departmental Representative.

PART 3 EXECUTION3.1 Bedding

- .1 Dewater excavation, as necessary, to allow placement of culvert bedding in dry condition.
- .2 Place minimum thickness of 300 mm of approved granular material on bottom of excavation and compact to minimum 95% maximum density to ASTM D698.

- .3 Shape bedding to fit lower segment of pipe exterior so that width of at least 50% 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.

3.2 Laying CSP Culverts

- .1 Begin pipe placing at downstream end.
- .2 Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length.
- .3 Do not allow water to flow through pipes during construction except as permitted by Departmental Representative.

3.3 Joints: CSP Culverts

- .1 Match corrugations of coupler with pipe sections before tightening.
- .2 Insert and tighten bolts.
- .3 Tap couplers firmly with a rubber mallet or similar non-marring tool as they are being tightened, to take up slack and ensure snug fit.
- .4 Repair spots where damage has occurred to coating in the field by applying two coats of zinc rich paint approved by the CSP supplier. Allow each coat to dry before placing second coat, bedding or backfill.

3.4 Backfilling

- .1 Backfill around and over culverts as indicated or as directed by Departmental Representative.
- .2 Place granular backfill material, in 150 mm layers to full width, alternately on each side of culvert, so as not to displace it laterally or vertically.
- .3 Compact each layer to 98% maximum density to ASTM D698 taking special care to obtain required density under haunches. Hand tamp where necessary to obtain compaction. Compaction Testing is the responsibility of the Contractor and will be in accordance with Section 31 24 13 - Roadway Excavation, Embankment and Compaction. Except there will be a minimum of two tests per lift of material placed against the culvert.
- .4 Protect installed culvert with minimum 900 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 2H: 1V.
- .5 Place backfill in unfrozen condition.
- .6 Place Rock Rip-Rap with filter fabric.

END OF SECTION

Public Works &
Government Services Canada
Pacific Region

Highway Construction
km 555.64 to km 560.78
and km 563.1 to km 570.2
Alaska Highway, B.C.

Appendix "3"
Culvert Locations and
Inventory

Km 456, Airport Compound

600mm Diameter: Length 6m x 31 pieces = 186m

900mm Diameter: Length 6m x 26 pieces = 157m

1200mm Diameter: Length 6m x 11 pieces = 66m

Km 554, Mill Creek Gravel Pit

600mm Diameter: Length 6m x 27 pieces = 162m

900mm Diameter: Length 6m x 36 pieces = 216m

1200mm Diameter: Length 6m x 31 pieces = 186m

Km 762.5, Liard Maintenance Camp

600mm Diameter: Length 5m x 30 pieces = 150m

600mm Diameter: Length 6m x 144 pieces = 864m

600mm Diameter: Length 7m x 40 pieces = 280m

900mm Diameter: Length 5m x 18 pieces = 90m

1200mm Diameter: Length 5m x 31 pieces = 155m

- Contractor shall supply all bolts and couplers required. Cost shall be incidental to applicable unit price for install Galvanized Corrugated Steel Pipe Culvert.
- Contractor to remove only the culvert material required to complete the roadwork on this Contract. Cost of hauling the culvert material to the job site is considered incidental to the applicable unit price for install Galvanized Corrugated Steel Pipe Culvert.

Density and Moisture Report: From _____ + _____ to _____ + _____ Date _____

Project No. _____ Type of Material Tested: _____

Station	Left Shoulder	Left O/S	Center	Right O/S	Right Shoulder

APPENDIX 4 - Example Form for Recording Density

Technician _____

UNIT PRICE TABLE: (I,WE) agree that the following table is the Unit Price Table to be used for the purposes of the contract.

Item	Class of Labour, Plant or Material	Unit of Measurement	Estimated Quantity	Price Per Unit	Estimated Total Price
1	Mobilization	Lump Sum	1		
2	Traffic Control	Lump Sum	1		
3	Grubbing	ha	20		
4	Stripping	m ³	110000		
5	Excavation, Haul, Place Embankment & Compaction	m ³	285000		
6	Supply, Haul, Place and Compact Select Granular Sub-grade fill	m ³	101000		
7	Supply, Haul, Place and Compact Granular Sub-base	m ³	67100		
8	Load, Haul, Place and Compact Granular Base Gravels	m ³	25000		
9	Supply, Load, Haul, Place and Compact Granular Base Gravels	m ³	37000		
10	Install Galvanized Corrugated Steel Pipe culverts				
	a) 600mm diameter	m	453		
	b) 900mm diameter	m	315		
	c) 1200mm diameter	m	182.5		
11	Supply and Install Rip-rap	m ³	202		
12	Calcium Chloride	t	65		
13	Load, Haul and Place topsoil	m ³	4500		
14	Provide Independent Certified Testing Services and survey crew	Lump Sum	1		
15	Departmental Representative's Camp Trailer	Lump Sum	1		
				TOTAL	

Note: Transfer the Total Estimated Amount to Clause 1.3 on Page 1 of the Tender Form.

The Price per Unit column shall be completed for each Unit Price Item. The Estimated Total Price column should be completed.

I/we agree that the Price(s) per unit as tendered govern in calculating the Total Estimated Amount. I/we understand that any errors in the extension of the Price per Unit and in the addition of the Estimated Total Price will be corrected in order to obtain the Total Estimated Amount.

Estimated Total Price will be corrected in order to obtain the Total Estimated Amount.