

## **Part 1 General**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Execute erosion and sedimentation control measures, including:
  - .1 Prepare and update, as required, the erosion and sedimentation control plan.
  - .2 Install and maintain erosion and sedimentation control measures.
  - .3 Repair and clean any damage resulting from erosion and sedimentation resulting from Work.
  - .4 Provide hay mulch over exposed rough graded surfaces that have not received finish treatment.

### **1.2 RELATED SECTIONS**

- .1 Section 01 35 43 Environmental Procedures
- .2 Section 31 23 10 Earthwork

### **1.3 REFERENCE STANDARDS**

- .1 ASTM E449-18 Standard Test Methods for Analysis of Calcium Chloride.
- .2 CGSB - CAN/CGSB-15.1-92 Calcium Chloride
- .3 Nova Scotia Environment, Erosion and Sedimentation Control Handbook for Construction Sites, 1988, (NSDOE Handbook).

## **Part 2 Products**

### **2.1 SEDIMENT AND CONTROL FENCE**

- .1 Sediment Control fence: preassembled sediment control fence with industrial woven geotextile fabric pre-stapled to wood posts spaced as indicated.

### **2.2 SEDIMENT CONTROL BERM**

- .1 Geotextile: non-woven, needle-punched polyester filter fabric.

### **2.3 DUST CONTROL AGENT**

- .1 Materials:
  - .1 Calcium chloride, Type I, to CAN/CGSB 15.1, flake, 35% aqueous solution.
  - .2 Magnesium chloride: magnesium liquid meeting the following:

Component	Minimum	Maximum
-----------	---------	---------

MgCl <sub>2</sub>	28	32
Ph	4 to 6	
Specific Gravity	1.29 to 1.3	

Solution to contain minimum required percentage by mass concentration of MgCl<sub>2</sub> in accordance with ASTM E449.

- .3 Water: to the Departmental Representative's approval.

### Part 3 Execution

#### 3.1 GENERAL

- .1 Prior to construction provide sediment control measures where required or as directed. Co-ordinate locations with the Departmental Representative. Maintain sediment control measures for the duration of the Work. Do not remove control measures until authorized by the Departmental Representative.
- .2 Prepare and submit within 5 days of award of Contract an Erosion and Sediment Control Plan (E&SC Plan) as per requirements for submission of Shop Drawings. E&SC Plan is to be specific to the particular site. Document is to anticipate E&SC problems with specific plans, actions, techniques, and BMP's.
- .3 Sediment and erosion control plan to conform to at a minimum Nova Scotia Environment, Erosion and Sedimentation Control Handbook for Construction Sites, 1988, (NSDOE Handbook).
- .4 The plan shall meet the following objectives:
  - .1 Limit the amount of exposed soil open at any one time.
  - .2 Recognize the most sensitive receptors adjacent to the project site and the potential sources of erosion and sediment release from the site.
  - .3 Prevent sediment-laden runoff by redirecting surface runoff away from areas of exposed soil.
  - .4 Prevent loss of soil during construction by stormwater runoff and/or wind erosion, including protecting topsoil by stockpiling and covering for reuse.
  - .5 Prevent polluting the air with dust and particulate matter.
  - .6 Prevent sedimentation of storm sewer or receiving streams.
  - .7 Managing sediment-laden water encountered during dewatering of excavations.
  - .8 Manage the temporary stockpiling of excavated materials on site and the disposal of excess material off site.
  - .9 Prevent the tracking of material and debris from the project site.
- .5 Provide draft construction schedule and sequence for site work as part of the E&SC Plan with specific references to how E&SC measures will be changed to address the changing construction site and anticipated weather schedule.
- .6 Plan to define daily, weekly and monthly activities to be undertaken with respect to E&SC and what steps are to be reviewed/undertaken before major storm events.

- .7 Include contingency plan in the event of storm events and failure of environmental controls in place.
- .8 Perform grading work to minimize the effects of erosion on site and as specified on Erosion and Sedimentation Control Plan. Take additional measures to prevent erosion as required by site conditions or as directed by Nova Scotia Environment or authority having jurisdiction.
- .9 Repair any damage which occurs as a result of erosion. Maintain erosion control measures and monitor daily and as required by work and weather throughout duration of Contract. The site is to be left so that no environmental damage to watercourses and surrounding properties may occur after completion of Contract.
- .10 Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. There are two exceptions that apply in Nova Scotia as follows:
  - .1 Where the initiation of stabilization measures by the 14th day after construction activity temporary or permanently cease is precluded by snow cover, stabilization measures shall be initiated as soon as practical.
  - .2 Where construction activity will resume on a portion of the site within 21 days from when the activities ceased, (e.g. the total time period that construction activity is temporarily ceased is less than 21 days) then stabilization measures do not have to be initiated on the portion of the site by the 14th day.

### **3.2 EXISTING PAVED AND GRANULAR SURFACES**

- .1 Keep existing paved and granular surfaces clean.
- .2 Supply and maintain minimum 7.0m wide x 10.0m long x 450mm thick granular pads at exits to existing paved and granular surfaces to reduce mud track-off. Inspect routinely and clean to remove sediment from granular pad as required or as direct by the Departmental Representative to maintain effectiveness. Promptly clean existing street of track-off from construction activities to approval of the Departmental Representative.

### **3.3 TEMPORARY SOIL COVERS**

- .1 If blown straw or hay is to be used as temporary soil cover, a 100% cover is required to ensure soil erosion is minimized.
- .2 Where blown straw or hay is used as mulch to protect new seeding, control the thickness of the application to avoid smothering of the seed. If used in lieu of environmental blanket, uniformly apply straw and hay blown onto the seeded areas. Thickness would depend on site conditions, seed mix, slope and soil type.

### **3.4 SEDIMENT CONTROL FENCE**

- .1 Attach fence with staples. Provide wood strapping along top of fence.

- .2 Excavate 100mm x 100mm trench along length of fence. Lay fabric bottom in trench and backfill with selected excavated material.

### **3.5 MAINTENANCE OF SILT AND SEDIMENT CONTROL MEASURES**

- .1 Maintain siltation control measures throughout the construction period. Repair damage to original condition.
- .2 Remove accumulated sediment from behind silt fence. Remove flow check berms when and as directed by the Departmental Representative.
- .3 Maintain vertical alignment of silt fence such that it is always plumb and straight.

### **3.6 DRAINAGE**

- .1 Dispose of water so as not to be injurious to public health and safety, to property or to any part of work completed under construction. Direct pumped water or runoff to control structures to allow particulate settlement prior to discharge to adjacent storm systems.
- .2 Clean out structures on a regular basis so that sediment discharge is prevented.
- .3 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.

### **3.7 CATCH BASIN FILTRATION**

- .1 Install sediment traps on all existing catch basins and culverts to ensure sediment does not enter storm water system.
- .2 Clean storm sewer system at completion of work to remove sediment and debris.

### **3.8 DUST CONTROL AGENT**

- .1 Deliver approved dust control agent to site in moisture-proof bags. Indicate name of manufacturer, name of product, net weight or mass and percentage of calcium chloride guaranteed by manufacturer.
- .2 Store bags of dust control agent in weather-proof enclosures.
- .3 Apply dust control agent or water for alleviation and prevention of dust nuisance caused by equipment and traffic movement when directed by the Departmental Representative.
- .4 Apply dust control agent or water with equipment approved by the Departmental Representative, at a rate and in locations approved by the Departmental Representative.
- .5 Apply water in areas where use of other dust control agent is not permitted. Use distributors equipped with spray system that will promote uniform application and with means of shut-off.

### **3.9 COMPLETION OF WORK**

- .1 Remove all erosion control measures as a requirement of completion of Work.

- .2 Repair any erosion issues resulting from Work.
- .3 Clean drainage structures of any sedimentation at completion of Work, including catch basins and ditches in Municipal right-of-way affected by Work of the contract.

**END OF SECTION**

## **Part 1 General**

### **1.1 GENERAL INSTRUCTIONS**

- .1 Complete general excavation, filling and site grading of the site as shown, specified, or required, including but not restricted to:
  - .1 All rock breaking required to execute construction of work, including removal of rock and treatment as required by Authorities Having Jurisdiction.
  - .2 Trenching for site services including backfill.

### **1.2 RELATED WORK**

- .1 Section 01 35 43 – Environmental Procedures.
- .2 Site Civil Drawings and Specifications.

### **1.3 REFERENCES**

- .1 ASTM D698-12e2 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m<sup>3</sup>)
- .2 ASTM D1557-12e1 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (2,700 kN-m/m<sup>3</sup>)
- .3 ASTM D3776/D3776M-20, Standard Test Methods for Mass Per Unit Area (Weight) of Fabric
- .4 ASTM D3786/D3786M-18 Standard Test Method for Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method
- .5 ASTM D4253-16e1 Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
- .6 ASTM D4254-16 Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
- .7 ASTM D4355/D4355M-21 Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus
- .8 ASTM D4632/D4632M-15a Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
- .9 ASTM D4833/D4833M-07(2020) Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products
- .10 Nova Scotia Department of Transportation and Infrastructure Renewal Standard Specification, Highway Construction and Maintenance, most recent edition.
- .11 Nova Scotia Environment – Sulphide Bearing Material Disposal Regulations.

#### **1.4 SITE CONDITIONS**

- .1 Known underground and surface utility lines and buried objects are indicated on site services Plan.
- .2 Establish location of all existing services before commencing work.
- .3 Contractor to verify existing grades and rock elevations prior to beginning work. Report any discrepancies to The Departmental Representative.

#### **1.5 DEFINITIONS**

- .1 Rock: material which requires drilling, ripping or breaking up with power-operated tools for its removal, and boulders and pieces of concrete exceeding volume limits below. Frozen material will not be classified as rock. Minimum volume limits:
  - .1 Mass excavation: 1.0 cubic metre.
  - .2 Trench excavation: 0.5 cubic metres.
- .2 Native Topsoil: Existing soil capable of supporting good vegetative growth. Native topsoil may not meet specification of topsoil required for sodding and planting activities.
- .3 Common: Excavated soil which is not rock, Unsuitable, or topsoil.
- .4 Unsuitable Material: all material which is not suitable for use in Work and must be disposed of.
- .5 Surplus Material: excavated material not required for re-use.
- .6 Subgrade: the surface of mass excavation and embankment finished to lines and elevations indicated.
- .7 Excavation classes: two classes of excavation will be recognized; rock excavation and common excavation.
  - .1 Rock excavation: excavation of rock as defined in 1.5.1 exceeding minimum volume limits.
  - .2 Common excavation: excavation of materials of whatever nature including pavements, drainage structures, timber and masonry encountered during excavation or indicated on the drawings, which are not included under definitions of rock excavation. This also includes the excavation of Unsuitable Material.

#### **1.6 SUBMITTALS**

- .1 Submit sieve analysis of all granular materials.
  - .1 Notify the Departmental Representative at least 2 weeks prior to commencing work, of proposed source of fill materials and provide access for sampling.

- .2 Contractor to prepare and submit for review an Excavation and Slate Management Plan detailing proposed methods of addressing sulphide bearing material, including preventing acid run-off and other adverse effects to the Environment. Plan to address all requirements of Nova Scotia Sulphide Bearing Material Disposal Regulations.

## **1.7 TOLERANCES**

- .1 Finish rough grading of site to 25mm +/- or as noted on Drawings.

## **1.8 PROTECTION OF EXISTING STRUCTURES**

- .1 Existing buried utilities and structures:
  - .1 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
  - .2 Prior to commencing excavation work, notify applicable Departmental Representative or authorities having jurisdiction, establish location and state of use of buried utilities and structures. Departmental Representatives or authorities having jurisdiction to clearly mark such locations to prevent disturbance during work.
  - .3 Confirm locations of buried utilities by careful test excavations.
  - .4 Maintain and protect from damage, water, sewer, gas, electric, telephone, and other utilities and structures encountered.
  - .5 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing or re-routing.
  - .6 Record location of maintained, re-routed and abandoned underground lines.
- .2 Existing surface features:
  - .1 Conduct, with The Departmental Representative, condition survey of existing service poles, wires, signs, pavement, survey benchmarks and monuments which may be affected by work.
  - .2 Protect existing surface features from damage while work is in progress. In event of damage, immediately make repair to approval of Departmental Representative.

## **1.9 SHORING, BRACING & UNDERPINNING**

- .1 If shoring, bracing or underpinning is required:
  - .1 Protect existing features to remain.
  - .2 Engage services of qualified professional Engineer who is registered or licensed in province of Nova Scotia to design and inspect shoring, bracing, and underpinning required for work.
  - .3 Submit design and supporting data at least 2 weeks prior to commencing work.
  - .4 Design and supporting data submitted to bear stamp and signature of qualified professional Engineer registered or licensed in province of Nova Scotia.



- .5 Professional Engineer responsible for design of temporary structures to submit proof of insurance coverage for professional liability except where engineer is employee of contractor, in which case contractor shall submit proof that work by professional engineer is included in contractor's insurance coverage.

## Part 2 Products

### 2.1 MATERIALS

- .1 Fill material: as specified herein. Obtain approval from Departmental Representative for excavated or graded material to be used as fill for grading work. Protect approved material from contamination.
- .2 Selected Backfill: Common material which is free from stumps, trees, roots, sod, organics, rock, boulders, and masonry larger than 100mm in any dimension; and other deleterious materials and meeting criteria for use as determined by Departmental Representative.
- .3 Borrow: well graded material from Contractor's own sources meeting the specification for Selected Backfill.

### 2.2 GRANULARS

- .1 Sand: hard, granular, sharp material, well graded from course to fine, free of impurities, chemicals or organic matter, and grades as follows:

Sieve Designation	Cum. % Passing
5 mm	100
0.16 mm	0-5

- .2 Clear Stone: crushed and screened, hard durable stone, free form clay and organic matter, and graded as follows:

- .1 Type C1:

Sieve Designation	Cum. % Passing
250 mm	100
150 mm	20-35
56 mm	0-10

- .2 Type C2:

Sieve Designation	Cum. % Passing
250 mm	100
150 mm	90-100
112 mm	0-10

.3 Type C3 (Surge Rock)

Sieve Designation	Cum. % Passing
200 mm	100
150 mm	90-100
112 mm	20-35
80 mm	0-20 mm
20 mm	0-10 mm

.4 Type C4:

Sieve Designation	Cum. % Passing
112 mm	100
80 mm	90-100
28 mm	0-10

.5 Type C5:

Sieve Designation	Cum. % Passing
28 mm	100
20 mm	90-100
10 mm	0-40
5 mm	0-10

- .3 Gravels: crushed and screened pit gravel or crushed and screened rock. Material shall consist of hard and durable stone particles. Gradation shall be dense, well graded and to Division 3 of Province of Nova Scotia Department of Transportation and Infrastructure Renewal Standard Specification, Metric Edition.

.1 Type 1:

Sieve Size, $\mu\text{m}$	% Passing
20,000	100
14,000	50-85
5,000	20-50
160	5-12
80	3-8 <sup>1</sup>

.2 Type 1S:

Sieve Size, $\mu\text{m}$	% Passing
20,000	100
14,000	50-90
5,000	30-55
160	7-20
80	5-12 <sup>1</sup>

.3 Type 2:

Sieve Size, $\mu\text{m}$	% Passing
80,000	100
56,000	70-100
28,000	50-80
14,000	35-65
5,000	20-50
160	3-10
80	0-7 <sup>1</sup>

.4 Type M:

Sieve Size, $\mu\text{m}$	% Passing
28,000	100
20,000	85-100
14,000	70-95
5,000	30-60
1,250	15-35
160	5-12
80	3-8

<sup>1</sup> For gravel sources not classified as quarries, the allowable percentage passing the 80  $\mu\text{m}$  sieve shall be 3 to 5%.

<sup>2</sup> Where percentages passing the 5000  $\mu\text{m}$  sieve are between 30 and 45%, the allowable percentage passing the 80  $\mu\text{m}$  sieve shall be 3 to 12%.

## 2.3 STRUCTURAL FILL

.1 All Structural Fill is to approval of the Departmental Representative.

.1 Type A Structural Fill:

.1 Approved inorganic well-graded soil with a maximum particle size of 100mm and maintained at a suitable moisture content to achieve the required compaction of 100% Standard Proctor Maximum Dry Density (ASTM D698).

.2 Type A Structural Fill is to be placed where needed within the stress zone of the building.

## 2.4 MISCELLANEOUS

.1 Pipe bedding and backfill: As noted on drawings.

.2 Geotextile: Non-woven geotextile fabric composed of polypropylene fibres inert to biological degradation and resistant to naturally encountered chemicals, alkalis, and acids and conform to minimum physical properties listed below:

.1 Weight (ASTM D3776): 136g/m<sup>2</sup>

.2 Grab Tensile (ASTM D4632): 400N minimum.

.3 Grab Elongation (ASTM D4632): 45-100%

- .4 Puncture Resistance (ASTM D4833): 200N minimum.
- .5 Mullen Burst (ASTM D3786): 1350 kPa minimum.
- .6 UV Resistance (ASTM D4355): 70% strength retained.

### **Part 3 Execution**

#### **3.1 GENERAL**

- .1 Ensure erosion and sedimentation control measures and other environmental protection measures as specified in Section 01 35 43 are in place prior to beginning work of this Section.
- .2 Remove obstructions, ice and snow, from surfaces to be excavated within limits of contract.
- .3 Verify existing grade elevations prior to beginning work. Report any discrepancies to The Departmental Representative.

#### **3.2 GRADING – GENERAL**

- .1 Undertake all grading operations to reviewed Excavation and Slate Management Plan.
- .2 Minimize construction traffic over load bearing Subgrade.
- .3 Rough grade to levels, profiles, and contours allowing for surface treatment as noted on Drawings.
- .4 Departmental Representative to inspect and approve prepared compacted Subgrade prior to placement of fill material.
- .5 Prior to placing fill over existing ground, scarify surface to depth of 150mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.

#### **3.3 EXCAVATION & EMBANKMENT**

- .1 Schedule excavation activities to minimize the exposure of load bearing Subgrade. Minimize construction traffic over load bearing Subgrade.
- .2 Excavate all types of materials to lines, grades, elevations and dimensions as indicated and as necessary for construction.
- .3 Handle material in a manner that will not endanger the public, personnel, property or the work. Do not reduce sight distances or obstruct roadways or utilities. Do not obstruct flow of surface drainage or natural watercourses.
- .4 Notify The Departmental Representative if in doubt as to definition of material.
- .5 Select method of excavation, support, and dewatering unless otherwise indicated or directed. Protect property and structures from damage.
- .6 Remove concrete, masonry, paving, walks, demolished foundations and rubble and other obstructions encountered during excavation.

- .7 Extend excavations sufficient distance from footings and walls to allow placing and removal of forms and for placing backfill materials indicated.
- .8 Excavation must not interfere with normal 45° splay of bearing from bottom of any footing.
- .9 When constructing embankment with common material place in uniform layers to full width of embankment. Compact to 95% Standard Proctor Density throughout full width and depth. Maximum rock size: 65% of compacted lift thickness.
- .10 Minimize disturbance of soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .11 Dispose of Surplus and Unsuitable excavated material off site unless otherwise directed. Departmental Representative may instruct Contractor to stockpile or place unsuitable materials within site.
- .12 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .13 Correct unauthorized over-excavation as follows and to the approval of the Departmental Representative:
  - .1 Fill under bearing surfaces and footings with concrete specified for footings.
  - .2 Fill under other areas with Type 2 fill compacted to not less than 95% of corrected maximum dry density.

### **3.4 EXCAVATION OF UNSUITABLE MATERIAL**

- .1 Notify The Departmental Representative whenever Unsuitable Materials are encountered in the Subgrade and remove to depth and extent directed. Isolate area to minimize entry of water into excavation.
  - .1 If such work is due to nature of the soil, the Departmental Representative and Contractor will jointly measure work for payment.
  - .2 If such work is due to any fault of the Contractor, remedial work is responsibility of Contractor.
- .2 Remove and dispose of Unsuitable Materials from trench bottom to extent and depth as required by these specifications and as identified by The Departmental Representative. Replace over excavation of trench with selected site material, granular material or concrete.
- .3 Dispose of Unsuitable Material off-site unless otherwise directed.

### **3.5 ROCK REMOVAL**

- .1 Undertake all rock removal operations to reviewed Excavation and Slate Management Plan.
- .2 Blasting not permitted.
- .3 Remove rock as required to undertake all aspects of construction work.

- .4 Remove rock by hydraulic breaking, wedging, drilling and/or mechanical hammer. Conduct rock removal with all possible care to avoid injury to persons and property.
- .5 Break rock to a depth 300mm below Subgrade. Remove loose rock fragments from slopes.
- .6 Conduct rock removal with all possible care to avoid injury to persons and property.
- .7 Contractor may use broken rock as Common Fill as allowed by regulations and to approval of Authorities Having Jurisdiction and the Departmental Representative.
- .8 Dispose of surplus broken rock in an approved disposal site acceptable to Authorities Having Jurisdiction and Departmental Representative and meeting Sulphide Bearing Material Disposal Regulations.
- .9 Scale, pressure wash and broom clean rock surfaces which are to bond to concrete.
- .10 Excavate trenches to lines and grades to minimum of 300 mm below pipe invert indicated. Provide recesses for bell and spigot pipe to ensure bearing will occur uniformly along barrel of pipe.

### **3.6 STOCKPILE**

- .1 Stockpile fill materials approved for use in areas designated by the Departmental Representative.
- .2 Do not stockpile materials alongside of excavations in such manner that stockpiling will cause side failure or bottom uplift.
- .3 Protect fill materials from contamination.

### **3.7 SUPPORT OF EXCAVATION**

- .1 Install and be responsible for shoring.
- .2 When shoring is required, engage services of a Professional Engineer, registered or licensed in the Province of Nova Scotia, to design shoring and inspect installation.
- .3 Provide record copy of drawings signed and sealed by Professional Engineer responsible for their preparation.

### **3.8 DEWATERING**

- .1 Keep excavations free of water while work is in progress.
- .2 Dewater excavation in a manner which will not endanger stability of the work.
- .3 Protect open excavations against flooding and damage due to surface run-off.
- .4 Dispose of water in accordance with Section 01 35 43 – Environmental Procedures and in manner not detrimental to public and private property, or any portion of work completed or under construction.

- .5 Take precautions to prevent uplift of pipe or structures.
- .6 Provide facilities as required by municipal, provincial or federal regulations to remove suspended solids or other materials before discharging to watercourses or drainage areas.

### **3.9 PLACEMENT OF STRUCTURAL FILL**

- .1 Ensure all building demolitions and removals are completed prior to placement of Structural Fill.
- .2 The Departmental Representative to review Subgrade prior to placement of Structural Fill.
- .3 Within footprint of building, site services and granular parking area, remove existing overburden and fill materials to native till elevation or material capable of meeting specified levels of compaction.
- .4 Place and compact Structural Fill with equipment and in lift thicknesses to ensure the specified levels of compaction throughout.

### **3.10 BEDDING**

- .1 Place and compact foundation layer of bedding for piping to depth indicated, shaped to provide uniform support to pipe structures. Granular bedding for all underground structures shall be as noted on Drawings.

### **3.11 BACKFILLING**

- .1 Use fill of types as indicated.
- .2 Departmental Representative to inspect and approve prepared Subgrade prior to placing any fill material and/or formwork.
- .3 Do not proceed with backfilling operations until Departmental Representative has inspected and approved installations.
- .4 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .5 Do not use backfill material which is frozen or contains ice, snow or debris.
- .6 After installation of pipe, place and compact bedding material in 150mm layers to horizontal centerline of pipe.
- .7 Place and compact remaining bedding material to depth indicated above the top of pipe before further compaction.
- .8 Backfill around installations.
- .9 Complete backfilling by placing and compacting material indicated in 300mm layers. Bring backfill up evenly around structures.
- .10 Control moisture content of backfill materials so that specified compaction may be obtained.
- .11 In areas of pedestrian and vehicular traffic, maintain surfaces level with existing surfaces until reinstatement.

### **3.12 COMPACTION**

- .1 Compact filled and disturbed areas to the following Standard Proctor densities:
  - .1 Subgrade fill - 95%
  - .2 Base and Sub-base courses of granular roadways – 100%
  - .3 Structural fill within future building footprint beneath slab-on-grade – 98%.
  - .4 Landscape areas – 90%
- .2 Density tests: Standard Proctor in accordance with Method B, ASTM D 698. Modified Proctor Density in accordance with ASTM D1557. Relative Density in accordance with ASTM D4253 and D4254.

### **3.13 TESTING**

- .1 Contractor to undertake quality control testing of filled and disturbed areas to ensure compliance with these specifications. Cost of quality control testing to be borne by Contractor.
- .2 At its discretion, the Departmental Representative may undertake inspection and testing of soil compaction. Cost of this testing to be borne by Departmental Representative.
- .3 If Departmental Representative's testing identifies non-compliance with these specifications, Contractor to pay for any additional testing required by Departmental Representative.

### **3.14 SURPLUS MATERIAL**

- .1 Remove Surplus Material from site.
- .2 Remove material not suitable for fill, grading or landscaping from site.

### **3.15 RESTORATION**

- .1 Upon completion of work, remove waste materials and debris, trim slopes, and correct defects as required and as identified by the Departmental Representative.
- .2 Reinstall pavements, lawns or other site features damaged by Work of this section to elevation which existed before excavation.
- .3 Clean and reinstall all areas affected by work and as identified by the Departmental Representative.

**END OF SECTION**