SEEDING

PART 1 GENERAL

1.1 Description of Work

.1 This section describes the labour, materials, and installation requirements necessary to complete the seeded turf planting related items as indicated or specified.

1.2 Related Work

.1	All Division 1	Specification Sections
.2	Section 01600	Material, Equipment & Workmanship Quality
.3	Section 02311	Site Grading
.4	Section 02911	Site Topsoil & Finish Grading

1.3 Product Data

.1 Submit product data in accordance with Section **01330 Submittals**.

.2 Provide product data for:

.1 Seed
.2 Mulch
.3 Fertilizer

1.4 Delivery, Storage and Acceptability

.1 All grass seed hydraulic mulch, fertilizers and other related materials, where required, shall be stored in a dry, weatherproof area and shall be protected from damage by heat, moisture, rodents, or other elements until the time of seeding or use. All material shall be labelled by grower or manufacturer as separate items and shall not be removed or defaced.

.2 Bulk deliveries of seed shall be accompanied with delivery tickets specifying percentage germination, purity, and noxious weed seed content.

1.5 Measurement for Payment

.1 Seeding will be measured as per square metre unless otherwise stipulated in the Bid Document – Price Schedule.

1.6 Job Conditions

.1 The turf areas will be free of waste or debris developed by other trades. Any discrepancy from such conditions shall be reported to

the Contractor before beginning construction.

1.7 Grading

.1 The Contractor shall grade all turf areas as noted on the Contract Document drawings;

.2 Fine grade all turf areas eliminating rough or low areas to ensure positive drain age.

PART 2 PRODUCTS

2.1 Grass Seed Mixture

.1 Consult the Consultant to determine specific requirements for seed mixture application. Fertilizer application rates are to be as recommended in the soils test report.

.2 Grass Seed shall be Certified Canada No. 1 Grade to Government of Canada, Seeds Regulations and having minimum germination of 85% and minimum purity of 97%.

.3 Seed mixtures shall be suited to the climate, soil conditions and type, orientation, sun exposure, terrain, establishment and maintenance conditions under which they are to be grown.

.4 The mixture shall be mixed and supplied by a recognized certified seed supplier.

2.2 Seed Labelling

.1 All seed and seed mixes shall be in the original sealed package with the original legible label securely attached.

.2 Labelling shall conform to the requirements of the Canadian Seeds Act and Regulations. Each package shall be labelled to show:

1. The name and address of the seed supplier.
2. The seed species, or the name of the seed mix and the various individual seed species that comprise the seed mix and the percentage by mass.
3. The grade of the seed or seed mix.
4. The supplier’s name and lot designation number.
5. Mass in kilograms
6. Date and location of bagging
7. Year of production

.3 Seeding mix specification for **Upland Naturalization Seed Mix**.

40% Elymus riparius (Riverbank Wild Rye)
25% Oenethera biennis (Evening Primrose)
10% Rudbeckia hirta (Black Eyed Susan)
5% Euthamnia graminifolia (Grass Leaf Goldenrod)
5% Carex granularis (Open Field Sedge)
2% Solidago Canadensis (Canada Goldenrod)
2% Asclepsis syriaca (Common Milkweed)
1% Aster cordifolius (Heart Leaved Aster)
1% Aster novae-angliae (New England Aster)
1% Anenome canadensis (Canada Anenome)
1% Clematis virginiana (Virgins Bower)
1% Monarda fistulosa (Wild Bergamot)

Seed rate to be 26 kg/Ha.

To be spread with Lolium multiflorum cover crop. Cover crop seed rate to be 22 kg/Ha. Ideally seed in Fall.

.4 Seeding mix specification for **Tableland parks**:

48% Creeping Red Fescue
15% Majestic Kentucky Bluegrass
13% Palmer Perennial Rye Grass
11% Gator Perennial Rye Grass
7% Fortress Creeping Red Fescue
6% Yorktown II Perennial Rye Grass

.5 Seed mix specification for **Valleylands**:

10% White Clover
15% Fiesta Perennial Rye Grass
10% Mustang Tall Fescue
10% Creeping Red Fescue
15% Timothy
10% 'Dormie' Kentucky Blue Grass
30% Bird’s Foot Trefoil

.6 Seed mix specification for **Road Buffers:**

25% RFT Tall Fescue (Festuca arundiancea ‘Rhizomatous’)
30% Perennial Rye Grass (Lolium perenne)
25% Creeping Red Fescue (Festuca rubra)
5% Kentucky Blue Grass (Poa pratensis)
5% White Clove (Tripofolium repens)
10% Bird’s Foot Trefoil (Lotus corniculatus)

.7 Seed rate as per manufacturer's recommendation.

.8 Seed will be shipped in containers with original tags from recognized supplier

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2.3 Mechanical Seeding

.1 Use equipment suitable for specified area to approval of Consultant. Where area allows, the "Brillion" type equipment is recommended.

.2 Use manually operated broadcast seeder only for small specific locations and areas inaccessible to "Brillion" seeding.

.3 Sow at the rate of as per manufacturer's recommendation during calm weather and when soil moisture content is adequate for germination.

.4 Sow seed in two directions, 50% of seed in one direction and remaining 50% of seed at right angles to first seeding pattern, using same method of seeding.

.5 Cover broadcasted seed by raking and chain harrowing.

.6 Hydro-Mulching:

.1 Mix fibre mulch with water according to manufacturer's recommendations, and apply to seeded areas at a minimum rate of 1600 kg/ha (16kg/100m2). Apply 2250 kg/ha (22.5 kg/100m2) on areas subject to wind and water erosion.

.2 Add and mix tackifier into slurry of water and fibre mulch and apply as required according to manufacturer's instructions and recommendations.

.3 Using hydro-mulching equipment, apply fibre mulch slurry mixture within twenty-four (24) hours of mechanical seeding. Achieve uniform coverage after application.

.7 Roll seeded grass with roller not exceeding 50 kg where uneven soil conditions warrant.

.8 Water entire area with fine spray after each area has been sown. Apply water only where application of water is practical and will not interfere with other Work.

.9 Apply enough water to ensure penetration of at least 50 mm, avoid

washing out seeds.

2.4 Hydro-Seeding and Mulching

.1 Proceed with hydro-seeding only after final grade has been approved by Contractor.

.2 No Hydro-seeding shall be performed when wind speeds exceed 10 km/h, over frozen soil, or on ground covered in snow, ice or standing water. Hydro-seed only when conditions are favourable for successful seed germination.

.3 Do not spray onto structures, signs guardrails fences, plant material, utilities and other than surfaces intended. Clean-up immediately, any material sprayed where not intended to the satisfaction of the Consultant.

.4 One- Step Hydraulic Seeding and Mulching

.1 Thoroughly mix grass seed, fertilizer, fibre mulch and water to obtain following slurry mixture and application rates per hectare.

1. Grass Seed – 300 kg/ha.
2. Fertilizer – (12-51-0) at 300 kg/ha.
3. Fibre Mulch – minimum 1600 kg/ha or 2250 kg/ha on areas subject to wind and water erosion.
4. Water – minimum 32,000 litres and to fibre mulch manufacturer's recommendations.

.2 Add tackifier directly into slurry mixture and thoroughly mix at rate recommended by manufacturer. Apply tackifier as required according to manufacturer's instructions.

.3 Using appropriate hydraulic hydro-mulching equipment, apply slurry mixture uniformly at optimum angle of application.

.4 Use proper nozzles for application and provide hose extensions to propel mulch slurry to inaccessible areas.

.5 Agitate slurry mix consistently during spraying to keep it homogeneous and avoid blockage to pipes.

2.5 Terra Seeding

.1 Terra Seeding Installation contractor must have three (3) years proven experience in the application of Terra Seeding using a

Blower Truck.

.2 A legible, valid Seed Analysis Certificate from a Seed Testing Laboratory approved by the Canadian Food Inspection Agency (CFIA) for all single seed species and all seed mixtures shall be provided to the Consultant twenty-four (24) hours prior to any seeding operations. The Seed Analysis Report shall stipulate the seed supplier's lot designation numbers.

.3 Test Results from the Seed Analysis Certificate shall specify germination and purity for each seed species of the mix as well as the seed mix composition expressed as a percentage of each see species by mass for each seed mix specified in the contract. Test results shall meet or exceed the value for the various seed mixes as specified by the consultant.

.4 Materials:

.1 Permanent Seed Mixes: Use permanent seed mixes as specified on drawings.

.2 Annual Nurse Crop Seed: Nurse crop seed shall be a cereal grain such as Annual Ryegrass, Fall Rye Grain or Winter Wheat Grain unless otherwise approved by the Consultant.

.3 Fertilizer: Shall comply with the provisions of the Canadian Fertilizers Act and Fertilizer Regulations. Fertilizer shall be supplied in original bags bearing the manufacturer's original label indicating mass and analysis. All fertilizer shall be in granular form, dry, free flowing and free from lumps, and applied at rates specified by the Consultant.

.4 Composted Topsoil: Shall be pre-mixed and shall consist of a minimum 60% compost material. The composted topsoil may be amended by the additional of concrete sand and peat loam. Concrete sand shall be added to improve aeration and soil structure. Peat loam shall be added to adjust the pH of the compost and to make the composted topsoil lighter and easier to blow. Both amendments shall be added at the discretion of the Contractor to ensure that the composted topsoil meets the material specification and is suited for distribution by a pneumatic blower. Once mixed, composted topsoil material shall consist of particles where 100% of the material is able to pass through a 25 mm sieve.

.5 Compost: Shall be derived from a well-composted green organic waste matter from an approved source. All compost

material shall meet the Ontario Ministry of the Environment's Interim Guidelines for the production and Use of Aerobic Compost in Ontario definition for Type A compost and shall be supplied from composting sites certified to meet the Ontario Ministry of the Environment's Compost Regulation 101.

.6 Concrete sand shall have a pH range from 7.7 to 8.0 with a mid-range of 7.8 and shall meet gradation requirements for concrete sand as described in OPSS.

.7 Peat loam shall consist of a minimum 50% organic matter and equal parts sand, silt and clay. Peat loam shall be suitable for horticultural purposes. Shredded particles shall not exceed 16 mm in size.

.5 Equipment:

.1 Pneumatic Blower Truck: Shall be a custom manufactured, fully integrated, truck mounted unit. The blower truck shall be equipped with a computer-calibrated seed injection system and shall be capable of uniformly applying composted topsoil and seed at a rate greater than 0.25 cubic meters of material per minute. The blower truck shall also be equipped with an application hose capable of extended 90 meters from the blower truck unit.

.6 Operational Constraints :

.1 The composted topsoil and seeding operation shall not commence until a legible, valid Seed Analysis Certificate and a legible, valid signed declaration from the compost supplier has been approved by the Consultant.

.2 The composted topsoil and seeding operation shall not commence until the Consultant has approved the surface preparation and the layout of permanent seed mixes.

.3 The composted topsoil and seeding application and or the re-application shall not be carried out under adverse field conditions such as high wind, frozen soil or soil covered with snow, ice or in areas of standing water to a concentrated flow of water.

.4 The Contractor shall maintain the site and control erosion until conditions permit application or re-application of seed and compost topsoil.

.5 The surface shall be prepared not more than seven (7) calendar days before the seeding operation. No seeding or composted topsoil application shall come in contact with the foliage of any trees, shrubs, or other vegetation. No seed or composted soil application shall come in contact with water bodies.

.7 Application Rates for Composted Topsoil:

1. Depending of the slope gradation, depth and composted soil, seed shall be as follows:

0- 5% slope:	10-15 mm. depth
5- 10% slope:	15-20 mm. depth
10-25% slope:	(4:1) 20-25 mm. depth.
25-35% slope:	(3:1) 25-40 mm. depth
35-45% slope	(40-50 mm. depth

2. Composted Topsoil and Seed Application

1. Prior to the application of the composted topsoil and seeding, the Contractor shall ensure that the pneumatic blower has been properly calibrated to provide the specified amounts of seed and that the blower can adequately uniformly apply composted topsoil and seed at a rate greater than .025 cubic meters of material per minute.

2. Once the blower has been calibrated, the Contractor shall apply composted topsoil and seeding uniformly ay specified depths to all areas identified for cover in the contract drawings or as directed by the Consultant.

2.6 Water

.1 Water used should be potable and shall be free of impurities that would inhibit germination and growth or may be harmful to the environment.

2.7 Seed Protection on Slopes and Ditches

.1 Erosion Control Blanket: where applicable, refer to plans for extent.

.1 Bonterra S1 Erosion Control Blanket or approved alternate: 100% weed free wheat straw .50 lb./yd^2. Netting on top side made of photo-degradable polypropylene or alternate with

mesh openings of approximately (13 mm x 13 mm). Blanket sewn with biodegradable or photo-degradable thread on 50 mm centres or approved alternate.

.2 Cover all prepared and seeded slopes 3:1 or steeper with erosion control blanket.

.3 Unroll blanket either horizontally or vertically to the slope without stretching or pulling.

.4 Lay blanket smoothly on soil surface. Overlap adjacent sections of blanket minimum 100 mm and use metal staples.

.5 Secure blanket to ground with staples in accordance with the erosion control blanket manufacturer's instructions.

.6 Minimize damage to seedbed during installation of blanket. Re-grade by hand raking as required, to correct any damage.

.7 In ditches and swales, unroll blanket in the direction of flow. Overlap adjacent sections of blanket minimum of 100 mm with upstream section on top and stapled. Follow manufacturer's installation recommendations.

2.8 Protection of Seeded Areas - General

.1 Immediately after seeding provide adequate protection against erosion, pedestrian and vehicular traffic damages. Protect newly seeded areas along walkways using bright coloured ribbon or fencing when necessary. Remove protection after seeded areas become established or when directed by the Consultant.

.2 Keep site well drained and landscape excavations dry.

PART 3 EXECUTION

3.1 Workmanship

.1 Do not perform Work under adverse field conditions such as frozen ground or ground covered with snow, ice or standing water.

3.2 Preparation of Surfaces

.1 At the time of seeding, all top soiled areas designated for seeding shall be free from erosion and shall have a fine graded, uniform surface free of humps and hollows. The surface shall be uniformly

cultivated with agricultural implements to a minimum depth of 50mm and shall not have surface stones greater than 50mm in diameter, weeds or other unwanted vegetation. Ensure areas are free of deleterious and refuse materials.

.2 Soil to be loose, friable and suitable as a seedbed to germinate seed, free of humps and hollows and deleterious materials.

.3 Obtain approval of topsoil grade and depth from the Consultant before starting seeding.

3.3 Area and Layout

.1 The locations of the different, permanent seed mixtures and composted topsoil shall be staked out on the ground surface in accordance with the contract documents. Stakes shall be used to indicate the limits of each type of seed mix.

3.4 Seeding

.1 Schedule seeding to be carried out when seasonal conditions are likely to ensure successful germination and a continued growth of all species of seed in the grass mixture establishment. All seeding shall be done during calm weather and on soil that is free of frost, snow and standing water.

.2 Seed shall be applied by Mechanical Dry Seeding, Terra Seeding, or Hydraulic Seeding unless otherwise specified.

.3 Sow seed uniformly at the rate as per manufacturer's recommendations.

.4 Seed between August 15th and September 15th, and between April 15th and May 1st unless otherwise directed by the Consultant.

.5 Blend applications into adjacent grass areas or sodded areas previous applications to form uniform surfaces.

.6 Embed seed into soil to depth of 5 mm within one hour of sowing.

.7 Roll area immediately with water ballast type idler prior to watering.

.8 Install Erosion Control Material as per manufactured instructions in areas as shown on plans and details.

.9 Protect seeded areas against damage by using temporary protective hoarding and signage to protect newly seeded areas from damage

including erosion, pedestrian and vehicular traffic or wild life. Remove this protection after lawn areas have been accepted by the Consultant.

3.5 Establishment

.1 Perform following operations from time of seed application until Preliminary Acceptance:

.1 Repair and reseed dead or bare spots to allow establishment of seed prior to Preliminary Acceptance.

.2 Cut grass to 40 mm whenever it reaches height of 60 mm. Remove clippings which will smother grass.

.3 Fertilize seeded areas after first cutting at the recommended rate per hectare as per testing agency. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well. Postpone fertilizing until following spring if application falls within four week period prior to expected end of local growing season.

.4 Eliminate weeds by mechanical means.

3.6 Maintenance

Perform the following operations from time of installation to acceptance and until the end of warranty period:

.1 Apply water in sufficient quantities to maintain optimum soil moisture level for germination and continued healthy growth of grass. Promptly repair and reseed any damage that occurs through washout of soil.

.2 Areas with no irrigation system: supply labour, hoses and attachments necessary to provide adequate watering to prevent grass and underlying soil from drying out.

.3 Provide clean water and water hauling vehicle with proper attachments to provide efficient and adequate watering of seeded areas when necessary.

.4 Provide weed control in newly seeded areas by mowing when required or directed by the Consultant. Cut and maintain weed growth to height of 100 mm. Remove all weed and grass clippings.

.5 Control and eliminate turf damaging pests that appear in newly seeded areas.

.6 Cut lawn grass at regular intervals and maintain minimum height of 60 mm. Cut forage or native type grass at 80 to 100 mm or as directed by the Consultant. Do not cut more than 30% of blade at any one mowing. Remove clippings that will smother grass.

.7 Re-seed areas which show root growth failure, deterioration, bare or thin spots, or which have been damaged by any means or cause, including replacement operations. Overseed areas that show inadequate or improper sowing of seed from Brillion or other methods.

.8 Fertilize seeded areas during establishment period, minimum six (6) weeks after seeding, with 27-14-0 fertilizer or as directed by the Consultant. Spread evenly at rate of 3 kg/100 m^2, water in well.

.9 Maintain daily maintenance log throughout Contract. Submit copy of log data to the Consultant each week for verification. Record all maintenance activities performed on site.

.10 The Consultant may extend maintenance period at no additional cost when Contractor fails to: maintain an accurate log; submit log when required; or when unsatisfactory and inadequate maintenance occurs.

3.7 Preliminary Acceptance

.1 Seeded areas will be accepted by the Consultant provided that:

.1 Areas are uniformly established to minimum of 95% and turf is free of rutted, eroded, bare or dead spots and free of weeds.

.2 Areas have been cut at least twice.

.3 Areas have been fertilized.

.2 Areas seeded in fall which have not received two (2) cuts will be reviewed for Preliminary Acceptance the following spring, one (1) month after start of growing season provided Preliminary Acceptance conditions are fulfilled.

3.8 Restoration

.1 Upon completion of Work, remove all or any surplus materials and

debris off site.

.2 Reinstate pavement and sidewalks, all amenities, etc., at elevation which existed before excavation.

.3 Clean and reinstate areas affected by Work as directed by the Consultant.

.4 Correct any or all deficiencies previously recorded.

3.9 Warranty

.1 Guarantee seeded areas due to faulty material and workmanship for a period of two (2) years from the issue date of the Substantial Performance of the work. Refer to Section **01700 Contract Closeout, Takeover & Warranties** for submittal requirements.

END OF SECTION - 02924