

**PART 1 - GENERAL**

- 1.1 RELATED SECTIONS
- .1 Section 011400 – Work Restrictions
  - .2 Section 013300 – Submittals Procedures
  - .3 Section 310099 - Earthworks for Minor Works
  - .4 Section 313119.14 - Erosion Control
  - .5 Section 313221 - Geotextile
  - .6 Section 329121 - Topsoil Placement and Grading
- 1.2 BASIS FOR PAYMENT
- .1 ITEM 6: The terraseeding including all materials, tooling, labour and monitoring necessary to complete the works presented in the drawings and without limit the work described below will be paid based on the actual quantities measured on site and the unit prices in the unit prices stated in the Bid and Acceptance Form.
  - .2 The maintenance of the seeded surfaces is included in the lump sum.
- 1.3 REFERENCES
- .1 Canada Seed Act and Regulations, (1959,c.35,article 1).
  - .2 Canada Fertilizer Act and Regulations, (CRC, c.1400).
  - .3 Ontario Pesticide Act and Regulations, current version.
  - .4 US Composting Council TMECC Manual,  
([www.compostingcouncil.org](http://www.compostingcouncil.org))
- 1.4 SUBMITTALS
- .1 Product Data.
    - .1 Submit product data in accordance with Section 013300 - Submittal Procedures. Provide a legible, valid certificate of Seed Analysis from a Seed Testing Laboratory, approved by Agriculture and Agrifood Canada, for all seed mixes shall be provided to the Departmental Representative a minimum of 15 days prior to any seeding operations.
  - .2 Provide product data for:
    - .1 Seed.
    - .2 Mulch
    - .3 Compost.
    - .4 Natural fertilizer
  - .3 Submit in writing to Departmental Representative seven (7) days prior to commencing work:
    - .1 Volume capacity of hydraulic seeder in litres.
    - .2 Amount of material to be used per tank based on volume.
    - .3 Number of tank loads required per hectare to apply specified mixture per hectare.

1.5 SCHEDULING

- .1 Schedule seeding so to coincide with the preparation of surfaces and installation of retention mulch. Seeding must be done under mulch layer.
- .2 Schedule hydro mulch/seeding using grass mixtures between dates recommended by the Provincial Agricultural Department.
- .3 Seeding shall be carried out during Spring planting periods, at specified in Section 011400 – Work Restrictions.
- .4 The Contractor must take into account the date of seeding in his schedule.
- .5 The seed supplier must be present during seeding work. The Contractor shall advise seed supplier seven (7) days prior to the commencement of work so that he can inspect the site before planting. Departmental Representative must be present during site inspection.

**PART 2 - PRODUCTS**

2.1 MATERIALS

- .1 The seed mix must correspond to the following mixture:

Species (French)	Variety	Species (English)	% seed
Raygrass (Ivraie) vivace	Médaille / Rangnar II	Perennial ryegrass	30
Fétuque gazonnante	Culumbra / Chancellor	Chewing fescue	30
Fétuque rouge traçante	Aberdeen	Creeping red fescue	25
Pâturin rude	Sun Up / Laser II	Rough bluegrass	15

*Seeding rate de 6 lb / 1000 pi<sup>2</sup> (285 kg / ha)*

2.2 MULCH

- .1 Mulch: Specially manufactured for erosion control of steep, rough, exposed or denuded slopes, non-toxic, water-activated and giving a green color, free of germination and growth inhibitors. and offering the following characteristics:
  - .1 Mulch :
    - .1 The mulch must be made of recycled wood phyto-sanitized wood fibers, a mineral activator made for seeding on steep slopes. All components of the HP-FGM shall be pre-packaged by the Manufacturer to assure both material performance and compliance with the following values. No chemical additives with the exception of fertilizer, soil pH modifiers, extended-term dyes and biostimulant materials should be added to this product.
    - .2 Organic matter level: 95%, more or less 0.5%.
    - .3 pH: 6.0.
    - .4 100% Biodegradable
    - .6 Thermally Processed (within a pressure vessel)

- Wood Fiber – 80% + 3%, heated to a temperature greater than 380 degrees Fahrenheit (193 degrees Celsius) for 5 minutes at a pressure greater than 50 psi (345 kPa)
- .7 Crosslinked Biopolymers and Water Absorbents – 10% ± 1%
- .8 Crimped, Man-made Biodegradable Interlocking Fibers – 5% ± 1%
- .9 Micro-Pore Granules – 5% ± 1%
- .10 Tackfier solvable in water.

	Test Method	Units	Minimum Value
<b>Physical Properties</b>			
Mass/Unit Area	ASTM D65661	g/m2 (oz/yd2)	407 (12)
Thickness	ASTM D65251	mm (in)	5.6 (0.22)
Erosion Control Effectiveness	ASTM D68181	N/m (lb/ft)	131 (9)
Ground Cover	ASTM D65671	%	99
Water-Holding Capacity	ASTM D7367	%	1700
Material Color	Observed	n/a	Green
<b>Environmental Properties</b>			
Biodegradability	ASTM D5338	%	100
Functional Longevity	ASTM D5338	n/a	Up to 18 months
Ecotoxicity	EPA 2021.0	%	96-hr LC50 > 100%
Effluent Turbidity	Large Scale	NTU	< 100
<b>Performance Properties</b>			
Cover Factor	Large Scale	n/a	< 0.01
Percent Effectiveness	Large Scale	%	> 99
Cure Time	Observed	hours	0-2
Vegetation Establishment	ASTM D73221	%	> 800
<b>Production Composition</b>			
Thermally Processed Wood Fibers (within a pressurized vessel)			<b>Typical Value</b> 80% ± 3%
Cross-Linked Biopolymers and Water Absorbents			10% ± 1%
Crimped, Man-Made Biodegradable Interlocking Fibers			5% ± 1%
Proprietary Mineral Activator			5% ± 1%

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|-----------------------|----|---|
| 2.3 <u>WATER</u>      | .1 | Free of impurities that would inhibit germination and growth. Avoid stagnant water. Use a 75 mm filter to filter seeding water, to avoid contamination by undesired seed species.   |
| 2.4 <u>FERTILIZER</u> | .1 | To Canada "Fertilizers Act" and "Fertilizers Regulations".  |
|                       | .2 | Incorporate in the first 100 mm a natural fertilizer of non-animal origin, whose ratio corresponds to 1-2.5-1. Perform a first application to seedlings, then a second, 20 days after seeding and finally a third, 90 days after seeding. |
| 2.5 <u>INOCULANTS</u> | .1 | As specified in the section 329121 – Top Soil Placement and Grading.  |
| 2.6 <u>TOPSOIL</u>    | .1 | Topsoil composition must comply with section 329121 Topsoil and Finish Grading.   |

### **PART 3 - EXECUTION**

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|------------------------------------|----|--|
| 3.1 <u>WORKMANSHIP</u>             | .1 | Do not spray onto structures, signs, guiderails, fences, utilities and, fences, planting beds, other than surfaces intended.   |
|                                    | .2 | Clean-up immediately, any material sprayed where not intended with clean water, to satisfaction of Designated Representative   |
|                                    | .3 | Do not perform work under adverse field conditions such as wind speeds over 10 km/h, frozen ground or ground covered with snow, ice or standing water.   |
|                                    | .4 | Protect seeded areas from trespass with temporary fencing until plants are established to acceptance standards.  |
| 3.2 <u>PREPARATION OF SURFACES</u> | .1 | Place topsoil following specifications in Section 329121 - Topsoil Placement and Grading.  |
|                                    | .2 | Perform seeding before placing soil retention membrane in phase 1 and perform seeding above the anti-erosion mulch mat in phases 2 and 3. Perform terrasseding under any new anti-erosion mulch mat installed in phases 2 and 3. |
|                                    | .3 | Fine grade areas to be seeded free of humps and hollows. Ensure areas are free of deleterious and refuse materials. Apply no geotechnically sound slopes.  |
|                                    | .4 | All bare soil areas must be seeded. Proceed as specified in section 313119.14 Erosion Control.   |
|                                    | .5 | Ensure areas to be seeded are moist to depth of 150 mm before seeding  |
|                                    | .6 | Obtain Departmental Representative approval of grade and topsoil depth before starting to seed.  |

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- 3.3 PREPARATION OF SEEDING MIXTURE
- .1 Mix fertilizer following recommendations of the manufacturer of the seeding mixture.
  - .2 Measure the quantities by weight or volume, by the means of a graduated container to the satisfaction of Departmental Representative. Provide all equipment necessary for the accurate measurement of quantities required for mixture.
  - .3 Pour the required amount of water in the hydraulic seeder. Start the agitator prior to adding seeding mixture. Spray mulch and load slowly.
  - .4 Mulch should be added to seeding mixture in sufficient quantity to allow a uniform application of the mixture.
- 3.4 PREPERATION OF MIXTURE
- .1 Prepare the mixture of from water and mulch (including fixative agent).
- 3.5 APPLICATION OF SEEDING MIXTURE
- .1 Hydraulic seeding equipment:
    - .1 Slurry tank.
    - .2 Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and/or mechanical agitation method.
    - .3 Capable of seeding by 50 m hand operated hoses and fantype nozzle (50-degree tip).
    - .4 Tank volume to be certified by certifying authority and identified by authorities "Volume Certification Plate".
  - .2 Mixing:
    - .1 Fill 1/3 of mechanically agitated hydroseeder with water. Turn pump on for 15 seconds and purge and pre-wet lines. Turn pump off.
    - .2 Turn agitator on and load low density materials first (i.e. seed).
    - .3 Continue slowly filling tank with water while loading fiber matrix into tank.
    - .4 The mulch mixture should be completely loaded before water level reaches 75% of the top of tank.
    - .5 Top off with water and mix until all fiber is fully broken apart and hydrated (minimum of 10 minutes — increase mixing time when applying in cold conditions).
    - .6 Add fertilizer
    - .7 Shut off recirculation valve to minimize potential for air entrainment within the slurry.
    - .8 Slow down agitator and start applying.
  - .3 Spread the seeding mixture consisting of seeds, mulch, tackifier, water and fertilizer according to the proportions suggested by the supplier.
  - .4 Apply seeding mixture uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
    - .1 Using correct nozzle for application.
    - .2 Using hoses for surfaces difficult to reach and to control application.

- .5 Apply seeding mixture evenly over the determined surface. Seeding should be done under calm weather where the wind speed is below 10 km/h.
- .6 Blend application 300 mm into adjacent seeded areas from previous applications to form uniform surfaces. Spread seeding mixture as many times as necessary in order to cover required area. The layer of mulch must be between 5mm and 10 mm thick.
- .7 Re-apply where application is not uniform.
- .8 Spread seeding mixture as many times as necessary in order to cover required area completely. The layer of mulch must be between 5mm and 10 mm thick. Perform at least 2 applications, one with the fertilizer, the soil amendments and 50% of the seeds and the other with the balance of the seed at a rate of 50 lbs / 125 gallons (23 kg / 475 litres) of water.
- .9 Application rates

< 4H to 1V	2500 lb/ac	2800 kg/ha
> 4H to 1V and < 3H to 1V	3000 lb/ac	3400 kg/ha
> 3H to 1V and < 2H to 1V	3500 lb/ac	3900 kg/ha
> 2H to 1V and < 1H to 1V	4000 lb/ac	4500 kg/ha
> 1H to 1V	4500 lb/ac	5100 kg/ha
- .10 Drizzle seeded areas delicately like fine rain in order to avoid that the seed be carried away by the water. Allow for water to reach a depth of 50 mm in soil, without causing runoff.
- .11 Remove any sprayed product from structures and surfaces that should not have been sprayed.
- .12 Prevent any movement on sown areas, to the satisfaction of the Departmental Representative.
- .13 Remove protections, according to the guidelines set by Departmental Representative.
- .14 Spread on the ground, after sowing, mycorrhizal inoculant at the rate of 2 kg / 1002.

3.6 MAINTENANCE DURING  
ESTABLISHMENT PERIOD

- .1 Perform following operations from time of seed application and for four (4) months between May 15 and October 15, or, if the four (4) months period is not over by October 15 of the year that the seeding was executed, the remaining of the establishment period is transferred to the following year, starting May 15. Three (3) separate fertilizations must have been performed before the end of the establishment period. Maintenance of the seeded areas follow seeding performed at each phase.
  - .1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
  - .2 Spread fertilizer according to the manufacturer's recommendations: (the first application during seeding).  
2nd application 20 days after seeding.  
3 rd application 90 days after sowing.

3.7 ACCEPTANCE

- .1 Seeded areas will be accepted by Departmental Representative provided that:
  - .1 Plants are uniformly established, and seeded areas are free of rutted, eroded, bare or dead spots.
  - .2 Areas have been fertilized.
  - .3 Areas seeded in spring will achieve final acceptance one month after beginning of growth period of provided acceptance conditions are fulfilled.

3.8 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**\*\*\* END OF SECTION \*\*\***