



**CONSTRUCTION SPECIFICATION FOR  
SEED AND COVER**

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**804.01 SCOPE**

This specification covers the requirements for seeding with either rolled erosion control products or hydraulically applied erosion control products.

**804.01.01 Specification Significance and Use**

This specification is written as a municipal-oriented specification. Municipal-oriented specifications are developed to reflect the administration, testing, and payment policies, procedures, and practices of many municipalities in Ontario.

Use of this specification or any other specification shall be according to the Contract Documents.

## **804.01.02 Appendices Significance and Use**

Appendices are not for use in provincial contracts as they are developed for municipal use, and then, only when invoked by the Owner.

Appendices are developed for the Owner's use only.

Inclusion of an appendix as part of the Contract Documents is solely at the discretion of the Owner. Appendices are not a mandatory part of this specification and only become part of the Contract Documents as the Owner invokes them.

Invoking a particular appendix does not obligate an Owner to use all available appendices. Only invoked appendices form part of the Contract Documents.

The decision to use any appendix is determined by an Owner after considering their contract requirements and their administrative, payment, and testing procedures, policies, and practices. Depending on these considerations, an Owner may not wish to invoke some or any of the available appendices.

## **804.02 REFERENCES**

When the Contract Documents indicate that municipal-oriented specifications are to be used and there is a municipal-oriented specification of the same number as those listed below, references within this specification to an OPSS shall be deemed to mean OPSS.MUNI, unless use of a provincial-oriented specification is specified in the Contract Documents. When there is not a corresponding municipal-oriented specification, the references below shall be considered to be the OPSS listed, unless use of a provincial-oriented specification is specified in the Contract Documents.

This specification refers to the following standards, specifications, or publications:

### **Ontario Ministry of Transportation Publication**

Seeding and Cover Quality Assurance Visual Inspection Field Guide

### **Canadian and Provincial Statutes**

Canada Fertilizers Act (R.S., 1985, c. F-10)

Canada Seeds Act (R.S., 1985, c. S-8)

## **804.03 DEFINITIONS**

For the purpose of this specification, the following definitions apply:

**Cover** means any approved or specified material such as rolled erosion control products, (i.e., blankets) or hydraulically applied erosion control products (i.e., hydraulic mulch, bonded fibre matrix, fibre reinforced matrix) applied at the time of seeding to provide temporary erosion control and protection of the germinating seed.

**Cultivate** means to prepare and work the soil with agricultural implements to provide a specified depth of loose, friable soil as a suitable medium to germinate seed.

**Fibre Reinforced Matrix (FRM)** means any approved or specified hydraulically applied erosion control product applied to provide cover, in which mechanical and chemical bonding techniques including water resistant tackifiers and flocculants are used to interlock fibres together to form a matrix that bonds to the soil surface.

**Seeded Earth Area** means the prepared earth area that has received the applied seed and fertilizer.

**Uniform, Cohesive Mat** means an application of cover that is unvarying in consistency and when all of the cover material particles are consolidated and adhere together to produce a solid layer that protects the seeded earth area from heat and adverse environmental conditions, yet allows moisture to percolate into the underlying soil.

**Waterbody** means any permanent or intermittent, natural or constructed body of water including lakes, ponds, wetlands and watercourses, but does not include sewage works as defined in the Ontario Water Resources Act.

## **804.04 DESIGN AND SUBMISSION REQUIREMENTS**

### **804.04.01 Submission Requirements**

A legible, valid Certificate of Seed Analysis from a seed testing laboratory approved by the Canadian Food Inspection Agency for all single seed species and all seed mixtures to be used on the Contract shall be provided to the Contract Administrator 24 hours prior to any seeding operations.

## **804.05 MATERIALS**

### **804.05.01 Seed**

#### **804.05.01.01 Grade Standards**

All seed supplied, either as single seed species or as a seed mix shall comply with the provisions of the Canada Seeds Act and Regulations and the grade standards for that particular seed type.

Birdsfoot Trefoil mix shall contain only certified Blue Tag Leo Birdsfoot Trefoil.

#### **804.05.01.02 Certificate of Seed Analysis**

The Certificate of Seed Analysis shall stipulate the seed supplier's lot designation numbers.

Test results from the Certificate of Seed Analysis 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 seed species by mass for each seed mix specified in the Contract Documents. Test results shall comply with the values shown in Table 1 for the various seed mixes.

#### **804.05.01.03 Seed Packaging, Labelling, and Storage**

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

Labelling shall be in accordance with the requirements of the Canada Seeds Act and Regulations. Each package shall be labelled to show:

- a) The name and address of the seed supplier.

- b) The name of the seed mix and the various individual seed species that comprise the seed mix and the percentage by mass of each.
- c) The grade of the seed or seed mix.
- d) The supplier's lot designation number corresponding to the Certificate of Seed Analysis.
- e) Mass in kilograms of the seed mix.
- f) The inoculant type, strain, and expiry date.

All seed and inoculant shall be stored in cool, dry locations until use. Inoculant is only required for seed mixes containing Crown Vetch or Birdsfoot Trefoil.

**804.05.01.04 Permanent Seed Mixes**

Permanent seed mixes shall be as specified in the Contract Documents and as shown in Table 1.

**804.05.02 Annual Nurse Crop Seed**

Nurse crop seed shall be either Fall Rye Grain or Winter Wheat Grain, unless otherwise approved by the Contract Administrator.

**804.05.03 Fertilizer**

Fertilizer shall comply with the provisions of the Canada Fertilizers Act and Regulations. Fertilizer shall be supplied in original factory sealed bags bearing the manufacturer's original label indicating mass and analysis. All fertilizer shall be in granular form being dry, free flowing, free from lumps, and with an analysis shown in Table 2.

**804.05.04 Cover**

**804.05.04.01 Straw Mulch**

Straw mulch shall be oat or wheat straw. Straw shall be supplied in bales, dry, and free of weeds and other foreign materials.

**804.05.04.02 Straw Mulch Tackifiers**

Organic straw mulch tackifiers may include wood and fibre paper mulch or guar and starch based tackifiers. Asphalt based tackifiers are not acceptable.

**804.05.04.03 Hydraulic Mulch**

Hydraulic mulch shall be capable of dispersing rapidly in water to form a homogeneous slurry and remain in such a state when agitated or mixed with other specified materials. When applied, hydraulic mulch shall be capable of forming a uniform, cohesive mat. Hydraulic mulch shall not inhibit growth or germination of the seed mix. Hydraulic mulch shall be dry, free of weeds and other foreign materials, and shall be supplied in factory sealed packages bearing the manufacturer's label indicating the product name and mass.

#### **804.05.04.04 Bonded Fibre Matrix (BFM) and Fibre Reinforced Matrix (FRM)**

BFM and FRM shall be a hydraulically applied, 100% biodegradable product, which after application is capable of adhering to the soil. In a dry state, BFM shall be comprised of not less than 70% by weight of long stranded wood fibres held together by organic or mineral bonding agents or both. The hydrated BFM shall form a viscous material that creates a high strength, porous, and erosion-resistant uniform, cohesive mat, when applied and dried. The bonding agent shall not dissolve or disperse upon re-wetting. BFM shall not inhibit the germination or growth of plant material.

#### **804.05.04.05 Erosion Control Blanket (ECB)**

ECB shall be of a consistent thickness with a 100% biodegradable even fibre distribution. The ECB shall be covered on top with a biodegradable and photodegradable plastic mesh. ECB may also be sewn together with cotton thread. ECB shall be supplied in a dry rolled mat protected with an outer waterproof wrap bearing the manufacturer's original label indicating product name and application instructions.

#### **804.05.05 Erosion Control Blanket (ECB) Staples**

ECB staples shall be u-shaped, constructed of wire with a diameter of at least 2.5 mm with legs at least 150 mm long and 25 mm apart.

#### **804.05.06 Water**

Water shall be free of any contaminants or impurities that would adversely affect the germination and growth of vegetation.

### **804.06 EQUIPMENT**

#### **804.06.01 Hydraulic Seeder and Mulcher**

The hydraulic seeder and mulcher shall be capable of mixing the materials into homogeneous slurry and maintaining the slurry in a homogeneous state until it is applied. The discharge pumps and gun nozzles shall be capable of applying the materials uniformly over the specified area. A hose extension for the hydraulic seeder and mulcher shall be on site and available for use for areas outside of the range of the gun nozzle.

#### **804.06.02 Straw Mulch Blower**

The straw mulch blower shall be capable of separating straw from the bales without chopping it into short lengths and applying the straw mulch in a uniform, cohesive mat.

When tackifiers are used, the straw mulch blower shall be capable of applying straw mulch and tackifiers simultaneously. The straw mulch blower shall be equipped with a minimum of two nozzles located inside the end of the blower pipe to coat the straw with the tackifier. Crimping may also be used to secure the straw mulch.

#### **804.06.03 Cyclone Spreader**

The cyclone spreader shall be capable of distributing seed and fertilizer uniformly in a dry state.

**804.07 CONSTRUCTION**

**804.07.01 Operational Constraints**

The seeding operation shall not commence until the Contract Administrator is in receipt of the Certificate of Seed Analysis for the seed being applied.

The seeding operation shall not commence until the Contract Administrator has approved the surface preparation, layout of permanent seed mix locations, and different cover types.

Seed and cover application or re-application shall not be carried out under adverse weather conditions such as high wind or heavy rain or when field conditions are not conducive to seed germination such as frozen soil or soil covered with snow, ice, or standing water.

The Contractor shall maintain the site and control erosion until final acceptance of the seed and cover.

Seed or cover shall not come in contact with the foliage of any trees, shrubs, or other vegetation, except as specified in the Seeding subsection. Seed or cover shall not come in contact with waterbodies.

BFM or FRM shall be installed by a Contractor certified and trained by the manufacturer in the proper mixing and installation of the product. To ensure a suitable drying and curing period, BFM and FRM shall not be applied when rainfall is expected, during rainfall, or immediately after rainfall.

**804.07.02 Surface Preparation for Seeding**

The surface to be seeded shall be prepared not more than 7 Days prior to the seeding operation.

At the time of seeding, all surface areas designated for seeding shall have a fine-graded uniform surface and shall exhibit no evidence of erosion. The surface shall be uniformly cultivated to a minimum depth of 50 mm and shall not have surface stones greater than 25 mm in diameter, foreign material, and weeds or other unwanted vegetation.

**804.07.03 Layout**

The locations and limits of the different permanent seed mixes and different cover types as specified in the Contract Documents shall be staked out on the ground surface.

**804.07.04 Seeding**

**804.07.04.01 Application Rates for Seed, Fertilizer, and Water**

Application rates for primary seed, nurse crop seed, and fertilizer shall be as shown in Table 2.

**804.07.04.02 Seed and Fertilizer Application**

Seed and fertilizer shall be applied prior to the application of cover.

Seed, fertilizer, and water shall be thoroughly mixed in the hydraulic seeder and mulcher into a homogeneous water slurry. When thoroughly mixed, the water slurry shall be applied to the prepared earth areas by the nozzle sprayer or extension hose.

The Contractor shall ensure that the seeding equipment is calibrated to provide the coverage shown in Table 2. The Contractor shall ensure there is a uniform dispersal of the mixed material over the entire area designated for seeding and that the spray does not dislodge soil or cause erosion.

Seed and fertilizer may also be applied separately by a cyclone spreader. Seeding shall overlap the adjoining ground cover by 300 mm.

#### **804.07.05 Cover Applications**

All cover materials shall be applied as a separate operation immediately following the application of seed and fertilizer.

The Contractor shall ensure that the hydraulic seeder and mulcher are properly calibrated to provide the coverage as specified for each of the hydraulically applied cover materials.

##### **804.07.05.01 Straw Mulch Application**

Straw mulch shall be applied to form a uniform, cohesive mat over 100% of the seeded earth area. The straw mulch shall be applied to a minimum depth of 25 mm and a maximum depth of 50 mm measured at the time of application.

##### **804.07.05.02 Hydraulic Mulch Application**

Hydraulic mulch shall be applied at the rate of 2,000 kg of dry product per 10,000 m<sup>2</sup>. Hydraulic mulch shall be thoroughly mixed with water into a homogenous slurry.

When thoroughly mixed, the hydraulic mulch slurry shall be applied to the seeded earth areas by nozzle sprayer or extension hose. The mixed material shall be evenly dispersed over the entire seeded earth area to form a uniform, cohesive mat. The spray shall not dislodge soil or cause erosion.

##### **804.07.05.03 Bonded Fibre Matrix (BFM) and Fibre Reinforced Matrix (FRM) Application**

BFM and FRM shall be applied at a minimum rate of 3,700 kg of dry product per 10,000 m<sup>2</sup>. BFM or FRM shall be mixed with water in a hydraulic seeder and mulcher at a rate of 20-30 kg of dry product to 500-600 litres of water to form a homogeneous slurry.

When thoroughly mixed, the BFM or FRM slurry shall be applied to the seeded earth areas by nozzle sprayer or extension hose. The BFM or FRM slurry shall be evenly dispersed in successive applications from different directions over the seeded earth area to form a uniform, cohesive mat. The spray shall not dislodge soil or cause erosion.

##### **804.07.05.04 Erosion Control Blanket (ECB) Application**

(ECB) shall be placed and stapled into position according to the manufacturer's installation instructions over the entire designated surface area. Blankets shall be installed in direct contact with the ground surface to form a uniform, cohesive mat over the seeded earth area. The Contractor shall ensure that the ECB is anchored to the soil and that tenting of the ECB does not occur.

On slopes, the uppermost edge of the ECB shall be anchored in a 150 mm wide by 150 mm deep trench when the ECB cannot be extended and anchored over the crest of the slope. The trench shall be backfilled with earth and compacted.

##### **804.07.06 Cleanup**

When seed and cover materials are applied to the foliage of trees, shrubs, other susceptible plant material, or waterbodies, the Contractor shall immediately remove the seed and cover materials from the areas and wash the areas with clean water.

When seed and cover materials are applied to areas or objects other than those designated, the Contractor shall remove the seed and cover materials.

**804.07.07 Management of Excess Material**

Management of excess material shall be as specified in the Contract Documents.

**804.07.08 Protection of Waterbodies and Waterbody Banks**

Protection of waterbodies and waterbody banks shall be as specified in the Contract Documents.

**804.08 QUALITY ASSURANCE**

**804.08.01 Performance Measure**

The Certificate of Seed Analysis shall be reviewed by the Contract Administrator to ensure compliance with the values shown in Table 1.

All seeded areas shall be inspected by the Contract Administrator using the Seeding and Cover Quality Assurance Visual Inspection Field Guide to ensure compliance with this specification at 30, 60, and 90-Day periods following the seeding and Cover operation.

At the 30-Day inspection within the seeded area:

- a) The applied cover shall be visually intact and shall form a uniform, cohesive mat.
- b) Germination of the nurse crop shall be visually evident.

At the 60-Day inspection within the seeded area:

- a) The nurse crop shall be evident at mature height in an evenly dispersed, uniform cover.
- b) Germination of the specified permanent seed species shall be visually evident in an evenly dispersed uniform cover.
- c) There shall not be any significant bare areas, both in terms of quantity and size.
- d) Non-seeded, non-specified vegetation shall not exceed 20% of the seeded earth area.

At the 90-Day inspection within the seeded area:

- a) The specified permanent seed species shall be at an average height of 50 mm in an evenly dispersed, uniform cover.
- b) There shall not be any significant bare areas, both in terms of quantity and size.
- c) Non-seeded, non-specified vegetation shall not exceed 20% of the seeded earth area.

Inspections shall not be made during the winter dormant period or when site conditions prohibit a visual field inspection. The timing intervals between inspections shall be suspended during the winter dormant period shown in Table 3.

**804.08.02 Failure to Meet Performance Measure**

If the values in the Certificate of Seed Analysis for the seeds supplied do not meet the values for seed germination, seed purity, and weed seed content shown in Table 1, the seed lot shall not be approved for use on the Contract and the Contractor shall supply a new seed lot and a new Certificate of Seed Analysis for approval prior to seeding.



If the values in the Certificate of Seed Analysis for the seeds supplied do not meet the values for seed species composition shown in Table 1, the Contractor shall supply a legible, valid copy of the seed mixing sheet from the seed supplier for approval by the Contract Administrator prior to seeding.

If the completed work does not meet the performance measures of the 30-Day inspection, the Contract Administrator shall document the failed areas, notify the Contractor of those areas, and re-inspect at the 60-Day inspection.

If the completed work does not meet the performance measures of the 60-Day inspection, the Contract Administrator shall notify the Contractor in writing of the failed areas. The Contractor shall re-apply the specified material in accordance with this specification within 14 Days of receiving the notification. The Contract Administrator shall re-inspect the seeded area at the 90-Day inspection.

If the completed work does not meet the performance measures of the 90-Day inspection, the Contract Administrator shall notify the Contractor in writing of the failed areas. The Contractor shall re-apply the specified material in accordance with this specification within 14 Days of receiving the notification. The Contract Administrator shall re-inspect the seeded area 30 Days after re-application of material.

Inspections and re-application of material shall continue, as outlined in the 90-Day inspection clause above, until the seeded area has been accepted.

All replaced seed and cover shall be subject to the Quality Assurance section of this specification.

#### **804.08.03 Dispute Resolution**

Dispute resolution only applies to the germination and growth of the permanent seed mix species.

Disputes arising from the performance measure evaluation shall be settled through referee testing using an actual live seedling count of the specified permanent seed mix species within the seeded earth area.

An independent consultant with experience in herbaceous plant identification shall perform the referee testing. Both parties shall agree on the selection of the independent consultant and both parties shall be bound by the consultant's evaluation.

The actual count shall be based on minimum germination requirements and minimum levels of acceptability to meet industry standards and federal legislation governing the testing, inspection, quality, and sale of seed.

To determine the number of seeds per unit of weight, published standard industry lists shall be referenced. When these lists show a range in the number of seeds per unit of weight, the mid-range number shall be used. When there is a difference in the estimated number of seeds by weight from one industry standard list to another, the lower figure shall be used.

To determine the germination rate for each seed species, the number of seeds per unit of weight is factored by the minimum germination rate of 70% in accordance with the Canada Seeds Act. A further 25% reduction is allowed to account for variation in seeding application, seedbed quality, seedbed preparation, and area cover.

The Contractor and the Owner may agree to use a simplified analysis, when instead of counting each seedling of each individual seeded perennial species of the mix, only the total number of seedlings of the mix is counted. If the parties cannot agree to the simplified analysis, the default method is a seedling count of each seeded perennial species.

The field inspection to determine the number of live plant seedlings should only be performed after the 90-Day inspection and when the seedlings reach an identifiable and measurable size.

The sampling procedure should be randomized over an area that both parties agree is representative of the seeded Contract. The selection and evaluation process is as follows:

- a) Select a representative area from the average seeded areas, eliminating the thinnest and thickest growth areas from the analysis.
- b) Measure its length and width. Use a random numbers table to generate five sets of X and Y axis coordinates from the area.
- c) Each axis coordinate is a sampling point. A sampling plot, or quadrat, is set out in a 200 x 1,000 mm plot with the axis coordinate becoming the lower right-hand corner of each quadrat.
- d) Each quadrat is divided into 20 sub-sampling units, each being 100 x 100 mm.
- e) The sub-sampling units are numbered from 1 to 20.
- f) Using a random numbers table, two of the twenty sub-sampling units are randomly selected.
- g) Live seedlings of each individual seeded perennial species of the mix are counted in the selected sub-sampling units to determine actual plant densities.
- h) An average seedling density per seeded perennial species, expressed as the number of seedlings per square metre is generated for each sampling plot or quadrat, based on the data from the two selected sub-sampling units.
- i) The procedure is repeated for the four other sampling points.
- j) The average number of seedlings per square metre for each of the seeded perennial species generated from the five sampling points is evaluated against the minimum industry standard benchmark for the seeded mix.

If the results of the referee testing prove that the seed and cover is unacceptable in meeting the minimum industry standard for germination, the Contractor shall then re-apply seed and cover in accordance with this specification to all areas under dispute. In addition, the Contractor shall be responsible for all costs associated with the dispute resolution process.

If the results of the referee testing prove that the seed and cover is acceptable in meeting the minimum industry standard for germination, the Owner shall then be responsible for all costs associated with the dispute resolution process.

**804.09                      MEASUREMENT FOR PAYMENT**

**804.09.01                 Actual Measurement**

**804.09.01.01            Seed and Mulch**

Seeding and mulch measurement shall be in square metres following the contours of the ground without any allowance for overlap.

**804.09.01.02            Seed and Erosion Control Blanket**

Seeding and erosion control blanket measurement shall be in square metres following the contours of the ground without any allowance for overlap.

**804.09.01.03                      Seed and Bonded Fibre Matrix (BFM) or Fibre Reinforced Matrix (FRM)**

Seed and BFM or RFM measurement shall be in square metres following the contours of the ground without any allowance for overlap.

**804.09.02                      Plan Quantity Measurement**

When measurement is by Plan Quantity, such measurement shall be based on the units shown in the clauses under Actual Measurement.

**804.10                      BASIS OF PAYMENT**

- 804.10.01                      Seed and Mulch - Item**
- Seed and Erosion Control Blanket - Item**
- Seed and Bonded Fibre Matrix or Fibre Reinforced Matrix - Item**

Payment at the Contract price for the above tender items shall be full compensation for all the labour, Equipment, and Material to do the work.

**TABLE 1**  
**Permanent Seed Mixes and Seed Certificate Analysis Values**

<b>Permanent Seed Mix</b>	<b>Grade Name</b>	<b>Minimum Seed Germination %</b>	<b>Minimum Seed Purity %</b>	<b>Maximum Weed Seed %</b>	<b>Seed Mix %</b>	<b>Seed Species Composition %</b>
<b>Standard Roadside Mix</b>	<b>Canada #1 Lawn Grass Seed Mixture</b>	<b>70</b>	<b>85</b>	<b>0.5</b>		
Creeping Red Fescue: <i>Festuca rubra</i>					50	50 to 60
Kentucky Bluegrass: <i>Poa pratensis</i>					10	25 to 30
Perennial Ryegrass: <i>Lolium perenne</i>					35	12 to 18
White Clover: <i>Trifolium repens</i>					5	2 to 4
<b>Crown Vetch Mix</b>	<b>Common #1 Forage Mixture</b>	<b>75</b>	<b>N/A</b>	<b>3.0</b>		
Creeping Red Fescue: <i>Festuca rubra</i>					66	62 to 70
Crown Vetch: <i>Coronilla varia</i> inoculated seed					34	30 to 38
<b>Birdsfoot Trefoil Mix</b>	<b>Common #1 Forage Mixture</b>	<b>75</b>	<b>N/A</b>	<b>3.0</b>		
Creeping Red Fescue: <i>Festuca rubra</i>					66	62 to 70

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<b>Permanent Seed Mix</b>	<b>Grade Name</b>	<b>Minimum Seed Germination %</b>	<b>Minimum Seed Purity %</b>	<b>Maximum Weed Seed %</b>	<b>Seed Mix %</b>	<b>Seed Species Composition %</b>
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Birdsfoot Trefoil 'Leo': <i>Lotus corniculatus</i> 'Leo inoculated seed					34	30 to 38
<b>Salt Tolerant Mix</b>	<b>Canada #1 Ground Cover Mixture</b>	<b>70</b>	<b>85</b>	<b>3.0</b>		
Tall Fescue: <i>Festuca arundinacea</i>					25	20 to 30
Fults Alkali Grass: <i>Puccinellia distans</i>					20	15 to 25
Creeping Red Fescue: <i>Festuca rubra</i>					25	15 to 25
Perennial Ryegrass: <i>Lolium perenne</i>					20	15 to 25
Hard Fescue: <i>Festuca trachyphylla</i>					10	10 to 15
<b>Lowland Mix</b>	<b>Common #1 Forage Mixture</b>	<b>75</b>	<b>N/A</b>	<b>3.0</b>		
Creeping Red Fescue: <i>Festuca rubra</i>					35	40 to 50
Brome Grass: <i>Bromus nerris</i>					25	20 to 30
Kentucky Bluegrass: <i>Poa pratensis</i>					10	10 to 20

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<b>Permanent Seed Mix</b>	<b>Grade Name</b>	<b>Minimum Seed Germination %</b>	<b>Minimum Seed Purity %</b>	<b>Maximum Weed Seed %</b>	<b>Seed Mix %</b>	<b>Seed Species Composition %</b>
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Birdsfoot Trefoil 'Leo': <i>Lotus corniculatus</i> 'Leo' inoculated seed					5	3 to 7
White Clover: <i>Trifolium repens</i>					5	3 to 7
Perennial Ryegrass: <i>Lolium perenne</i>					20	3 to 7
<b>Acidic Soil Mix</b>	<b>Common #1 Forage Mixture</b>	<b>75</b>	<b>N/A</b>	<b>3.0</b>		
Birdsfoot Trefoil 'Leo', <i>Lotus corniculatus</i> 'Leo' inoculated seed					30	30 to 40
Red Top: <i>Agrostis gigantea</i>					10	20 to 30
Tall Fescue: <i>Festuca arundinacea</i>					15	15 to 20
Creeping Red Fescue: <i>Festuca rubra</i>					30	7 to 12
Hard Fescue: <i>Festuca trachyphylla</i>					5	3 to 7
Alsike Clover: <i>Trifolium hybridum</i>					5	3 to 7
Red Clover: <i>Trifolium pratense</i>					5	3 to 7

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<b>Permanent Seed Mix</b>	<b>Grade Name</b>	<b>Minimum Seed Germination %</b>	<b>Minimum Seed Purity %</b>	<b>Maximum Weed Seed %</b>	<b>Seed Mix %</b>	<b>Seed Species Composition %</b>
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<b>Northern Ontario Mix</b>	<b>Common #1 Forage Mixture</b>	<b>75</b>	<b>N/A</b>	<b>3.0</b>		
Red Top: <i>Agrostis gigantea</i>					10	35 to 40
Timothy: <i>Phleum pratense</i>					10	10 to 20
Creeping Red Fescue: <i>Festuca rubra</i>					30	10 to 15
Birdsfoot Trefoil: <i>Lotus corniculatus</i> 'Leo" inoculated seed					5	6 to 10
Alsike Clover: <i>Trifolium hybridum</i>					3	3 to 7
White Clover: <i>Trifolium repens</i>					2	3 to 7
Bromegrass: <i>Bromus nerrer</i>					20	1 to 5
Hard Fescue: <i>Festuca trachyphylla</i>					10	1 to 5
Meadow Fescue: <i>Festuca pratensis</i>					10	1 to 5

**TABLE 2**  
**Application Rates for Seed and Fertilizer**

Permanent Seed Mixes	Permanent Seed Mix Rate kg/10,000 m <sup>2</sup>	Fertilizer Rate minimum 200 kg/ha			Nurse Crop Rate kg/10,000 m <sup>2</sup>
		8-32-16	0-46-0	0-0-60	
Standard Roadside Mix	130	350	-	-	60
Crown Vetch Mix	100	350	250	-	60
Birdsfoot Trefoil Mix	100	350	250	-	60
Salt Tolerant Mix	130	350	-	-	60
Lowland Mix	130	350	-	-	60
Acidic Soil Mix	130	350	200	200	60
Old Field Mix	100	350	-	-	60

**TABLE 3**  
**Winter Dormant Period**

SOUTHWESTERN ONTARIO	SOUTHERN ONTARIO	NORTHERN ONTARIO
That area of Ontario south of a line joining Grand Bend and Clarkson.	That area of Ontario between the northern and southern boundaries of Southwestern Ontario and Northern Ontario respectively.	That area of Ontario north of a line joining Waubauskene, Severn Bridge, Bancroft, and Ottawa.
November 15 to April 15 inclusive	November 1 to April 30 inclusive	October 15 to May 15 inclusive



**Appendix 804-A, November 2014  
FOR USE WHILE DESIGNING MUNICIPAL CONTRACTS**

**Note:** This is a non-mandatory Commentary Appendix intended to provide information to a designer, during the design stage of a contract, on the use of the OPS specification in a municipal contract. This appendix does not form part of the standard specification. Actions and considerations discussed in this appendix are for information purposes only and do not supersede an Owner's design decisions and methodology.

**Designer Action/Considerations**

The following should be specified in the Contract Documents:

- Permanent seed mixes. (804.05.01.04)

The designer may select the appropriate seed mix and cover type application from Tables A-1 and A-2 included in this appendix. The designer may propose new site specific seed mixes to suit existing conditions that require a different seed than those specified.

The designer should ensure that the General Conditions of Contract and the 100 Series General Specifications are included in the Contract Documents.

**Related Ontario Provincial Standard Drawings**

No information provided here.

**APPENDIX TABLE A-1  
Permanent Seeding Mix Types**

<b>Permanent Seed Mixes</b>	<b>Seed Mix Attributes</b>	<b>Selection Criteria</b>
Standard Roadside Mix	A tested mix of hardy roadside perennial grasses that have performed well in highway situations.	This mix should be the default seed mix for most roadside seeding work.
Crown Vetch Mix	A blend of a hardy legume and a hardy turfgrass. The turfgrass provides control and top growth until the Crown Vetch plants grow and develop after several seasons. Crown Vetch produces a mass of purple flowers in season and is a vigorous ground cover.	This mix is primarily used to revegetate slope areas when erosion and soil fertility may be a problem. There have been some concerns over its ability to spread and crowd out indigenous growth and its non-native status.
Birdsfoot Trefoil Mix	A blend of another hardy legume and a hardy turfgrass. Very similar growth characteristics to the Crown Vetch mix, except a little slower growing, less vigorous, and Trefoil has masses of yellow flowers in season.	As with Crown Vetch, this mix is primarily used to revegetate slope areas when erosion and soil fertility may be a problem. It is hardier in the north than Crown Vetch and is not as aggressive in growth and habit.
Salt Tolerant Mix	The salt tolerant mix is a blend mixture of several turfgrass species with a proven resistance to salt.	The salt tolerance mix should be specified in areas such as medians, shoulder strips, and shoulder ditches, when salt is thought to be in heavier concentrations.
Lowland Mix	The lowland mix was developed with several species of turfgrasses that grow well in low-lying wet areas.	The lowland mix should be specified along waterbody edges in low-lying areas when light seasonal flooding is a possibility.
Acidic Soil Mix	The acidic soil mix was developed to provide adequate vegetative cover on areas of low fertility and high acidity.	The acidic soil mix should be used in areas of low fertility, medium to high acidity, and in the northern areas of the province.
Northern Ontario Mix	This mix is designed to suit the limited topsoil conditions and acidity of Northern Ontario sites.	Old field should be selected when there will be fallow areas left alone with little or no maintenance, no mowing, and the area will be required to be self-sustaining. More suitable in rural areas than urban or suburban.

**APPENDIX TABLE A-2  
Seeding Cover Application Types**

<b>Cover Application Types</b>	<b>Cover Type Attributes</b>	<b>Selection Criteria</b>
Straw	Chopped straw is applied to the seeded area via a straw mulch blower and is coated with a tackifier or crimped to hold it together. A time-tested method of providing cover and protection for germinating seedlings, as well as short-term erosion control.	One of the default cover types. Straw has the advantage of being relatively cheap and providing good coverage. Straw cover application requires another piece of equipment and a labour intensive second application to properly apply the cover material.
Hydraulic Mulch	Hydraulic mulch is a processed fibre of wood, straw, cotton, cellulose pulp, or any combination of these materials. Hydraulic mulches provide a uniform absorptive mat that allows moisture to penetrate into the underlying soil, while providing cover for the germinating seed.	Hydraulic mulch is the other default mulch. It has the advantage of being easy to apply, using the same equipment when applying seed and fertilizer. It is low-cost and low-labour. Hydraulic mulch does not give the same degree of protection to the germinating grass as straw does. During extremes of temperature and moisture, it will not perform as well as straw or other higher levels of erosion control.
Erosion Control Blanket (ECB)	ECBs are a family of products that are supplied in rolls. They are unrolled over the seeded earth area and stapled in place. ECBs provide a higher level of erosion control and protection for germinating seedlings. ECBs are machine woven mats with a variety of materials sandwiched between the two woven layers. Materials can be wood, coco or cotton fibre, straw, or any combination depending upon manufacturer.	ECBs should be specified in the contract preparation stage and not during construction. ECBs are specified on a project when erosion of soil slopes or soil ditches is expected to be a problem. ECBs have an advantage over hydraulic mulch in that the blanket is firmly attached to the underlying soil by staples, it is longer lasting, and provides a superior growth medium for seedlings. It is more expensive and improper installation can result in poor end results leading to surface erosion.
Bonded Fibre Matrix (BFM)	BFM is a hydraulically applied product made of wood, cotton, or cellulose pulp fibres. The fibres are bonded together by various means including mineral bonding agents or organic tackifiers. When applied, the BFM forms a viscous material that upon drying creates a high strength, porous, and erosion resistant mat.	BFMs are applied like hydraulic mulches and have a great similarity to hydraulic mulches, except BFMs have greater erosion resistance and create a thicker, firmer mat. BFMs should be specified when erosion of soil slopes or soil ditches is expected to be a problem and when hydraulic seeders can get access. BFMs are specified in the design stage and have also been substituted for ECBs during construction, although usually at the Contractor's request.
Fibre Reinforced Matrix (FRM)	FRM is a hydraulically applied product made of pasteurized wood fibers, dispersible synthetic fibers, and soil-bonding agents. When applied, the FRM forms a viscous material that dries quickly and locks up within one hour. Upon drying the product provides increased flexibility and loft for impact resistance, air circulation, and moisture retention that promotes seed germination and plant growth.	FRMs are applied like hydraulic mulches and have a great similarity to hydraulic mulches, except differ from BFMs in that they cure within two hours, have superior cover factor and vegetation establishment. The functional longevity is up to 18 months. Due to the thickness, the product provides superior terrain protection, even during hard rains. This product can be used for any slopes, including 1H:1V.