



# Public Works and Government Services Canada

## Specification

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CSC Matsqui Institution

Roadway Revitalization

Requisition No. EZ899-162223/A

Project No. R.077706.001

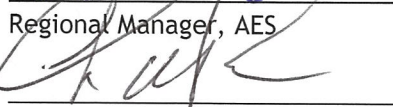
January 2016

**APPROVED BY:**

  
\_\_\_\_\_  
Regional Manager, AES

2016-01-07

Date

  
\_\_\_\_\_  
Construction Safety Coordinator

2016-01-07

Date

**TENDER:**

  
\_\_\_\_\_  
Project Manager

2016-01-07

Date

**Matsqui Institution – Abbotsford, BC  
Roadway Revitalization**SPECIFICATIONS- DIVISION 1 TO 32

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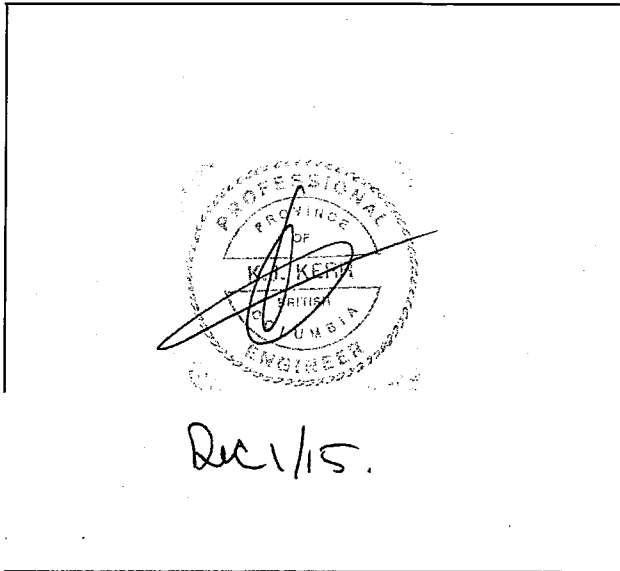
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**END OF SECTION**

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ENGINEERS – SEAL & SIGNATURE

Seal / Signature / Date



**Matsqui Institution – Abbotsford, BC  
Roadway Revitalization****Part 1 Summary of Work****1.1 RELATED SECTIONS****1.2 WORK COVERED BY CONTRACT DOCUMENTS**

- .1 Work of this Contract generally consists of road widening and asphalt overlay for the perimeter roadway and full road construction of the internal fire lane. There are associated minor drainage works to suit the road widen.

**1.3 OCCUPANCY**

- .1 The site and buildings will remain unoccupied during the Work.
- .2 Co-operate with Departmental Representative in scheduling operations to minimize conflict and to facilitate CSC usage of premises, where applicable.

**1.4 CONTRACTOR'S USE OF PREMISES**

- .1 Contractor will have access to site as necessary to complete the Work.
- .2 Contractor will be responsible for securing the site if the contractor fails to complete the project in the specified time
- .3 Access to areas inside Institutions is controlled by the Departmental Representative.

**1.5 DOCUMENTS REQUIRED:**

- .1 Maintain at job site, one copy each document as follows, where applicable:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change Orders.
  - .5 Other Modifications to Contract.
  - .6 Field Test Reports.
  - .7 Copy of Approved Work Schedule.
  - .8 Health and Safety Plan and Other Safety Related Documents.
  - .9 Environmental Protection Plan, relevant environmental permits and other environment related documents
  - .10 Other documents as specified.

**Part 2 Work Restrictions**

- .1 Execute work with least possible interference or disturbance to normal use of premises.

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- .2 Where security is reduced by work provide temporary means to maintain security.
  - .3 Accept liability for damage, safety of equipment and overloading of stairs
  - .4 Construct barriers in accordance with Temporary Barriers and Enclosures clause.
  - .5 Security Requirements: refer to Section 01 14 10 - Security requirements.
  - .6 Hours of work:
    - .1 Perform work during in accordance with applicable Municipal bylaws. Work may be performed on weekends and holidays, with a minimum forty-eight (48) hours advance notice and approval of the Departmental Representative. Arrange with Departmental Representative at each work site when after-hours work, is required due to schedule slippage. Provide schedule for prior approval of Departmental Representative.
  - .7 Access into Institution:
    - .1 Vehicle access through the Principal Entrance Sally Port will be restricted during the inmate "Count" at breakfast, lunch and dinner hours. Confirm "count" times with Departmental Representative. Delay may occur when entering and existing the Institution with vehicles during "count" times and due to security situations and heavy traffic.
    - .2 A Construction Escort will be provided by the Departmental Representative, at no cost to the Contract. Notify Departmental Representative minimum 48 hours in advance of when Construction Escort is required.
  - .8 Perimeter patrol and fire lane access in and around the institution
    - .1 Contractor must maintain patrol and fire truck access around the perimeter of the institution at all times, except final paving operations. During final paving operations contractor must work with CSC/PWGSC with a work methodology on how patrol and emergency traffic will be provided around the construction activities. The work methodology must be provided a minimum 40 hours in advance of final paving.

**Part 3 Construction Work Schedule**

- .1 Commence work immediately upon official notification of acceptance of offer and complete the work within six (6) weeks from the date of such notification.
- .2 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Substantial Certificate and Final Certificate as defined times of completion are of essence of this contract.
- .3 Submittals:
  - .1 Refer to Section 01 33 00 Submittal Procedures.

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- .4 Project Scheduling Reporting:
    - .1 Update Project Schedule on weekly 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.
  - .5 Project Meetings:
    - .1 Discuss Project Schedule at weekly 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 Before submitting first progress claim submit breakdown of Contract price in detail as directed by Departmental Representative and aggregating contract price. After approval by Departmental Representative cost breakdown will be used as basis for progress payments.

**Part 4 Health and Safety**

- .1 Specified in Section 01 35 33 - Health and Safety Requirements.

**Part 5 Erosion and Sedimentation Control Measures**

- .1 Specified in Section 01 57 14 – Erosion and Sedimentation Control Measures

**Part 6 Regulatory Requirements****6.1 REFERENCES AND CODES:**

- .1 Perform Work in accordance with National Building Code of Canada (NBCC2010) including all amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Meet or exceed requirements of:
  - .1 Contract documents.
  - .2 Specified standards, codes and referenced documents.

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**Part 7           Quality Control****7.1               INSPECTION:**

- .1     Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .2     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.
- .3     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, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

**7.2               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 removals or replacements promptly.

**Part 8           Temporary Utilities****8.1               TEMPORARY VENTILATION:**

- .1     Ventilating:
  - .1     Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during abatement and demolition.
  - .2     Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
  - .3     Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
  - .4     Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .2     Maintain strict supervision of operation of temporary ventilating equipment to:
  - .1     Conform with applicable codes and standards.
  - .2     Enforce safe practices.
  - .3     Prevent abuse of services.

.4 Prevent damage to finishes.

**8.2 TEMPORARY POWER AND LIGHT:**

- .1 Existing electrical power and lighting may be used for abatement and demolition purposes at no extra cost as directed by the Departmental Representative, provided that electrical components used for temporary power are replaced when damaged. Provide own electrical lines from source.

**8.3 TEMPORARY COMMUNICATION FACILITIES:**

- .1 Conform to Section 01 14 10 Security Requirements.

**8.4 FIRE PROTECTION:**

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations and bylaws.

**Part 9 Construction Facilities**

**9.1 LIFTING EQUIPMENT**

- .1 Where required, provide, operate and maintain lifting equipment and manpower required for moving of heavy products.

**9.2 SITE STORAGE/LOADING:**

- .1 Confine work and operations of employees to areas specified in 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.

**9.3 CONSTRUCTION PARKING:**

- .1 Parking space is on the sides of roadways, in accordance with applicable municipal regulations and bylaws.

**9.4 CONTRACTOR'S SITE OFFICE:**

- .1 Provide office as required to accommodate Contractor's operations.
- .2 Provide a clearly marked and fully stocked first-aid case in a readily available location in accordance with WorkSafe BC requirements.



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**9.5 EQUIPMENT AND TOOLS STORAGE:**

- .1 Provide and maintain, in a clean and orderly condition, lockable secure lock box for storage of tools and materials.

**9.6 SANITARY FACILITIES:**

- .1 Contractor to provide their own sanitary facilities.

**9.7 CONSTRUCTION SIGNS:**

- .1 If signage is requested or required, format, location and quantity of site signs and notices to be approved by Departmental Representative.
- .2 Signs and notices for safety or instruction to be in English language, or commonly understood graphic symbols.
- .3 Maintain signboards, signs and notices for duration of project. Remove and dispose of signs off site when directed by Departmental Representative.
- .4 Remove signs from site at completion of project or as directed by Departmental Representative.

**Part 10 Temporary Barriers and Enclosures**

**10.1 ENCLOSURE OF WORK AREA:**

- .1 Provide temporary dust barriers around work areas where dust or harmful vapours are being generated. Exhaust dust and vapours to exterior.

**Part 11 Cleaning**

**11.1 PROJECT CLEANLINESS:**

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative.
- .3 Provide on-site containers for collection of waste materials and debris.
- .4 Provide and use clearly marked separate bins for recycling. Refer to Section 01 74 21 – Demolition Waste Management And Disposal.
- .5 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

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- .6 Provide adequate ventilation during use of volatile or noxious substances.
  - .7 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
  - .8 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

**11.2 FINAL CLEANING:**

- .1 When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Remove waste products from site.

**Part 12 Closeout Procedures**

**12.1 INSPECTION AND DECLARATION:**

- .1 Contractor's Inspection: Conduct an inspection of Work with all subcontractors, identify deficiencies and defects, and repair as required to conform to Contract Documents.
- .2 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
- .3 Request Departmental Representative's Inspection.

**12.2 INSPECTION:**

- .1 Departmental Representative, Consultant and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.

**12.3 COMPLETION:**

- .1 Submit written certificate that the 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 Work is complete and ready for Final Inspection.

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**12.4 FINAL INSPECTION:**

- .1 When items noted above are completed, request final inspection of Work by Departmental Representative. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

**END OF SECTION**

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**Part 1        General**

**1.1        RELATED SECTIONS**

- .1        Not applicable

**1.2        WORK COVERED BY CONTRACT DOCUMENTS**

- .1        Work of this Contract generally consists of road widening and asphalt overlay for the perimeter roadway and full road construction of the internal fire lane. There are associated minor drainage works to suit the road widen.

**1.3        CONTRACT METHOD**

- .1        Conduct Work under stipulated price (lump sum) contract.
- .2        Relations and responsibilities between Contractor and subcontractors are as defined in Conditions of Contract. Assigned Subcontractors must, in addition:
  - .1        Furnish to Contractor, bonds covering faithful performance of subcontracted work and payment of obligations thereunder when Contractor is required to furnish such bonds to Owner.
  - .2        Purchase and maintain liability insurance to protect from claims for not less than limits of liability which Contractor is required to provide to Owner.

**1.4        WORK BY OTHERS**

- .1        Co-operate with other Contractors in carrying out their respective works and carry out instructions from Consultant.
- .2        Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Consultant in writing, any defects which may interfere with proper execution of Work.

**1.5        EXISTING SERVICES**

- .1        Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2        Carry out work at times as directed by governing authorities with minimum disturbance to vehicular traffic.
- .3        Provide alternative routes for vehicular traffic, as required.
- .4        Temporary services to maintain critical building and tenant systems are not required.

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- .5 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
  - .6 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
  - .7 As part of demolition, all services are to be capped off at property line (where possible) in manner approved by authorities having jurisdiction.
  - .8 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
  - .9 Although power may be provided by the site the Contractor must plan to provide power to be self-sufficient, if necessary.
  - .10 Although potable water may be provided by the site the Contractor must plan to supply potable water to be self-sufficient, if necessary.
  - .11 Site will allow for access to the existing sewer but the Contractor must plan for pumping out the system when necessary.
  - .12 Portable washroom facilities must be supplied by the Contractor.

**1.6 DOCUMENTS REQUIRED**

- .1 Maintain at job site, one copy each document as follows:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Reviewed Shop Drawings.
  - .5 List of Outstanding Shop Drawings.
  - .6 Change Orders.
  - .7 Other Modifications to Contract.
  - .8 Field Test Reports.
  - .9 Copy of Approved Work Schedule.
  - .10 Health and Safety Plan and Other Safety Related Documents.
  - .11 Environmental Protection Plan, relevant environmental permits and other environment related documents.
  - .12 Other documents as specified.

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<b>Part 2</b>	<b>Products</b>
<b>2.1</b>	<b>NOT USED</b>
.1	Not used.

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**Part 3          Execution**

**3.1              NOT USED**

.1          Not used.

**END OF SECTION**

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**Part 1        General**

**1.1        RELATED REQUIREMENTS**

- .1        Not applicable

**1.2        ACCESS AND EGRESS**

- .1        Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

**1.3        USE OF SITE AND FACILITIES**

- .1        Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2        Maintain existing services to building as require to facilitate the Work, and provide for personnel and vehicle access.
- .3        Where security is reduced by work provide temporary means to maintain security.
- .4        Portable washroom facilities must be supplied by the Contractor
- .5        Closures: protect work temporarily until permanent enclosures are completed.

**1.4        ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING**

- .1        Execute work with least possible interference or disturbance to site operations, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

**1.5        EXISTING SERVICES**

- .1        Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2        Provide for pedestrian and vehicular traffic.
- .3        Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

**1.6        SPECIAL REQUIREMENTS**

- .1        Carry out noise generating Work in accordance with applicable Municipal bylaws.



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- .2 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .3 Keep within limits of work and avenues of ingress and egress.
- .4 Deliver materials between 07:00 to 16:00 unless otherwise approved by Departmental Representative.

**1.7 SECURITY**

- .1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.
- .2 Security clearances:
  - .1 Personnel employed on this project will be subject to a security check as outlined in Section 01 14 10 – Security Requirements. Obtain clearance, as instructed, for each individual who will require to enter premises.
  - .2 Obtain requisite clearance, as instructed, for each individual required to enter premises.
  - .3 Personnel will be checked daily at start of work shift and provided with pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.

**1.8 BUILDING SMOKING ENVIRONMENT**

- .1 Comply with smoking restrictions. Smoking is not permitted.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

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**Part 1 Purpose**

- .1 To ensure that both the abatement and demolition project and the institutional operations may proceed without undue disruption or hindrance and that the security of the Institution is maintained at all times.

**Part 2 Definitions**

- .1 "Contraband" means:
  - .1 an intoxicant, including alcoholic beverages, drugs and narcotics
  - .2 a weapon or a component thereof, ammunition for a weapon, and anything that is designed to kill, injure or disable a person or that is altered so as to be capable of killing, injuring or disabling a person, when possessed without prior authorization,
  - .3 an explosive or a bomb or a component thereof,
  - .4 currency over any applicable prescribed limit, \$25.00, and
  - .5 any item not described in paragraphs (a) to (d) that could jeopardize the security of a Penitentiary or the safety of persons, when that item is possessed without prior authorization.
- .2 "Unauthorized smoking and related Items" means all smoking items including, but not limited to, cigarettes, cigars, tobacco, chewing tobacco, cigarette making machines, matches and lighters.
- .3 "Commercial Vehicle" means any motor vehicle used for the shipment of material, equipment and tools required for the abatement/demolition project.
- .4 "CSC" means Correctional Service Canada.
- .5 "Departmental Representative" means Departmental Representative, Warden or Superintendent of the Institution as applicable.
- .6 "Abatement/demolition employees" means persons working for the general contractor, the sub-contractors, equipment operators, material suppliers, testing and inspection companies and regulatory agencies.
- .7 "Departmental Representative" means the Public Works and Government Services Canada representative defined in General Conditions.
- .8 "Perimeter" means the fenced or walled area of the institution that restrains the movement of the inmates.
- .9 "Abatement/demolition limits" means the area, as indicated in the contract documents, that the contractor will be allowed to work". This area may or may not be isolated from the

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security area of the institution. Limits to be confirmed at abatement/demolition start-up meeting.

**Part 3 Preliminary Proceedings**

- .1 At abatement/demolition start-up meeting:
- .2 Discuss the nature and extent of all activities involved in the Project.
- .3 Establish mutually acceptable security procedures in accordance with this instruction and the institution's particular requirements.
- .4 The contractors' responsibilities:
- .5 Ensure that all abatement/demolition employees are aware of the security requirements.
- .6 Ensure that a copy of the security requirements is always prominently on display at the job site.
- .7 Co-operate with institutional personnel in ensuring that security requirements are observed by all abatement/demolition employees.

**Part 4 Contractor Employees**

- .1 Submit to the Departmental Representative a list of the names with date of birth of all employees to be employed on the abatement/demolition site and a security clearance form for each employee.
- .2 Allow 10 working days for processing of security clearances. Employees will not be admitted to the Institution without a valid security clearance in place and a recent picture identification such as a provincial driver's license. Security clearances obtained from other CSC institutions are not valid at this institution except as approved otherwise.
- .3 The Departmental Representative may require that facial photographs may be taken of abatement/demolition employees and these photographs may be displayed at appropriate locations in the institution or in an electronic database for identification purposes. The Departmental Representative may require that these Photo ID cards be provided for all abatement/demolition workers. ID cards will then be left at the designated entrance to be picked up upon arrival at the Institution and be displayed prominently on the abatement/demolition employees clothing at all times while employees are in the institution.
- .4 Entry to Institutional Property will be refused to any person there may be reason to believe may be a security risk.
- .5 Any person employed on the abatement/demolition site will be subject to immediate removal from Institutional Property if they:
  - .1 appear to be under the influence of alcohol, drugs or narcotics.

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- .2 behave in an unusual or disorderly manner.
- .3 are in possession of contraband.

**Part 5 Vehicles**

- .1 All unattended vehicles on CSC property must have windows closed; fuel caps locked, doors and trunks locked and keys removed. The keys must be securely in the possession of the owner or an employee of the company that owns the vehicle.
- .2 The Departmental Representative may limit at any time the number and type of vehicles allowed within the Institution.

**Part 6 Parking**

- .1 The parking area(s) to be used by abatement/demolition employees will be designated by the Departmental Representative. Parking in other locations will be prohibited and vehicles may be subject to removal.

**Part 7 Work Hours**

- .1 In accordance with applicable municipal bylaws and regulations.

**Part 8 Tools and Equipment**

- .1 Store all tools and equipment in approved secure locations.
- .2 Lock all tool boxes when not in use. Keys to remain in the possession of the employees of the contractor.

**Part 9 Contraband**

- .1 Weapons, ammunition, explosives, alcoholic beverages, drugs and narcotics are prohibited on the work site.
- .2 The discovery of contraband on the abatement/demolition site and the identification of the person(s) responsible for the contraband shall be reported immediately to the Departmental Representative.
- .3 Contractors should be vigilant with both their staff and the staff of their sub-contractors and suppliers that the discovery of contraband may result in cancellation of the security clearance of the affected employee. Serious infractions may result in the removal of the company from the project.
- .4 Presence of arms and ammunition in vehicles of contractors, sub-contractors and suppliers or employees of these will result in the immediate cancellation of security clearances for the driver of the vehicle.

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**Part 10 Stoppage of Work**

- .1 The Departmental Representative may request at any time that the contractor, his employees, sub-contractors and their employees not enter or leave the work site immediately due to a security situation occurring within the Institution. The contractor's site supervisor shall note the name of the staff member making the request and the time of the request and obey the order as quickly as possible.
- .2 The contractor shall advise the Departmental Representative within 24 hours of this delay to the progress of the work.

**Part 11 Contact with Inmates**

- .1 Unless specifically authorized, it is forbidden to come into contact with inmates, to talk with them, to receive objects from them or to give them objects. Any employee doing any of the above will be removed from the site and his security clearance revoked.
- .2 It is forbidden to take pictures of inmates, of CSC staff members or of any part of the Institution other than those required as part of this contract.

**END OF SECTION**

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**Part 1        General**

**1.1        RELATED SECTIONS**

- .1    Not applicable

**1.2        ADMINISTRATIVE**

- .1    Project meetings will be scheduled and administered throughout the progress of the work at the call of Departmental Representative.
- .2    Meeting minutes will be recorded by the Contractor and distributed by Departmental Representative, if required.
- .3    Representative of Contractor, Subcontractor and/or suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

**1.3        PRECONSTRUCTION MEETING**

- .1    Departmental Representative will schedule a pre-commencement meeting.
- .2    Departmental Representative, Consultant and Contractor will be in attendance.
- .3    Agenda to include:
  - .1    Appointment of official representative of participants in the Work.
  - .2    Schedule of Work: in accordance with schedule stipulated in Contract Documents.
  - .3    Schedule of submission. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
  - .4    Delivery schedule of specified equipment.
  - .5    Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
  - .6    Owner provided products.
  - .7    Monthly progress claims, administrative procedures, photographs, hold backs.
  - .8    Insurances, transcript of policies.

**1.4        PROGRESS MEETINGS**

- .1    Progress meetings will be held. Departmental Representative will schedule the meetings and arrange for a meeting location.
- .2    Contractor involved in Work, Departmental Representative and Consultant (if required) are to be in attendance.
- .3    Notify parties minimum 5 days prior to meetings.
- .4    Departmental Representative will chair the meeting, and distribute meeting minutes. Contractor will record the meeting minutes and provide within 5 business days.

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- .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 Corrective measures and procedures to regain projected schedule.
  - .6 Revision to construction schedule.
  - .7 Progress schedule, during succeeding work period.
  - .8 Review submittal schedules: expedite as required.
  - .9 Maintenance of quality standards.
  - .10 Review proposed changes for effect on construction schedule and on completion date.
  - .11 Other business.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

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**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1            Not applicable.

**1.2                REFERENCES**

- .1

**1.3                ADMINISTRATIVE**

- .1            Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2            Do not proceed with Work affected by submittal until review is complete.
- .3            Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4            Where items or information is not produced in SI Metric units converted values are acceptable.
- .5            Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6            Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7            Verify field measurements and affected adjacent Work.
- .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            Allow 10 days for Departmental Representative's review of each submission.



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- .3 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .4 After Departmental Representative's review, distribute copies.
- .5 Submit 6 prints and an electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .6 Submit 6 copies and an 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.
- .7 Shop drawings, if required, are to be stamped by a Professional Engineer (P.Eng.) registered in the province of the Work.
- .8 Delete information not applicable to project.
- .9 Supplement standard information to provide details applicable to project.
- .10 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.

**1.5 PHOTOGRAPHIC DOCUMENTATION**

- .1 Submit electronic copies of colour digital photography in “.jpg” format, standard resolution as directed by Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Viewpoints and their location as determined by Departmental Representative.
- .4 Frequency of photographic documentation: as directed by Departmental Representative.
  - .1 Upon completion of Work, and as directed by Departmental Representative.

**1.6 CERTIFICATES AND TRANSCRIPTS**

- .1 Immediately after award of Contract, submit Workers' Compensation Board (WorkSafeBC) status or clearance letter.
- .2 Submit transcription of insurance immediately after award of Contract.

**Products**

**1.7 NOT USED**

- .1 Not Used.

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**Part 2            Execution**

**2.1                NOT USED**

.1                Not Used.

**END OF SECTION**

**Mastqui Institution – Abbotsford, BC  
Road Revitalization****Part 1       References**

- .1   Government of Canada:
  - .1    Canada Labour Code - Part II.
  - .2    Canada Occupational Health and Safety Regulations.
- .2   American National Standards Institute (ANSI):
  - .1    ANSI A10.3-2006, – Safety Requirements for Powder-Actuated Fastening Systems A
  - .2    ANSI for Construction and Demolition Operations
- .3   Canadian Standards Association (CSA):
  - .1    CSA Z797-2009 Code of Practice for Access Scaffold.
- .4   HRSDC Fire Protection Engineering Section:
  - .1    FCC No. 301-1982, Standard for Construction Operations.
- .5   National Building Code of Canada (NBCC 2005):
  - .1    Part 8, Safety Measures at Construction and Demolition Sites
- .6   Province of British Columbia Building Code (2006):
  - .1    Part 8, Safety Measures at Construction and Demolition Sites.
- .7   Province of British Columbia:
  - .1    Workers Compensation Act Part 3 - Occupational Health & Safety.
  - .2    Occupational Health & Safety Regulations.

**Part 2       Related Sections**

- .1   Section 01 01 50 – General Instructions
- .2   Section 01 33 00 – Submittal Procedures
- .3   Section 01 51 00 – Temporary Utilities
- .4   Section 01 56 00 – Temporary Barriers and Enclosures

**Part 3       Workers' Compensation Board Coverage**

- .1   Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.
- .2   Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

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- .1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.
- .2 It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

**Part 5 Submittals**

- .1 Make submittals in accordance with Section 01 01 50 General Instructions and 01 33 00 Submittal Procedures.
- .2 Submit the following:
  - .1 Health and Safety Plan.
  - .2 Copies of reports or directions issued by federal and provincial health and safety inspectors.
  - .3 Copies of incident and accident reports.
  - .4 Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
  - .5 Emergency Procedures.
- .3 The Departmental Representative will review the Contractor's site-specific project Health and Safety Plan and emergency procedures, and provide comments to the Contractor within 5 days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative for review.
- .4 Medical surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of work, and submit additional certifications for any new site personnel to Departmental Representative.
- .5 Submission of the Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:
  - .1 Be construed to imply approval by the Departmental Representative.
  - .2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.
  - .3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

**Part 6 Responsibility**

- .1 Assume responsibility as the Prime Contractor for work under this contract and appoint a qualified coordinator for the purpose of ensuring the coordination of health and safety

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activities for the location in accordance with sections 118 and 119 of Part 3 of the Workers Compensation Act.

- .2 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .3 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

**Part 7 Health and Safety Coordinator**

- .1 The Health and Safety Coordinator (Registered Occupational Hygienist, Certified Industrial Specified Hygienist, Canadian Registered Safety Professional or other WorkSafe BC Recognized Qualified Person) must:
  - .1 Be responsible for completing all health and safety training, and ensuring that personnel that do not successfully complete the required training are not permitted to enter the site to perform work.
  - .2 Be responsible for implementing, daily enforcing, and monitoring the site-specific Health and Safety Plan.
  - .3 Be on site during execution of work.

**Part 8 General Conditions**

- .1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.
- .2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.
  - .1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.
  - .2 Secure site after working hours in accordance with Section 01 14 10 – Security Requirements.

**Part 9 Project/Site Conditions**

- .1 Work at site will involve:
  - .1 Working in areas/properties adjacent to a CSC institution.

**Part 10 Regulatory Requirements**

- .1 Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site.

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- .2 In event of conflict between any provisions of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Departmental Representative will advise on the course of action to be followed.

**Part 11 Filing of Notice**

- .1 Submit a Notice of Project, form 52E49, to WorkSafeBC in accordance with OH&S Regulation 20.2, at least 24 hours before start of work.
- .2 Submit copy to Departmental Representative.

**Part 12 Health and Safety Plan**

- .1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.
- .2 Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:
  - .1 Primary requirements:
    - .1 Contractor's safety policy.
    - .2 Identification of applicable compliance obligations.
    - .3 Definition of responsibilities for project safety/organization chart for project.
    - .4 General safety rules for project.
    - .5 Job-specific safe work, procedures.
    - .6 Inspection policy and procedures.
    - .7 Incident reporting and investigation policy and procedures.
    - .8 Occupational Health and Safety Committee/Representative procedures.
    - .9 Occupational Health and Safety meetings.
    - .10 Occupational Health and Safety communications and recordkeeping procedures.
  - .2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.
  - .3 List hazardous materials to be brought on site as required by work.
  - .4 Indicate engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.
  - .5 Identify personal protective equipment (PPE) to be used by workers.
  - .6 Identify personnel and alternates responsible for site safety and health.
  - .7 Identify personnel training requirements and training plan, including site orientation for new workers.
- .3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.

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- .4 Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.
- .5 Departmental Representative's review: the review of Health and Safety Plan by Public Works and Government Services Canada (PWGSC). PWGSC's review shall not relieve the Contractor of responsibility for errors or omissions in final Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract documents.

**Part 13 Emergency Procedures**

- .1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:
  - .1 Designated personnel from own company.
  - .2 Regulatory agencies applicable to work and as per legislated regulations.
  - .3 Local emergency resources.
  - .4 Departmental Representative.
- .2 Include the following provisions in the emergency procedures:
  - .1 Notify workers of the nature and location of the emergency.
  - .2 Evacuate all workers safely.
  - .3 Check and confirm the safe evacuation of all workers.
  - .4 Notify the fire department or other emergency responders.
  - .5 Notify adjacent workplaces which may be affected if the risk extends beyond the workplace.
  - .6 Notify Departmental Representative.
- .3 Provide written rescue/evacuation procedures as required for, but not limited to:
  - .1 Work at high angles.
  - .2 Work in confined spaces or where there is a risk of entrapment.
  - .3 Work with hazardous substances.
  - .4 Underground work.

**Part 14 Hazardous Products**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labeling and provision of Material Safety Data Sheets (MSDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.
- .2 Where use of hazardous and toxic products cannot be avoided:
  - .1 Advise Departmental Representative beforehand of the product(s) intended for use.
  - .2 Submit applicable MSDS and WHMIS documents in accordance with clause 5.2.4.

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- .1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.
  - .1 Before undertaking any work, coordinate required energizing and de-energizing of new and existing circuits with Departmental Representative.
  - .2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.

**Part 16 Electrical Lockout**

- .1 Where required, develop, implement and enforce use of established procedures to provide electrical lockout and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.
- .2 Where required, prepare the lockout procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have procedures available for review upon request by the Departmental Representative.
- .3 Keep the documents and lockout tags at the site and list in a log book for the full duration of the Contract. Upon request, make such data available for viewing by Departmental Representative or by any authorized safety representative.

**Part 17 Overloading**

- .1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

**Part 18 Powder-Actuated Devices**

- .1 Use powder-actuated devices in accordance with ANSI A10.3 only after receipt of written permission from the Departmental Representative.

**Part 19 Fire Safety and Hot Work**

- .1 Obtain Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.
- .2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.



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- .1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
- .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

**Part 21 Fire Protection and Alarm System**

- .1 Do not use fire hydrants for purposes other than firefighting.
- .2 Be responsible/liable for costs incurred from the fire department and the Departmental Representative, resulting from false alarms.

**Part 22 Unforeseen Hazards**

- .1 Should any unforeseen or peculiar safety-related factor, hazard or condition become evident during performance of the work, immediately stop work and advise the Departmental Representative verbally and in writing.

**Part 23 Posted Documents**

- .1 Post legible versions of the following documents on site:
  - .1 Health and Safety Plan.
  - .2 Sequence of work.
  - .3 Emergency procedures.
  - .4 Site drawing showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.
  - .5 Notice of Project.
  - .6 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.
  - .7 Workplace Hazardous Materials Information System (WHMIS) documents.
  - .8 Material Safety Data Sheets (MSDS).
  - .9 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.
- .2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.
- .3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.

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**Part 24 Meetings**

- .1 Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.

**Part 25 Correction of Non-Compliance**

- .1 Immediately address health and safety non-compliance issues identified by the Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.
- .3 The Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The Contractor will be responsible for any costs arising from such a "stop work order".

**END OF SECTION**

## **PART 1 GENERAL**

### **1.1 PURPOSE**

- .1 To provide the general requirements for control of erosion and sediment.
- .2 It is not intended that this section identify all and/or specific requirements.
- .3 This section must be read in conjunction and interpreted simultaneously with all sections and Drawings pertinent to the Work of this Contract.

### **1.2 EROSION & SEDIMENTATION CONTROL OBJECTIVES**

- .1 Erosion and Sedimentation Control (ESC) objectives are as follow:
  - .1 Minimize the disturbance of existing vegetation and soil on the site.
  - .2 Prevent the loss of soil from the site (including topsoil stockpiled for reuse) resulting from storm water runoff, wind erosion and construction activities.
  - .3 Prevent the sedimentation of or discharge of sediment to creeks, streams, ditches, drainage courses or other receiving waters.
  - .4 Prevent pollution of the air with dust and particulate matter.

### **1.3 DESCRIPTION OF WORK**

- .1 Temporary Erosion and Sediment Control: includes the installation and maintenance of temporary structural control measures as required or specified to reduce or eliminate the erosion of soil and transport of sediment. This may include, but not be limited to, silt fences, ditch checks, sediment basins, erosion control blankets, stabilized construction entrance, temporary diversions, inlet protection, sediment traps, slope drains, wheel wash and detention tanks.
- .2 Dust Control: includes the management of operations and the application of water or dust palliatives in order to reduce or eliminate the spread of dust from the site.
- .3 Conduct site activities so as to not compromise installed ESC measures and facilities.
- .4 Install additional ESC measures and facilities as required for Work that is not covered by ESC measures and facilities already in place.
- .5 Monitor the condition of the ESC facilities and measures and maintain ESC facilities and measures in proper operating condition.

### **1.4 MEASUREMENT PROCEDURES**

- .1 Payment shall be at the Contract Price for the related work item for supply and installation of erosion and sediment control facilities and measures, including but limited to monitoring, testing, maintenance and repairs, off-site disposal of removed sediments

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and removal and/or decommissioning and all other incidental work and shall be all inclusive.

**PART 2 PRODUCTS****2.1 MATERIALS**

- .1 Silt fence:
- .1 Manufactured from woven geotextile material with a shiny to smooth surface texture designed to reduce velocity of run-off to point that suspended particles settle out due to reduction of hydraulic energy.
  - .2 The geotextile shall be free of any treatment or coating which might adversely alter its physical properties after installation.
  - .3 Geotextile rolls shall be furnished with suitable wrapping for protection against moisture and extended ultraviolet exposure prior to placement. Each roll shall be labeled or tagged to provide product identification sufficient for inventory and quality control purposes.
  - .4 Acceptable Products:
    - .1 Nilex - Amoco 2130;
    - .2 Layfield Silt Fence (SF 135) with wire back; or
    - .3 Equivalent products acceptable to Departmental Representative.
  - .5 Minimum Requirements:

Property	Test Method	Geotextile Requirements
Maximum post spacing (m)	ASTM D 4632	2
Elongation	ASTM D 4632	<50%
Grab Strength (N)	ASTM D 4632	
Machine direction		550
X-Machine direction		450
Permittivity (sec <sup>-1</sup> )	ASTM D 4491	0.05
Apparent Opening Size (mm)	ASTM D 4751	0.60 max. avg. roll value
Ultraviolet stability (% retained strength)	ASTM D 4355	70% after 500 hrs. of exposure
Above values are "Minimum Average Roll Values" on the weaker principal direction.		

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- .6 Apply in accordance with manufacturer's instructions and recommended rates.
- .2 Mulching:
  - .1 Organic Mulches shall be free of disease and noxious weeds.
  - .2 Pine needles, compost of straw manure and peat moss not be permitted.
  - .3 Chemical mulches complete with tackifier shall be applied in accordance with manufacturer's instructions and application rates suitable to slope and soil conditions.
- .3 Chemical Mulching:
  - .1 Terra-Wood with tacking Agent 3;
  - .2 Terra-Mulch Cellulose with Tacking Agent 3; or
  - .3 Equivalent products acceptable to Departmental Representative.
- .4 Check Dams:
  - .1 Rip Rap
    - .1 Hard durable quarry stone with relative density (formally specific gravity) not less than 2.65, free from seams, cracks or other structural defects, to meet the following grain size distribution:

Class of Rip Rap (kg)	Nominal Thickness of Rip Rap (mm)	Rock Gradation Percentage Smaller Than Given Rock Mass (kg)		
		15%	50%	85%
10	350	1	10	30
25	450	2.5	25	75

- .2 Approximate average dimensions shall be:

Class of Rip Rap (kg)	Approximate Average Dimension (mm)		
	15%	50%	85%
10	90	195	280
25	120	260	380

- .2 Manufactured:
  - .1 "Geo Ridge" 'A' Shaped Permeable Dams by Nilox complete with all anchoring hardware;

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- .2 EnviroBerm ® by Cascade Geotechnical Inc. with all anchoring hardware; or
  - .3 Equivalent products acceptable to the Departmental Representative.
- .5 Water:
- .1 Apply water to the construction site as appropriate to reduce or eliminate the spread of dust outside of the Project limits.
  - .2 Apply water at the rate of 4 to 8 litres per m<sup>2</sup> of roadbed and disturbed areas.
  - .3 Provide all necessary equipment and materials for dust control and maintenance.

## **PART 3 EXECUTION**

### **3.1 GENERAL**

- .1 Install and maintain erosion and sediment control facilities and measures in accordance with Erosion and Sediment Control plan prepared by the Contractor's Environmental Consultant.
- .2 Minimize the amount of disturbed land that is susceptible to erosion. Ensure that areas outside the limits of construction are clearly defined and protected for all construction activities.
- .3 Install erosion control facilities and measures at the earliest practical time and within one day after soil is disturbed;
- .4 Provide immediate permanent or temporary measures to prevent discharge of sediment to creeks, streams, drainage courses, ditches or other receiving waters.
- .5 Install the appropriate erosion and sediment control measures in accordance with sequence of construction approved for the Work. Schedule and perform clearing, stripping and grubbing operations so that grading operations and permanent erosion control features can follow immediately thereafter.
- .6 Monitor erosion and sediment control facilities and measures on a weekly basis and immediately following a significant rain event. If a facility or measure has been reduced in capacity by 50 percent or more, restore such facility or measure to original condition within a schedule approved by the Departmental Representative.
- .7 A significant rain event equates to a precipitation event that meets or exceeds 25mm of total rainfall depth within a 24 hour period as measured at the rain gauge nearest to the project site.
- .8 If sediment is deposited outside the limits of the site, remove the sediment from the location(s) in which it is deposited within 24 hours of the occurrence.

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Mechanically sweep (NOT FLUSH) roadways or haul routes to the site on a daily basis and the conclusion of and provide dust control measures.

**3.2 SILT CONTROL MEASURES**

- .1 Silt Fences
  - .1 Place silt barrier in a manner that will intercept runoff at or close to right angles to flow.
  - .2 Position posts in a manner such that fence fabric remains naturally taut. Posts to always be positioned downstream.
  - .3 Where silt fence is placed within or at the bottom of a slope, turn the ends of the silt fence slightly upslope in "J" configuration to ensure flow does not bypass end of silt fence.

**3.3 STABILITY MEASURES**

- .1 Mulching
  - .1 Apply mulching strictly in accordance with manufacturer's instructions.
  - .2 Install as required by Erosion and Sediment Control Plan prepared by Contractor's Environmental Consultant

**3.4 CLEAN-UP & REMOVAL**

- .1 Upon completion of the Work, when erosion and sedimentation controls are no longer required, as determined by the Departmental Representative , remove all such temporary erosion and sedimentation controls and clean up and restore areas.

**END OF SECTION**

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**Part 1            General**

**1.1                RELATED SECTIONS**

- .1    Not applicable.

**1.2                REFERENCES**

- .1    Not applicable.

**1.3                PROJECT CLEANLINESS**

- .1    Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Departmental Representative or other Contractors.
- .2    Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .3    Clear snow and ice from access to building, if necessary.
- .4    Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5    Provide on-site containers for collection of waste materials and debris.
- .6    Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Demolition Waste Management and Disposal.
- .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. Use of building ventilation systems is not permitted for this purpose.
- .10   Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

**1.4                FINAL CLEANING**

- .1    When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2    Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3    Prior to final review remove surplus products, tools, construction machinery and equipment.



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- .4 Remove all waste products and debris.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .8 Clean and sweep areaways and sunken wells.
- .9 Sweep and wash clean paved areas.

**1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Demolition Waste Management and Disposal

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

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- Part 1            General**
- 1.1            RELATED REQUIREMENTS**
- .1            Not applicable.
- 1.2            REFERENCES**
- .1            Not applicable.
- 1.3            ADMINISTRATIVE REQUIREMENTS**
- .1            Acceptance of Work Procedures:
- .1            Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
- .1            .1            Notify Departmental Representative or Consultant in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
- .2            .2            Request Departmental Representative/Consultant's inspection.
- .2            Departmental Representative/Consultant's Inspection:
- .1            .1            Departmental Representative/Consultant and Contractor to inspect Work and identify defects and deficiencies.
- .2            .2            Contractor to correct Work as directed.
- .3            .3            Completion Tasks: submit written certificates in English that tasks have been performed as follows:
- .1            .1            Work: completed and inspected for compliance with Contract Documents.
- .2            .2            Defects: corrected and deficiencies completed.
- .3            .3            Equipment and systems: tested and fully operational.
- .4            .4            Underground / Aboveground storage tank inspection documentation, registration, forms, decommissioning and removal in accordance with CEPA SOR/2008-197, if applicable.
- .5            .5            Work: complete and ready for final inspection.
- .4            .4            Final Inspection:
- .1            .1            When completion tasks are done, request final inspection of Work by Departmental Representative, Consultant, and Contractor.
- .2            .2            When Work incomplete according to Departmental Representative, Consultant, complete outstanding items and request re-inspection.
- .5            .5            Final Payment:
- .1            .1            When Departmental Representative and Consultant consider final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
- 1.4            FINAL CLEANING**
- .1            .1            Clean in accordance with Section 01 74 11 - Cleaning.
- .1            .1            Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2            .2            Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Demolition Waste Management and Disposal

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**Part 2            Products**

**2.1                NOT USED**

.1                Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1                Not Used.

**END OF SECTION**

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**Part 1            General****1.1            SCOPE OF WORK**

- .1        This section relates to civil concrete work, relevant to external concrete slabs and cast-in-place concrete associated with subsurface utility works.

**1.2            RELATED SECTIONS**

- .1        Section 01 33 00 - Submittal Requirements

**1.3            REFERENCES**

- .1        ASTM International
  - .1        ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
  - .2        ASTM D260-86(2001), Standard Specification for Boiled Linseed Oil.
  - .3        ASTM D1751-04, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non extruding and Resilient Bituminous Types).
- .2        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound.
- .3        CSA International
  - .1        CSA-A23.1/A23.2-2004, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2        CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
  - .3        CAN/CSA-G30.18-M92(R2002), Billet-Steel Bars for Concrete Reinforcement.

**1.4            ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

**1.5            QUALITY ASSURANCE**

- .1        Provide to Departmental Representative, 4 weeks minimum prior to starting concrete work, valid and recognized certificate from plant delivering concrete.
  - .1        Quality Control Plan (QCP): provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements. The QCP is to include details of the sampling and testing of concrete in compliance with CSA-A23.1. The results of all testing are to be furnished to the Departmental Representative.

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**1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Delivery and Acceptance Requirements:
  - .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
- .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

**Part 2 Products****2.1 DESIGN CRITERIA**

- .1 Alternative 1 - Performance: to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.

**2.2 PERFORMANCE CRITERIA**

- .1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

**2.3 MATERIALS**

- .1 Cement: to CSA A3001.
- .2 Water: to CSA A23.1/A23.2.
- .3 Premoulded joint filler:
  - .1 Bituminous impregnated fibreboard: to ASTM D1751.
- .4 Joint sealer/filler: grey to CAN/CGSB-19.24, Type 1, Class B.
- .5 Sealer: boiled linseed oil to ASTM D260, mixed with mineral spirits 1:1 proprietary poly-siloxane resin blend.
- .6 Supplementary and other concrete materials: to CSA A23.1/A23.2.

**2.4 MIXES**

- .1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
  - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in PART 3 – FIELD QUALITY CONTROL.
  - .2 Intended application: Surface slabs and exposed site concrete.
    - .1 Uniformity and workability: free of surface blemishes, loss of mortar, colour variations, segregation.
    - .2 Durability and class of exposure: C-2.
    - .3 Compressive strength at 28 days: 32 MPa minimum.

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- .4 Nominal maximum aggregate size 20 mm.
  - .3 Intended application: Subsurface civil works.
    - .1 Uniformity and workability: free of loss of mortar, segregation.
    - .2 Durability and class of exposure: C-4.
    - .3 Compressive strength at 28 days: 25 MPa minimum.
    - .4 Nominal maximum aggregate size 28 mm.
    - .5 For cast-in-place manhole bases achieve reduced permeability in the long term.
  - .4 Concrete supplier's certification required.
  - .5 Provide quality management plan to ensure verification of concrete quality to specified performance.

**Part 3 Execution****3.1 PREPARATION**

- .1 Provide Departmental Representative 24 hours notice before each concrete pour.
- .2 During concreting operations:
  - .1 Development of cold joints not allowed.
  - .2 Ensure concrete delivery and handling facilitates placing with minimum of rehandling, and without damage to existing structure or Work.
- .3 Protect previous Work from staining.
- .4 Clean and remove stains prior to application of concrete finishes.

**3.2 INSTALLATION/APPLICATION**

- .1 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.
- .2 Sleeves and inserts:
  - .1 Cast in sleeves, ties, slots, anchors, reinforcement, frames, conduit, bolts, waterstops, joint fillers and other inserts required to be built-in.
  - .2 Sleeves and openings greater than 100 mm x 100 mm not indicated, must be reviewed by Departmental Representative.

**3.3 FINISHES**

- .1 Formed surfaces exposed to view: in accordance with CSA A23.1/A23.2, unless specified otherwise.
- .2 Surface slabs and exposed site concrete:
  - .1 Screed to plane surfaces and using aluminum, magnesium or wood floats.
  - .2 Provide round edges and joint spacings using standard tools.

- 
- .3 Trowel smooth to provide lightly brushed non-slip finish, unless specified otherwise.

**3.4 CONTROL JOINTS**

- .1 Form control joints in surface slabs as indicated, to CSA A23.1/A23.2 and install specified joint sealer/filler.

**3.5 EXPANSION AND ISOLATION JOINTS**

- .1 Install premoulded joint filler in expansion and isolation joints full depth of surface slabs flush with finished surface to CSA A23.1/A23.2.

**3.6 CURING**

- .1 Use curing compounds compatible with applied finish on concrete surfaces free of bonding agents and to CSA A23.1/A23.2.

**3.7 SEALING APPLICATION**

- .1 Surface slabs: After curing is complete, apply poly-siloxane resin blend sealer at 4 m<sup>2</sup>/L.

**3.8 FIELD QUALITY CONTROL**

- .1 Concrete testing: to CSA A23.1/A23.2 by independent testing laboratory. Accelerated test methods will apply.

**3.9 CLEANING**

- .1 Use trigger operated spray nozzles for water hoses.
- .2 Designate cleaning area for tools to limit water use and runoff.

**END OF SECTION**

**Part 1        General****1.1        REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C88, Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.
  - .2 ASTM C136, Method for Sieve Analysis of Fine and Coarse Aggregate.
  - .3 ASTM C117, Test Method for Material Finer than 0.075 mm Sieve in Mineral Aggregates by Washing.
  - .4 ASTM D1557, Specification for Test Methods for Aggregate Mixtures using 10 lb (4.54 kg) Rammer and 18 inch (457 mm) Drop.
  - .5 ASTM D698, Standard Test Methods for Moisture Density Relations of Soils and Soil Aggregate Mixtures using 2.49 kg Rammer and 304.8 mm Drop.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction.

**1.2        RELATED SECTIONS**

- .1 Section 01 57 14 – Erosion Sedimentation Control Measures
- .2 Section 01 33 00 - Submittal Requirements
- .3 Section 32 12 16.02 – Asphalt Paving for Building Sites
- .4 Section 33 05 13 – Manholes and Catch Basin Structures

**1.3        SCOPE OF WORK**

- .1 General site clearing, grubbing and topsoil stripping.
- .2 Civil Engineering cut, fill, asphalt and concrete removals, trenching and grading work exceeding 1m beyond the building footprint inclusive of:
  - .1 Excavating, trenching and backfill for utility services and buried installations.
  - .2 General site grading
  - .3 Topsoil restoration in re-graded landscaped areas
  - .4 Sub-grading below paved areas
- .3 Exclusions to scope of this specification:
  - .1 Earthworks inside a perimeter drawn 1m beyond the building and foundations footprint.



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**1.4 REGULATIONS**

- .1 Shore and brace excavations, protect slopes and banks and perform all work in accordance with Provincial and Municipal regulations whichever is more stringent.
- .2 Do not begin backfilling or filling operations until material has been approved for use by the Departmental Representative.
- .3 Not later than 48 hours before backfilling or filling with approved material, notify the Departmental Representative so that compaction tests can be carried out by designated testing agency.
- .4 Before commencing work, conduct, with the Departmental Representative, condition survey of existing structures, trees and other plants, lawns, fencing, service poles, wires, rail tracks and paving, survey bench marks and monuments which may be affected by work.

**1.5 TESTS AND INSPECTIONS**

- .1 The contractor shall retain, at his own cost, the services of an independent and certified testing agency to undertake soil and granular material tests at the following minimum frequencies / intervals:
  - .1 Sieve Analysis prior to commencing and 1 every 200 tonnes on:
    - .1 All materials referred to in item 2.1 of this Section 31 00 99 (Earthworks for Minor works)
    - .2 Base and sub-base materials referred to in Section 2.1.1 of Section 32 12 16.03 (Gravel Vehicular Accesses).
  - .2 Modified Proctor Analysis on all materials for which density tests are specified below, prior to commencing and 1 every 200 tonnes.
  - .3 Density Tests on placed and compacted soils and granular materials, for which the results are to be expressed as a percentage of Modified Proctor Density, as follows:
    1. Stripped and compacted subgrade: Density tests at 1 per 500 m<sup>2</sup> or part thereof.
    2. Compacted fill below paved areas and sidewalk: Density tests at 1 per 500 m<sup>2</sup> or part thereof.
    3. Base and Sub-base granular: Density tests at 1 per 500 m<sup>2</sup> or part thereof.  
Note: For all other specification details for base and sub-base granular material please refer to Section 32 12 16.02 - Asphalt Paving for Building Sites.
    4. Compacted trench backfill (trenches up to 1.5m depth): Density tests at 1 per 30 lin.m or part thereof.; just below road subgrade.

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5. Compacted trench backfill (trenches exceeding 1.5m depth): Density tests at 2 per 30 lin.m or part thereof.; one at half height and one just below road subgrade.
  3. The Contractor shall cooperate with the Departmental Representative in the selection of test samples. Copies of the test results shall be forwarded to Departmental Representative.
  4. The Contractor is responsible for ensuring all materials meet specifications. Where initial tests fail and subsequent testing is deemed necessary by the Departmental Representative, the cost of the subsequent testing will be the responsibility of the Contractor.
  5. In addition to sample testing, the Contractor will undertake proof rolling of subgrade, subbase and base granular surfaces as required and in the presence of the Departmental Representative and / or the Geotechnical Consultant, for which a minimum of 48 hours notice shall be provided by the Contractor.

**1.6 BURIED SERVICES**

- .1 Before commencing work verify the location of all buried services on and adjacent to the site.
- .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work. Pay costs of relocating services.
- .3 Remove obsolete buried services within 2 m of foundations. Cap cut-offs.

**1.7 PROTECTION**

- .1 Protect excavations from freezing.
- .2 Keep excavations clean, free of standing water, and loose soil.
- .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to the Departmental Representative's approval.
- .4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
- .5 Protect all active buried services. Assume all services to be active unless:
  - .1 Stated otherwise in contract documents;
  - .2 Confirmed otherwise by contractor's own investigations in consultation with Departmental Representative.
- .6 Repair at contractor's own cost damage to existing structures or services resulting from the contractor's failure to locate and protect.
- .7 Avoid mixing excavated materials. Protect the condition and suitability of native soil and topsoil materials stockpiled for re-use.

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**Part 2            Products****2.1                MATERIALS**

- .1        Imported granular material to be composed of inert, durable material, reasonably uniform in quality and free from soft or disintegrated particles. In absence of satisfactory performance records over a five year period for particular source of material, soundness to be tested according to ASTM test procedure C-88 or latest revised issue. Maximum weight average losses for course and fine aggregates to be 30% when magnesium sulphate is used after five cycles.
- .2        Imported crushed granular material when tested according to ASTM C-136 and ASTM C-117, or latest revised issue, to have a generally uniform gradation, conform to following sieve grading and have one or more fractured faces. Determination of the Ministry of Transportation and Highways' Specification I-11, Fracture Count for Coarse Aggregate, Method "A", which determines fractured faces by count. The Plasticity Index for crushed gravel to not exceed 6.0.
- .3        Native material to be any workable soil free of organic or foreign matter; any material obtained within limits of Contract may be deemed native material for purposes of payment if it is approved by the Departmental Representative. Native material is not acceptable if it is impracticable to control its water content or compact to specified density.

**Part 3            Execution****3.1                SITE PREPRATION**

- .1        Remove obstructions, ice and snow, from surfaces to be excavated and / or re-graded.
- .2        Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

**3.2                CLEARING AND GRUBBING**

- .1        Remove trees, stumps, logs, brush, shrubs, bushes, vines, undergrowth, rotten wood, dead plant material, exposed boulders and debris within areas to be excavated, covered with new construction or re-graded.
- .2        Remove stumps and tree roots below footings, slabs, and paving, and to not less than 200 mm below finished grade elsewhere.
- .3        Dispose of cleared and grubbed material off site daily to disposal areas acceptable to authority having jurisdiction.

**3.3                EXCAVATION**

- .1        Topsoil stripping
  - .1        Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.

- 
- .2 Strip topsoil over areas to be excavated, areas to be covered by new construction, areas where grade changes are required, and so that excavated material may be stockpiled without covering topsoil.
  - .3 Topsoil to be stored for re-use in stockpiles not exceeding 1.5m high in location designated by the Departmental Representative.
  - .4 Should insufficient quantity of native topsoil be available for restoring landscaped areas, due to inappropriate handling or storage of topsoil by contractor, the contractor shall import the required balance at his own cost, ensuring imported material is equal or better than native material.
  - .5 Avoid mixing topsoil with subsoil.
- .2 Excavate as required to carry out work, in all materials met. Do not disturb soil or rock below bearing surfaces. Notify the Departmental Representative when excavations are complete and obtain Departmental Representative's approval before proceeding further. If bearings are unsatisfactory, additional excavation will be authorized in writing and paid for as additional work. Excavation taken below depths shown without Departmental Representative's written authorization to be filled with concrete of same strength as for footings at Contractor's expense.
  - .3 Temporary excavations for service trenches and building areas deeper than 1.2m requiring worker entry should be sloped/shored in accordance with Workers' Compensation Board regulations, or as directed on site by a qualified professional engineer. Flatter cut slope inclinations may be required if heavy groundwater seepage is encountered or if the temporary excavations will be open during periods of high precipitation.
  - .4 Dewatering may be required, especially if the excavation is carried out during wet weather. The contractor should protect open excavations against flooding and damage from surface runoff. Select dewatering methods based on site conditions and construction techniques, disposing of water in accordance with Environmental procedures via flocculation tanks, settling basins or other treatment facilities to remove suspended solids or other contaminants before discharging to storm sewers. Avoid discharge to permanent existing or proposed soakaways without written approval of the Departmental Representative.
  - .5 Excavate trenches to provide uniform continuous bearing and support for 100 mm thickness of pipe bedding material on solid and undisturbed ground. Trench widths below point 300 mm above pipe not to exceed diameter of pipe plus 600 mm.
  - .6 Excavate for slabs and paving to subgrade levels. In addition, remove all topsoil, organic matter, debris and other loose and harmful matter encountered at subgrade level.
  - .7 For trench excavation, unless otherwise authorized by the Departmental Representative in writing, do not excavate more than 30m of trench in advance of installation operations and do not leave open more than 15m at the end of the day's operation.
  - .8 Keep excavated and stockpiled materials a safe distance away from edge of trench. Restrict vehicle operations directly adjacent to open trenches.
  - .9 Avoid mixing different excavated subsoils.

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**3.4 BACKFILLING / FILLING**

- .1 Inspection: do not commence backfilling until fill material and spaces to be filled have been inspected and approved by the Departmental Representative.
- .2 Remove snow, ice, construction debris, organic soil and standing water from spaces to be filled.
- .3 Lateral support: maintain even levels of backfill around structures as work progresses, to equalize earth pressures.
- .4 Compaction: place backfill / fill in uniform lifts not exceeding 150mm and compact to following Modified Proctor densities in compliance with ASTM D1557. (All densities in compliance with ASTM D1557).
  - .1 Below boulevards, easements and landscaped areas to minimum 90%
  - .2 Below and within 1:1 sloping zone of influence of ground-bearing structures, roads, driveways, shoulders, re-shaped ditches, parking areas, patios, paved areas and sidewalks to minimum 95%.
  - .3 Use caution in pipe zone to ensure no damage to pipe.
- .5 Under areas to be top-soiled: use compliant native material up to bottom of topsoil.
- .6 Blown rock material, not capable of fine grading, is not acceptable, imported material must be placed on this type of material.
- .7 Do not proceed with backfilling operations until Departmental Representative has inspected and approved installations.
- .8 During backfilling / filling and compaction, compact each layer before placing succeeding layer.
- .9 Backfilling around installations:
  - .1 Place bedding and surround material as specified elsewhere.
  - .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing concrete.
  - .3 Place layers simultaneously on both / all sides of installed work to equalize loading.

**3.5 CONTAMINATED MATERIALS**

- .1 If contaminated materials are detected during excavation operations, immediately notify the Departmental Representative. Any contaminated materials to be disposed of using methods approved by the Departmental Representative.

**3.6 GRADING**

- .1 Following clearing and topsoil stripping excavate to rough grade any areas requiring cut.
- .2 Proof roll exposed sub-grade. Excavate soft spots encountered and backfill with permitted materials in maximum 150mm lifts with compaction to specified density.
- .3 Before placing fill in areas requiring fill, scarify surface to depth of 150mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.

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- .4 In areas requiring fill, raise elevations in permitted materials in maximum 150mm lifts with compaction to specified density.
  - .5 Employ the preceding operations to achieve rough grading to design elevations allowing for depth of pavement structure, topsoil or other surface treatment as indicated. Grade slopes to be consistent and smooth between finished spot elevations shown on drawings. Tolerance on sub-grade elevations is within 30mm of design elevations but not uniformly high or low.
  - .6 Slope rough grade away from building at 2% minimum (unless indicated otherwise).
  - .7 Do not disturb soil within branch spread of trees and shrubs to remain.

### **3.7 RESTORATION – TOPSOILED AREAS**

- .1 Prepare subgrade as detailed above and verify that all grades are correct.
- .2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .3 remove debris, roots, branches, stones in excess of 50mm diameter and other deleterious materials. Remove soil contaminated with calcium chloride, toxic materials and petroleum products. Remove debris which protrudes more than 75mm above surface. Dispose of removed material to appropriately licensed off-site disposal area.
- .4 Coarse cultivate entire area which is to receive topsoil to a minimum depth of 150mm immediately before placing topsoil. Cross cultivate areas where equipment used for hauling and spreading has compacted soil.
- .5 When sub-grade accepted by Departmental Representative, commence placing topsoil.
- .6 Place topsoil over prepared subgrade and allow to settle or compact by light rolling such that it is firm against deep footprints. Do not compact topsoil more than is necessary to meet this requirement.
- .7 Ensure topsoil is moist (25% to 75% of field capacity) but not wet when placed, and do not handle if frozen or so wet that its structure will be altered.
- .8 Manually spread topsoil around trees, shrubs and obstacles.
- .9 Fine grade topsoil after placing to specified elevations and contours. Re-grade rough spots and low areas to ensure positive surface drainage.
- .10 Finish surface smooth, uniform, firm against deep footprinting with a fine loose surface texture. Grass seed restored and repaired topsoiled areas.

### **3.8 RESTORATION - GENERAL**

- .1 Upon completion of work, remove waste materials and debris, trim slopes, and correct defects as directed by the Departmental Representative.
- .2 Reinstate pavement, sidewalks and grass-block areas in layers, materials, densities and to lines and elevations which existed before excavation, in all cases providing smooth transition to adjacent paved areas.
- .3 Clean all affected surfaces.

- .4 Scarify and loosen topsoil in areas used for storage, haulage, machinery and the like.

**3.9 SHORTAGE AND SURPLUS**

- .1 Supply all necessary fill to meet backfilling and grading requirements.
- .2 Dispose of surplus material off site.

**END OF SECTION**

## PAVEMENT CRACK CLEANING AND FILLING

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**PART 1 - GENERAL**

- |                                   |    |   |
|-----------------------------------|----|---|
| <b>1.1 Related Sections</b> <hr/> | .1 | Section 01 33 00 - Submittal Procedures.  |
|                                   | .2 | Section 32 12 16.03 – Asphalt Paving for Building Sites.  |
| <hr/>                             |    |   |
| <b>1.2 References</b> <hr/>       | .1 | American Society for Testing and Materials International, (ASTM)  |
|                                   | .1 | ASTM C117 04, Standard Test Method for Material Finer Than 0.075mm (No.200) Sieve in Mineral Aggregates by Washing. |
|                                   | .2 | ASTM C136 06, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.                                     |
|                                   | .3 | ASTM D2419 09, Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.                          |
|                                   | .2 | Canadian General Standards Board (CGSB)   |
|                                   | .1 | CAN/ CGSB 8.1 88, Sieves Testing, Woven Wire, Inch Series.  |
|                                   | .2 | CAN/ CGSB 16.2 M89, Emulsified Asphalts, Anionic Type, for Road Purposes.   |
|                                   | .3 | CAN/ CGSB 16.4 M89, Emulsified Asphalts, Cationic Type, for Road Purposes.  |



## PAVEMENT CRACK CLEANING AND FILLING

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- |     |                                      |    |   |
|-----|--------------------------------------|----|---|
| 1.3 | <u>Samples</u>                       | .1 | Submit samples in accordance with Section 01 33 00 Submittal Procedures.  |
|     |                                      | .2 | Submit to the Departmental Representative the following samples of materials proposed for use at least 2 weeks prior to beginning Work.   |
|     |                                      | .1 | One 4 L container of asphalt material. Submit emulsions in plastic container.   |
|     |                                      | .2 | One 20 kg sample of each aggregate gradation.   |
|     |                                      | .3 | Provide access for the Departmental Representative to sample materials actually incorporated into Work as required.   |
| 1.4 | <u>Certificates</u>                  | .1 | Submit manufacturer's test data and certification that following materials meet requirements of this Section to the Departmental Representative at least 2 weeks prior to beginning Work:   |
|     |                                      | .1 | Aggregates.   |
| 1.5 | <u>Waste Management And Disposal</u> | .1 | Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/ Demolition Waste Management And Disposal.  |
|     |                                      | .2 | Remove from site and dispose of all packaging materials at appropriate recycling facilities.  |
|     |                                      | .3 | Collect and separate for disposal paper, plastic, polystyrene, and corrugated cardboard packaging material in appropriate on site bins for recycling in accordance with Waste Reduction Workplan and the Material Source Separation Plan. |
|     |                                      | .4 | Place materials defined as hazardous or toxic in designated containers.   |
|     |                                      | .5 | Divert unused aggregate materials from landfill to a facility for reuse as approved by the Departmental Representative.   |
|     |                                      | .6 | Fold up metal banding, flatten and place in designated area for recycling.  |
|     |                                      | .7 | Divert unused asphalt from landfill to facility capable of recycling materials.   |

## PAVEMENT CRACK CLEANING AND FILLING

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- .8 Dispose of unused sealing at official hazardous material collections site or recycling facility approved by the Departmental Representative.
- .9 Do not dispose of unused sealing mix into the sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

## PART 2 - PRODUCTS

## 2.1 Materials

- .1 Emulsified asphalt: to [CAN/CGSB 16.2, grade [SS 1] ] [CAN/ CGSB 16.4, grade [CRS 1] ].
- .2 Aggregate for crack filling: material to following requirements:
  - .1 Screened sand or screenings.
  - .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB 8.1.
  - .3 Table:
 

Sieve Designation	% Passing Sand-asphalt slurry using emulsion
12.5 mm	100
9.5 mm	80-100
4.75 mm	50-95
2.36 mm	30-80
0.600 mm	10-50
0.300 mm	0-25
0.075 mm	0-6
  - .4 Sand equivalent: to ASTM D2419, not less than 45%.
  - .5 Mixing water: free from foreign matter.

## PAVEMENT CRACK CLEANING AND FILLING

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- 2.2 Equipment**
- .1 Pressure applicator capable of applying slurry at 100 kPa from a one nozzle arrangement.
  - .2 Hand tools.
  - .3 Small diameter diamond bladed pavement saws or mechanical rotary routers specifically designed for following random irregular cracks without tearing, chipping or spalling edge and capable of producing clean, vertical side walls. Open "V" type grooves not permitted.
- 2.3 Mixes**
- .1 Prepare sand asphalt slurry or mix with following proportions:
    - .1 50 kg of aggregates.
    - .2 16L of asphalt material.
    - .3 Water to produce uniform mix of consistency to achieve full penetration into cracks.
  - .2 Hot mix asphalt concrete: in accordance with Section 32 12 16.02 - Asphalt Paving for Building Sites.

## PART 3 - EXECUTION

- 3.1 Preparation**
- .1 Clean cracks in areas indicated on the contract drawings.
  - .2 Remove existing sealer and loose materials
    - .1 From spalled edges and pavement surface.
    - .2 To minimum depth of 19 mm.
  - .3 Saw or Rout designated cracks to minimum width of 16 mm using rotary routers or pavement saws approved by the Departmental Representative.
  - .4 Saw or Rout designated cracks to depth between 19 mm and 25 mm.
  - .5 Clean loose material from cracks with oil free compressed air applied at pressure not less than 600 kPa.
  - .6 Dispose of material removed from cracks at a landfill facility licensed for the material.
- 3.2 Crackfilling**
- .1 Ensure cracks are clean and dry immediately before filling.

PAVEMENT CRACK CLEANING AND FILLING

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- .2 Fill cracks designated and approved by the Departmental Representative.
  - .3 Do not use frozen aggregate.
  - .4 Fill cracks when air temperature is above 10oC and rising, when daily low temperature does not fall below 5oC, and when no rain is forecast.
  - .5 Fill and tamp cracks with sufficient applications to ensure cured fill material is level with pavement surface.
  - .6 Cracks wider than 50 mm may be filled with hot mix asphalt concrete and tamped, immediately prior to placement of asphalt concrete overlay, where approved by the Departmental Representative.
  - .7 Remove and dispose of excess filling material as directed by the Departmental Representative.

**END OF SECTION**

**PART 1 - GENERAL**

- |                             |    |  |
|-----------------------------|----|--|
| <b>1.1 Section Includes</b> | .1 | Materials and installation for asphalt concrete pavement for car park areas, driveways to buildings, bikeways and walks or play areas and extruded asphalt concrete curbs. |
| <hr/>                       |    |  |
| <b>1.2 Related Sections</b> | .1 | Section 31 00 99 - Earthwork For Minor Works   |
| <hr/>                       |    |  |
| <b>1.3 References</b>       | .1 | American Association of State Highway and Transportation Officials (AASHTO)  |
|                             | .1 | AASHTO M320 [02], Standard Specification for Performance Graded Asphalt Binder.  |
|                             | .2 | AASHTO R29 [02], Standard Specification for Grading or Verifying the Performance Graded of an Asphalt Binder.  |
|                             | .3 | AASHTO T245 [97(2001)], Resistance to Plastic flow of Bituminous Mixtures Using Marshall Apparatus.  |
|                             | .2 | Asphalt Institute (AI)   |
|                             | .1 | AI MS2, Mix Design Methods for Asphalt Concrete and Other Hot Mix Types.   |
|                             | .3 | American Society for Testing and Materials International, (ASTM)   |
|                             | .1 | ASTM C88, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.  |
|                             | .2 | ASTM C117, Standard Test Method for Material Finer Than 0.075mm (No.200) Sieve in Mineral Aggregates by Washing.   |

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- .3 ASTM C123, Standard Test Method for Lightweight Particles in Aggregate.
  - .4 ASTM C127, Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.
  - .5 ASTM C128, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate.
  - .6 ASTM C131, Standard Test Method for Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
  - .7 ASTM C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .8 ASTM C207, Standard Specification for Hydrated Lime for Masonry Purposes.
  - .9 ASTM D995, Standard Specification for Mixing Plants for Hot Mixed, Hot Laid Bituminous Paving Mixtures.
  - .10 ASTM D1557-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.
  - .11 ASTM D2419, Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
  - .12 ASTM D3203, Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.
  - .13 ASTM D4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
  - .14 ASTM D5821, Standard Test Method for determining the Percentage of Fractured Particles.
  - .15 ASTM D6307, Standard Test Method for Asphalt content of Hot-Mix Asphalt.
  - .4 Canadian General Standards Board (CGSB)
    - .1 CAN/CGSB 16.1 M89, Cutback Asphalts for Road Purposes.
    - .2 CAN/CGSB 16.2 M89, Emulsified Asphalts, Anionic Type, for Road Purposes.

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- 1.4 Submittals**
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- .1 Submit product data in accordance with Section 01 33 00 Submittal Procedures.
  - .2 Submit asphalt concrete mix design to Departmental Representative for review.
  - .3 Materials to be tested by a testing laboratory approved by the Departmental Representative at the Contractor's expense.
  - .4 Submit test certificates showing suitability of materials at least 4 weeks prior to commencing work.
  - .5 Submit samples in accordance with Section 01 33 00 Submittal Procedures.
  - .6 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing work.
  - .7 Submit samples of following materials proposed for use at least 4 weeks prior to commencing work:
    - .1 One 5 L container of asphalt cement.
- 1.5 Waste Management And Disposal**
- 
- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/ Demolition Waste Management And Disposal.
  - .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
  - .3 Collect and separate for disposal paper, plastic, polystyrene, and corrugated cardboard packaging material in appropriate on site bins for recycling in accordance with Waste Management Plan.
  - .4 Divert unused asphalt materials from landfill to a local facility as approved by Departmental Representative.
  - .5 Divert unused aggregate materials from landfill to a local facility for reuse as approved by Departmental Representative.
  - .6 Unused protective coating material must be disposed of at an official hazardous material collections site as approved by Departmental Representative.

- .7 Unused protective coating material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
- .8 Fold up metal banding, flatten and place in designated area for recycling.

## PART 2 - PRODUCTS

## 2.1 Materials

- .1 Granular base and sub base material: to Section 31 00 99 – Earthworks for Minor Works and following requirements:
- .1 Crushed or screened stone, gravel or sand.
- .2 Gradations: within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.
- .3 Table:

Sieve Designation	Granular Base (% passing)	Granular Sub-Base (% passing)
75 mm	-	100
38.1 m	-	60-100
19 mm	100	35-80
12.5 mm	75-100	-
9.5 mm	60-90	26-60
4.75 mm	40-70	20-40
2.36 mm	27-55	15-30
1.18mm	16-42	10-20
0.600 mm	8-30	5-15
0.300 mm	5-20	3-10
0.075mm	2-8	0-5



- .4 Granular base aggregates:
- .1 Crushed particles: at least 50 % of particles by mass retained on 4.75 mm sieve to have at least 1 freshly fractured face.
- .2 Asphalt concrete aggregates shall meet the following requirements:
- .1 Be comprised of all mineral matter passing the sieve designated in the table below in accordance with the test procedure for each individual test.
- .2 Be clean, tough, durable, moderately sharp, free from coatings of clay, silt or other deleterious material, and shall contain no clay balls or other aggregations of fine material.
- .3 Meeting the gradation requirements in the table below.

Sieve Designation	% Passing Lower Course	% Passing Upper Course
19 mm	100	-
12.5 mm	84-99	100
9.5 mm	73-88	-
4.75 mm	50-68	55-75
2.36 mm	35-55	38-58
1.18 mm	27-46	28-47
0.600 mm	18-36	20-36
0.300 mm	10-26	10-26
0.150 mm	4-17	4-17
0.075 mm	3-8	3-8

- .4 Coarse aggregate: aggregate retained on 4.75 mm sieve and fine aggregate is aggregate passing 4.75 mm sieve when tested to ASTM C136.
- .5 Do not use aggregates having known polishing characteristics in mixes for surface courses.

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- .6 Sand equivalent of not less than 50% when tested to ASTM D2419.
  - .7 Magnesium Sulphate soundness: to ASTM C88. Max % loss by mass:
    - .1 Coarse aggregate surface course: 12 %.
    - .2 Coarse aggregate lower course: 12 %.
    - .3 Fine aggregate, surface course: 12 %.
    - .4 Fine aggregate, lower course: 12 %.
  - .8 Degradation: Grading B, to ASTM 6928. Max % loss by mass:
    - .1 Coarse aggregate, surface course: 20%.
    - .2 Coarse aggregate, lower course: 20 %.
  - .9 Absorption: to ASTM C127. Max % by mass:
    - .1 Coarse aggregate, surface course: 1.75 %.
    - .2 Coarse aggregate, lower course: 2.00 %.
  - .10 Lightweight particles: to ASTM C12. Max % by mass less than 1.95 relative density:
    - .1 Surface course: 1.5 %.
    - .2 Lower course: 1.5 %.
  - .11 Flat and elongated particles: to ASTM D4791, (with length to thickness ratio greater than 5): Max% by mass:
    - .1 Coarse aggregate, surface course: 10 %.
    - .2 Coarse aggregate, lower course: 10 %.
  - .12 Crushed fragments: at least 60 % of particles by mass within each of following sieve designation ranges, to have at least 1 freshly fractured face. Material to be divided into ranges, using methods of ASTM C136.

Passing		Retained on
25 mm	to	12.5 mm
12.5 mm	to	mm
  - .13 Regardless of compliance with specified physical requirements, fine aggregates may be accepted or rejected on basis of past field performance.

- .4 Mineral filler:
  - .1 Shall consist of all mineral matter passing the 0.600 mm sieve and mineral dust shall consist of all mineral matter passing the 0.075 mm sieve
  - .2 Shall be free from organic matter
  - .3 Shall be non plastic when tested in accordance with ASTM D 4318, thoroughly dry and free from lumps.
  - .4 Add mineral filler when necessary to meet job mix aggregate gradation or as directed to improve mix properties.
  - .5 Mineral filler to be dry and free flowing when added to aggregate.
- .5 Anti stripping agent: hydrated lime to ASTM C207. Add lime at rate of approximately 2-3% of dry weight of aggregate.
- .6 Water: to approval of Departmental Representative.
- .7 Asphalt cement: to CAN/CGSB-16.3, grade 120-150.
- .8 Asphalt prime: to CAN/CGSB-16.2, SS-1.
- .9 Sand blotter: clean granular material passing 4.75 mm sieve and free from organic matter or other deleterious materials.
- .10 Asphalt tack coat: to CAN/CGSB-16.2, grade SS-1.

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**2.2 Equipment**

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- .1 Pavers: mechanical grade controlled and self powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.
- .2 Rollers: minimum of two rollers per paver of type and weight to obtain specified density of compacted mix.
- .3 Vibratory rollers:
  - .1 Minimum drum diameter: 1200 mm.
  - .2 Maximum amplitude of vibration (machine setting): 0.5 mm for lifts less than 40 mm thick.
- .4 Haul trucks: sufficient number and of adequate size, speed and condition to ensure orderly and continuous operation and as follows:
  - .1 Boxes with tight metal bottoms.
  - .2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.
  - .3 In cool weather or for long hauls, insulate entire contact area of each truck box.
  - .4 Use only trucks which can be weighed in single operation on scales supplied.
- .5 Hand tools:
  - .1 Lutes or rakes with covered teeth for spreading and finishing operations.
  - .2 Tamping irons having mass not less than 12 kg and bearing area not exceeding 310 cm<sup>2</sup> for compacting material along curbs, gutters and other structures inaccessible to roller. Mechanical compaction equipment, when approved by Departmental Representative, may be used instead of tamping irons.
  - .3 Straight edges, 4.5 m in length, to test finished surface.

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**2.3 Mix Design**

- .1 Mix design to be provided by Contractor and shall be stamped by a professional engineer registered in the province of British Columbia
- .2 Mix design shall be submitted and approved by Departmental Representative.
- .3 Mix design to be developed by testing laboratory approved by Departmental Representative.
- .4 Design of mix: by Marshall method to requirements below.
  - .1 Compaction blows on each face of test specimens: 75.
  - .2 Mix physical requirements:

Property	Requirements
Marshall Stability (KN min)	6.4 lower course 5.5 upper course
Marshall Flow (mm)	2-4
Air Voids (%)	3-6 lower course 3-5 upper course
Voids in Mineral Aggregate (% min)	14.0 lower course 15.0 uppercourse
Index of Retained Stability (% min)	75

- .3 Measure physical requirements as follows:
  - .1 Marshall load and flow value: to AASHTO T245.
  - .2 Compute void properties on basis of bulk specific gravity of aggregate to ASTM C127 and ASTM C128. Make allowance for volume of asphalt absorbed into pores of aggregate.
  - .3 Air voids: to ASTM D3203.
  - .4 Voids in mineral aggregates: to AI MS2, chapter 4.
  - .5 Index of Retained Stability: measure in accordance with Marshall Immersion Test for Bitumen.
- .4 Do not change job mix without prior approval of Departmental Representative.

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**PART 3 - EXECUTION**

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|-----|---|----|--|
| 3.1 | Subgrade Surface<br>Preparation And<br>Inspection | .1 | Verify grades of subgrade drains and other items set in paving area for conformity with elevations and sections before placing granular base material.   |
|     |   | .2 | Obtain approval of subgrade of Departmental Representative before placing granular base.   |
|     |   | .3 | Back-filling to subgrade levels to be in accordance with Section 31 00 99 – Earthworks for Minor Works.  |
| 3.2 | Granular Base And<br>Granular Subbase             | .1 | Place granular base and sub-base material on clean unfrozen surface, free from snow and ice.   |
|     |   | .2 | Place granular base and sub-base to compacted thicknesses as indicated. Do not place frozen material.  |
|     |   | .3 | Place in layers not exceeding 150 mm compacted thickness. Compact to density not less than 95 % of Modified Proctor to ASTM D1557.   |
|     |   | .4 | Finished base surface to be within 10 mm of specified grade, but not uniformly high or low.  |
| 3.3 | Asphalt Prime                                     | .1 | Emulsified asphalt: <ul style="list-style-type: none"> <li>.1 Dilute asphalt emulsion with clean water at 1:1 ratio for application. Mix thoroughly by pumping or other method approved by Departmental Representative.</li> <li>.2 Apply diluted asphalt emulsion at rate directed by Departmental Representative but do not exceed 5 L/m<sup>2</sup>.</li> <li>.3 Apply on damp surface unless otherwise directed by Departmental Representative.</li> </ul> |
|     |   | .2 | Do not apply prime when air temperature is less than 5°C or when rain is forecast within 2 hours.  |
|     |   | .3 | If asphalt prime fails to set within 24 hours, spread sand blotter material in amounts required to absorb excess material. Sweep and remove excess blotter material.   |

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|-----|-------------------------------|----|---------------|
| 3.4 | Plant And Mixing Requirements | .1 | To ASTM D995. |
|-----|-------------------------------|----|---------------|
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- |     |                         |     |  |
|-----|-------------------------|-----|--|
| 3.5 | Asphalt Concrete Paving | .1  | Obtain approval of primer from Departmental Representative before placing asphalt mix.   |
|     |                         | .2  | Place asphalt mix only when base or previous course is dry and air temperature is above 5°C.   |
|     |                         | .3  | Place asphalt concrete in compacted layers not exceeding 50 mm.  |
|     |                         | .4  | Minimum 135°C mix temperature required when spreading.   |
|     |                         | .5  | Maximum 160°C mix temperature permitted at any time.   |
|     |                         | .6  | Compact each course with roller as soon as it can support roller weight without undue cracking or displacement.  |
|     |                         | .7  | Compact parking lot and driveway asphalt concrete to density not less than 95 % of density obtained with Marshall specimens prepared in accordance with ASTM D1559, on from samples of mix being used. Roll until roller marks are eliminated. |
|     |                         | .8  | Keep roller speed slow enough to avoid mix displacement and do not stop roller on fresh pavement.  |
|     |                         | .9  | Moisten roller wheels with water to prevent pick up of material.   |
|     |                         | .10 | Compact mix with hot tampers or other equipment approved by Departmental Representative in areas inaccessible to roller.   |
|     |                         | .11 | Finish surface to be within 10 mm of design elevation and with no irregularities greater than 10 mm in 4.5 m.  |
|     |                         | .12 | Repair areas showing checking, rippling or segregation as directed by Departmental Representative.   |

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- 3.6 Joints**
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- .1 Remove surplus material from surface of previously laid strip. Do not deposit on surface of freshly laid strip.
  - .2 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.
  - .3 For cold joints, cut back to full depth vertical face and tack face with hot asphalt.
  - .4 For longitudinal joints, overlap previously laid strip with spreader by 25 to 50 mm.
- 3.7 Asphaltic Curbs**
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- .1 Form asphalt curbs by machine to profiles as indicated. Curve curbs uniformly.
- 3.8 Testing**
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- .1 Inspection and testing of asphalt pavement will be carried out by designated testing laboratory. Refer to Section 01 45 00 - Quality Control.
- 3.9 Protection**
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- .1 Keep vehicular traffic off newly paved areas until paving surface temperature has cooled below 38°C. Do not permit stationary loads on pavement until 24 hours after placement.
  - .2 Provide access to buildings as required. Arrange paving schedule so as not to interfere with normal use of premises.

**END OF SECTION**



**PART 1 - GENERAL**

<u>1.1 Section Includes</u>	.1	Materials and installation for constructing new outfall structures, precast and cast-in-place manholes and catch basins.
<u>1.2 Related Sections</u>	.1	Section 01 11 50 – General Instructions.
	.2	Section 03 30 00 – Cast in place Concrete
	.3	Section 31 00 99 – Earthworks for Minor Works
<u>1.3 References</u>	.1	American Society for Testing and Materials (ASTM International).
	.1	M A48/A48M, Standard Specification for Gray Iron Castings.
	.2	ASTM C139, Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.
	.3	ASTM C478M, Specification for Precast Reinforced Concrete Manhole Sections Metric
	.2	Canadian General Standards Board (CGSB).
	.1	CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
	.2	CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.
	.3	Canadian Standards Association (CSA International).
	.1	CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
	.2	CAN/CSA-G30.18-M92, Billet Steel Bars for Concrete Reinforcement.
	.3	CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
<u>1.4 Submittals</u>	.1	Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work. Include manufacturer's drawings, information and shop drawings where pertinent.
<u>1.5 Scheduling of Work</u>	.1	Schedule work to minimize interruptions to existing services and to

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maintain existing flow during construction.

- .2 Submit schedule of expected interruptions for approval and adhere to approved schedule.

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## PART 2 - PRODUCTS

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### 2.1 Materials

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- .1 Cast-in-place concrete: to Section 03 30 00 - Cast-in-Place Concrete.
- .2 Concrete reinforcement: to Section 03 20 00 - Concrete Reinforcement.
- .3 Precast manhole units: to ASTM C478M, circular or oval. Top sections eccentric cone or flat slab top type with opening offset for vertical ladder installation.
- .4 Precast catch basin sections: to ASTM C478M.
- .5 Joints: to be made watertight using rubber rings.
- .6 Mortar:
- .1 Aggregate: to CSA A82.56.
- .2 Cement: to CAN/CSA-A8.
- .7 Ladder rungs: to CAN/CSA-G30.18, No.25M billet steel deformed bars, hot dipped galvanized to CAN/CSA-G164. Rungs to be safety pattern (drop step type).
- .8 Adjusting rings: to ASTM C478M.
- .9 Concrete Brick: to CAN3-A165 Series.
- .10 Drop manhole pipe: to be same as sewer pipe.
- .11 Steel gratings, I-beams and fasteners: as indicated.
- .12 Frames, gratings, covers to dimensions as indicated and following requirements:
- .1 Metal gratings and covers to bear evenly on frames. A frame with grating or cover to constitute one unit. Assemble and mark unit components before shipment.
- .2 Gray iron castings: to ASTM A48/A48M, strength class 30B.
- .3 Castings: coated with two applications of asphalt varnish or cleaned and ground to eliminate surface imperfections.
- .4 Manhole frames and covers: heavy duty municipal type for

road service; Cover cast without perforations and complete with two 25 mm square lifting holes.

**.13 Granular bedding and backfill meeting the following requirements:**

- .1 Crushed screed stone, gravel or sand.
- .2 Granulations to be within limits specified when tested to ASTM C136. Sieve sizes to CAN/CGSB-8.1.

**.3 TABLE**

Sieve Designation	% Passing Stone/Gravel	Gravel/Sand
200 mm	-	-
75 mm	-	-
50 mm	-	-
38.1 mm	-	-
25 mm	100	-
19 mm	-	-
12.5 mm	65-90	100
9.5 mm	-	-
4.75 mm	35-55	50-100
2.00 mm	-	30-90
0.425 mm	10-25	10-50
0.180 mm	-	-
0.075 mm	0-8	0-10

- .4 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete.

**PART 3 - EXECUTION**

- |            |                                |   |
|------------|--------------------------------|---|
| <b>3.1</b> | <b>Excavation and Backfill</b> | .1 Excavate and backfill in accordance with Section 31 00 99 – Earthworks for Minor Works and as indicated. |
|            |                                | .2 Obtain approval of Departmental Representative before installing, manholes or catch basins.              |
| <b>3.2</b> | <b>Concrete Working</b>        | .1 Do concrete work in accordance with Section 03 30 00 - Cast-in-Place Concrete.                           |
|            |                                | .2 Position metal inserts in accordance with dimensions and details as indicated.                           |
| <b>3.3</b> | <b>Installation</b>            | .1 Construct units in accordance with details indicated, plumb and true to alignment and grade.             |

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- .2 Complete units as pipe laying progresses. Maximum of three units behind point of pipe laying will be allowed.
  - .3 Dewater excavation to approval of Departmental Representative and remove soft and foreign material before placing concrete base.
  - .4 Set precast concrete base on 150 mm minimum of granular bedding compacted to 100% corrected maximum dry density.
  - .5 Precast units:
    - .1 Set bottom section of precast unit in bed of cement mortar and bond to concrete slab or base. Make each successive joint watertight with Departmental Representative approved rubber ring gaskets, bituminous compound, cement mortar, epoxy resin cement, or combination thereof.
    - .2 Clean surplus mortar and joint compounds from interior surface of unit as work progresses.
    - .3 Plug lifting holes with precast concrete plugs set in cement mortar or mastic compound.
  - .6 Compact granular backfill to 95% corrected maximum dry density.
  - .7 Place unshrinkable backfill in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfill.
  - .8 Set frame and cover to required elevation on no more than 4 courses of brick. Make brick joints and join brick to frame with cement mortar. Parge and make smooth and watertight.
  - .9 Place frame and cover on top section to elevation as indicated. If adjustment required use concrete ring.
  - .10 Clean units of debris and foreign materials. Remove fins and sharp projections. Prevent debris from entering system.
  - .11 Install safety platforms in manholes having depth of 5 m or greater, as indicated.
- 3.4 Leakage Test**
- 
- .1 Install watertight plugs or seals on inlets and outlets of each new manhole and fill manhole with water. Leakage not to exceed 0.3% per hour of volume of manhole.
  - .2 If permissible leakage is exceeded, correct defects. Repeat until approved by Departmental Representative.
  - .3 Departmental Representative will issue Test Certificate for each

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manhole passing test.

- .4 Provide copy certification of leakage test acceptance to Owner's Representative. Include certification in Commissioning Manual.

**END OF SECTION**