The Executed Agreement including General Conditions and Supplementary Conditions, Division 01, applicable drawings and amendments are part of and are to be read in conjunction with this Section.

1 GENERAL

1.01 GENERAL

.1 Provide and maintain sediment control measures where indicated, prior to construction. Co-ordinate locations with the Departmental Representative. Do not remove control features until authorized by the Departmental Representative.

.2 Provide and maintain sediment control berms where required or as directed, prior to construction. Co-ordinate locations with the Departmental Representative. Do not remove control features until authorized by the Departmental Representative.

1.02 REFERENCE STANDARDS

.1 ASTM A449-14, Test Methods for Analysis of calcium Chloride.

.2 CAN/CGSB 15.1-92, Calcium Chloride.

2 PRODUCTS

2.01 SEDIMENT CONTROL FENCE

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

2.02 SEDIMENT CONTROL BERM

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

.2 Construct sediment control berms as indicated on the project documents.

2.03 DUST CONTROL

.1 Materials:
.1 Calcium chloride, Type I, to CAN/CGSB 15.1, flake, 35% aqueous solution.

.2 Water: to Departmental Representative's approval.

3 EXECUTION

3.01 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.

3.02 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 or as indicated by Project Documents. Lay fabric bottom in trench and backfill with selected excavated material.

3.03 MAINTENANCE OF SILT FENCE

.1 Maintain siltation control features throughout the

construction period. Repair damage to original condition.

.2 Remove accumulated sediment from behind silt fence. Remove silt fence when and as directed by the Departmental Representative.

.3 Maintain vertical alignment of silt fence such that it is always plumb and straight.

3.04 DRAINAGE

.1 Do not pump or drain water containing suspended materials (except as required by bypass pumping of sanitary sewage) into waterways, sewer or drainage systems.

.2 Bypass pumping of sanitary sewage may only be discharged into an existing sanitary sewage sewer system.

3.05 CATCHBASIN FILTRATION

.1 Install sediment traps on all existing and newly installed catch basins to ensure sediment does not enter stormwater system.

3.06 DUST CONTROL

.1 Deliver calcium chloride 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 calcium chloride in weather-proof enclosures.

.3 Apply calcium chloride and water for alleviation and

prevention of dust nuisance caused by equipment and traffic movement when directed by the Departmental Representative.

.4 Apply calcium chloride and 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 calcium chloride is not permitted. Use distributors equipped with spray system that will promote uniform application and with means of shut-off.

END OF SECTION

The Executed Agreement including General Conditions and Supplementary Conditions, Division 01, applicable drawings and amendments are part of and are to be read in conjunction with this Section.

1 GENERAL

1.01 RELATED SECTIONS

.1 Section 32 11 16 - Granular Subbase
.2 Section 32 11 23 - Aggregate Base Courses
.3 Section 32 12 16 - Asphalt Concrete Paving
.4 Section 32 16 15 - Concrete Walks, Curbs and Gutters
.5 Section 32 98 00 - Reinstatement
.6 Section 33 11 16 - Site Water Utility Distribution Piping
.7 Section 33 31 13 - Public Sanitary Sewerage Piping

1.02 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
  .1 ASTM C 117-13, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
  .2 ASTM C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  .3 ASTM D 422-63 (2007), Standard Test Method for Particle-Size Analysis of Soils.
  .4 ASTM D 698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft 3) (600 kN-m/m 3).
  .5 ASTM D 1557-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3) (600 kN-M/m3)
  .6 ASTM D 4318-10, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
  .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.3 Canadian Standards Association (CSA International)
  .1 CAN/CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
    .1 CSA-A3001-08, Cementitious Materials for Use in Concrete.
  .2 CSA-A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete

.4 U.S. Environmental Protection Agency (EPA)/Office of Water
  .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

.5 Nova Scotia Transportation and Infrastructure Renewal (NSTIR)
  .1 Standard Specification for Highway Construction and Maintenance, Latest Edition.

1.03 DEFINITIONS

.1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.
  .1 Rock: solid material in excess of 0.5 cubic meters and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 cubic meter bucket. Frozen material not classified as rock.
  .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.

.2 Topsoil: soil capable of supporting good vegetative growth and suitable for use in top dressing and landscaping.
.3 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
.4 Borrow material: material obtained from locations outside area to be graded and required for construction of fill areas or for other portions of Work.
.5 Unsuitable material: all material which is not suitable for use in work and must be disposed of.
.6 Surplus Material: excavated material not required for re-use.
.7 Subgrade: the surface of mass excavation and embankment finished to the lines and elevations indicated.
.8 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.04 SUBMITTALS

.1 Quality Control: in accordance with Section 01 45 00 - Quality Control:
  .1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.
  .2 Submit proposed dewatering and heave prevention methods as described in PART 3 of this Section for review by the Departmental Representative.
  .3 Submit written notice at least 7 days prior to excavation work to the Departmental Representative.
  .4 Submit testing and inspection results and report as described in PART 3 of this Section to the Departmental Representative.

.2 Preconstruction Submittals:
  .1 Submit construction equipment list for major equipment to be used in this section prior to

start of Work.

.2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field, clearance record from utility authority, and/or location plan of relocated and abandoned services, as required.

.3 Samples:

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

.2 Inform the Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of fill materials and provide access for sampling.

.3 Submit 70 kg samples of type of fill specified including representative samples of excavated material.

.4 Ship samples prepaid to the Departmental Representative, in tightly closed containers to prevent contamination and exposure to elements.

1.05 QUALITY ASSURANCE

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

.2 Keep design and supporting data on site.

.3 Do not use soil material until written report of soil test results are reviewed and approved by the Departmental Representative.

.4 Health and Safety Requirements:

.1 Do construction occupational health and safety in accordance with local standards.

1.06 WASTE MANAGEMENT AND DISPOSAL

.1 Divert excess aggregate materials from landfill to local facility for reuse as directed by the Departmental Representative.

1.07 EXISTING CONDITIONS

.1 Buried Services:

.1 Before commencing work verify location of buried services on and adjacent to 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.

.4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.5 Prior to beginning excavation Work, notify the Departmental Representative and authorities having jurisdiction and establish location and state of use of buried utilities and structures.

.6 Confirm locations of buried utilities by careful test excavations or soil hydrovac methods.

.7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.

.8 Where utility lines or structures exist in area of excavation, obtain direction of the Departmental Representative before removing or re-routing.

.9 Record location of maintained, re-routed and abandoned underground lines.

.10 Confirm locations of recent excavations adjacent to area of excavation.

.2 Existing buildings and surface features:

.1 Conduct, with the Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by

the Departmental Representative.

2 PRODUCTS

2.01 MATERIALS

.1 All granular materials shall be non-ore bearing.

.2 Type 1 granular material: Type 1 gravel in accordance with NSTIR's Standard Specifications for Highway Construction and Maintenance.

.3 Type 2 granular material: Type 2 gravel material in accordance with NSTIR's Standard Specifications for Highway Construction and Maintenance.

.4 Backfill material: selected material approved by the Departmental Representative for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.

.5 Granular Fill within Parking & Landscaped Areas: Select Granular Fill approved by the Departmental Representative's Geotechnical Consultant. Material shall be unfrozen, with a maximum particle size of 200mm and free from cinders, ashes, sods, refuse or other deleterious materials. The material shall be well graded such that smaller particles fill the voids between larger particles and allows for placement of finer materials above and have a fines content less than 15% (based on the minus 75mm portion of fill). Acid bearing material is not acceptable.

.6 Rock Fill within the building zone: Surge fill, as noted below.

.7 Type C3 free-draining material: Type C3 crushed clear stone in accordance with NSTIR's Standard Specifications for Highway Construction and Maintenance.

.8 Type C5 foundation drain clear stone: Type C5 crushed clear stone in accordance with NSTIR's Standard Specifications for Highway Construction and Maintenance.

.9 Surge Fill: well-graded granular material, maximum particle size not to exceed 100 mm and fines content not to exceed 5%.

.10 Sand: hard, granular sharp material, well graded from coarse to fine, free of impurities, chemicals or organic matter, and graded as follows:

Sieve Designation	Percent Passing
5mm	100
0.16mm	0 – 5

.11 Crusher Dust: Crushed aggregate; hard, durable angular particles, free from clay lumps, cementation, organic matter, frozen material and other foreign materials.

Sieve Designation	Percent Passing
5mm	100
2.2mm	63 - 73
0.90 mm	40 - 50
0.40 mm	25 - 35
0.16mm	13 – 21

.12 Rip Rap: Hard, dense (with specific gravity not less than 2.65), non-ore bearing, non-toxic to aquatic life, durable quarry stone, free from seams, cracks or other structural defects, to meet the following size distribution for use intended:

.1 Class A: at least 70% of the rip-rap shall have a minimum dimension of between 150mm and 200mm.

.2 Class B: at least 70% of the rip-rap shall have a minimum dimension of between 200mm and 450mm.

3 EXECUTION

3.01 TEMPORARY EROSION AND SEDIMENT CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent

properties and walkways, according to requirements of authorities having jurisdiction.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal upon completion of the project.

3.02 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Cut pavement neatly and in straight lines along limits of proposed excavation in order that surface may break evenly and cleanly.

3.03 PREPARATION/PROTECTION

.1 Protect existing features in accordance with applicable local regulations.

.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 Departmental Representative 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 buried services that are required to remain undisturbed.

3.04 STOCKPILING

.1 Stockpile fill materials in areas designated by the Departmental Representative.

.1 Stockpile granular materials in manner to prevent segregation and increases in moisture content.

.2 Protect fill materials from contamination.
.3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.05 COFFERDAMS, SHORING, BRACING, AND UNDERPINNING

.1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with the latest edition of the Occupational Health and Safety Act for the Province of Nova Scotia.
  .1 Where conditions are unstable, Departmental Representative to verify and advise methods.
.2 Construct temporary Works to depths, heights and locations as approved by the Departmental Representative.
.3 During backfill operation:
  .1 Unless otherwise indicated or directed by the Departmental Representative, remove sheeting and shoring from excavations.
  .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
  .3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation at least 500 mm above toe of sheeting.
.4 When sheeting is required to remain in place, cut off tops at elevations as indicated.
.5 Upon completion of substructure construction:
  .1 Remove cofferdams, shoring and bracing.
  .2 Remove excess materials from site and restore watercourses as directed by the Departmental Representative.

3.06 DEWATERING AND HEAVE PROTECTION

.1 Keep excavations free of water while Work is in progress.
.2 Dewatering can be accomplished through the use of sump pits installed below the proposed excavation depth or

the installation of well points. Both these dewatering methods should be installed PRIOR to commencing the excavation.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.

.1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

.2 If this is suspected, advise the Departmental Representative and await further instruction.

.4 Protect open excavations against flooding and damage due to surface run-off.

.5 Dispose of water in accordance with local standards to approved collection and in manner not detrimental to public and private property, or portion of Work completed or under construction.

3.07 EXCAVATION

.1 Excavate to lines, grades, elevations and dimensions as indicated.

.2 Excavation must not interfere with bearing capacity of adjacent foundations.

.3 For trench excavation, unless otherwise authorized by the Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.

.4 Any soft spots should be removed and replaced with compacted Surge fill or Type 2 granular material.

.5 Correct unauthorized over-excavation as follows:

.1 Fill under bearing surfaces, footings, structural elements, gravel surfaces and paved areas with Surge fill or Type 2 granular material compacted to not less than 100% of maximum dry density to ASTM D698 or 80% relative density and placed in lifts compatible with the compaction equipment used (lifts not to exceed 300 mm thickness).

.2 Fill in trenches with Type 2 fill compacted to not less than 98% maximum dry density to ASTM D698 and placed in lifts compatible with the

compaction equipment used (lifts not to exceed 300 mm thickness).

.3 Under landscaped areas, place backfill material in lifts not exceeding 300 mm thickness and compact to 95% maximum dry density to ASTM D698.

.6 Rock excavation is included in the contract.

.7 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by the Departmental Representative.

.8 Restrict vehicle operations directly adjacent to open trenches.

.9 Dispose of surplus, unsuitable and waste excavated material off site unless otherwise indicated by the Project Documents.

.10 Do not obstruct flow of surface drainage or natural watercourses.

.11 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.12 Notify the Departmental Representative when bottom of excavation is reached.

.13 Obtain Departmental Representative approval of completed excavation.

.14 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by the Departmental Representative.

.15 Hand trim, make firm and remove loose material and debris from excavations.

.1 Clean out rock seams and fill with concrete mortar or grout to approval of the Departmental Representative.

3.08 FILL TYPES AND COMPACTION

.1 Use types of fill as indicated or specified below.

.1 Under roadway: Sub-grade to be constructed using approved on-site soils, engineered fill, or imported quarried rockfill and gravel or sand and gravel pit run to be proof rolled with a minimum of 3 passes with a 10 tonne vibrating roller under the supervision of the Departmental

Representative's Geotechnical Consultant. Granular base and sub-base placed as indicted on drawings in lifts compatible with the compaction equipment used (lifts not to exceed 300 mm thickness). Compact fill below 300mm of paved areas to 95% SPD and 98% within 300mm of paved are subgrade.

.2 Under landscaped areas: Backfill material. Place in lifts compatible with the compaction equipment used (lifts not to exceed 300 mm thickness). Compact each lift to 95% Standard Proctor Density.

.3 Utility trenches:

.1 Backfill under bearing surfaces, roadways and parking areas: Approved on-site soils, surge fill, or Type 2 granular material placed in lifts compatible with compaction equipment (not to exceed 300 mm). Compact each lift to 100% maximum dry density to A STM D698.

.2 Backfill under landscaped areas: Backfill material. Placed in lifts compatible with compaction equipment (not to exceed 300 mm). Compact each lift to 95% maximum dry density to ASTM D698.

4. Outside of retaining walls: In all areas where interior finished floor is lower than exterior grade backfilling should consist of a granular wedge within a zone bounded by the edge of footing and a line drawing upwards and outwards at 45 degrees from the base of the wall. Granular edge to be constructed with Type 2 compacted to 100% Standard Proctor Density.

5. Under building slab: Slab on grade to be founded on approved undisturbed sub-grade or structural fill. Structural Fill to be approved on-site soils or imported quarried rockfill and gravel or sand and gravel pit run. A 150mm thick layer of 25mm clear stone to be placed below the floor slab for levelling and support purposes. All fill

in building areas shall be compacted to 100% standard proctor density.

3.09 BACKFILLING

.1 Do not proceed with backfilling operations until completion of following:
  .1 Departmental Representative has inspected and approved installations.
  .2 Departmental Representative has inspected and approved of construction below finish grade.
  .3 Removal of concrete formwork.
  .4 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.
.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
.3 Do not use backfill material which is frozen or contains ice, snow or debris.
.4 Place backfill material in lifts compactible with the compaction equipment used (lifts not to exceed 300 mm thickness). Compact each layer before placing succeeding layer.
.5 Place backfill in accordance with Section 3.8 FILL TYPES AND COMPACTION.
.6 Backfilling around installations:
  .1 Place bedding and surround material as specified elsewhere.
  .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
  .3 Place layers simultaneously on both sides of installed Work to equalize loading.
  .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:
    .1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from the Departmental Representative or:
    .2 If approved by the Departmental

Representative, erect bracing or shoring to counter act unbalance, and leave in place until removal is approved by the Departmental Representative.

3.10 MASS EXCAVATION

.1 Establish with Departmental Representative lead time required to take measurements. Notify Departmental Representative in accordance with agreed lead time.
.2 Excavate and place fill to lines and grades indicated.
.3 Maintain crowns and cross slopes to provide surface drainage.
.4 When rock, or unsuitable material is encountered notify Departmental Representative for measurement.
.5 Break rock to depth 300mm below subgrade. Excavate broken rock to subgrade or as indicated by project documents. Remove loose rock fragments from slopes.
.6 Remove existing pavement encountered within 300mm of subgrade elevation.
.7 Do not place material which is frozen or place material on frozen surfaces.
.8 When constructing embankment with common material place in uniform layers to full width of embankment. Compaction as outlined in Section 3.8 Fill Types and Compaction.
.9 When constructing embankment with rock fill, place to full width of embankment in layers of sufficient depth to contain maximum sized rocks, but in no case is thickness to exceed 450mm. Fill interstices with rock fragments or earth to form compact mass. Fill voids at subgrade level to prevent migration of fine material.
.10 Do not place boulders or broken rock fragments with dimensions greater than 200mm within 300mm of subgrade.
.11 Shape and compact material to within 40mm of design subgrade elevation, but not uniformly high or low.
.12 Finish side slopes uniformly to lines and elevations

indicated. Remove boulders encountered in cut slopes and fill resulting cavities.

3.11 BREAKING ROCK WITHOUT REMOVAL

.1 Break Rock without removal to lines and grades indicated.
.2 Break rock below street subgrade such that maximum dimension of rock fragments within 300mm of subgrade is 200mm.
.3 Break Rock for future removal as follows:
  .1 Mass: maximum size of 90 percent of volume of rock broken is less than 0.5 cubic meters with no fragments exceeding one cubic meter.
  .2 Trench: Maximum size of 90 percent of volume of rock broken is less than 0.3 cubic meters with no fragments to exceed 0.5 cubic meters.
.4 Excavate broken rock to depth indicated at test locations selected by Departmental Representative in accordance with following criteria:
  .1 Mass: one test hole for each 1000 square meters of surface area with a minimum of one test hole in each location
  .2 Trench: One test hole for each 30 meters along trench with minimum of one test hole at each separate trench.
.5 Should test excavation indicate that breaking techniques do not give required results, do remedial work.
.6 Backfill test excavations after inspection using excavated materials.

3.12 ROAD GRAVELS

.1 Prior to placing road gravels, grade surface to within 40mm of elevations and cross sections indicated but not uniformly high or low. Compact top 300mm to 98% Standard Proctor Density or as indicated in the

Project Documents.

.2 Place Gravels in uniform layers not exceeding 200mm to thickness indicated. Grade intermediate gravel courses to within 30mm of elevations and cross-sections indicated, but not uniformly high or low. Compact to 100% Standard Proctor Density or as indicated in the Project Documents.

3.13 TESTING

.1 Geotechnical & Materials Testing to be completed by Departmental Representative's Inspection and Testing Consultant. Coordinate and assist Departmental Representative to gather samples and inspect the work as necessary.

3.14 RESTORATION

.1 Upon completion of Work, remove waste materials and debris and trim slopes, and correct defects as directed by the Departmental Representative.

.2 Replace topsoil as directed by the Departmental Representative.

.3 Reinstate lawns to elevation which existed before excavation.

.4 Reinstate pavements and curb disturbed by excavation to thickness, structure and elevation which existed before excavation.

.5 Clean and reinstate areas affected by Work as directed by the Departmental Representative.

.6 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION