

PART 1 - GENERAL

<u>1.1 RELATED SECTIONS</u>	.1	Section 31 23 33 - Excavating, Trenching and Backfilling.
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<u>1.2 REFERENCES</u>	.1	Canadian Standards Association (CSA). .1 CAN/CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
	.2	American Society for Testing and Materials (ASTM). .1 ASTM D698-00a, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³) (600 kN-m/m ³).

PART 2 - PRODUCTS

<u>2.1 MATERIALS</u>	.1	Concrete mixes and materials: Proportion normal density concrete in accordance with A23.1, Alternate 1, to give following quality for concrete as indicated: .1 For concrete in all exterior concrete slabs, ramps, steps, etc: .1 Type GU cement. .2 Minimum compressive strength at 28 days: 35 MPa. .3 Class of exposure: C-1. .4 Maximum water / cement ratio: 0.40 .5 Nominal maximum size of coarse aggregate: 20mm. .6 Slump at time and point of discharge: 80mm ± 30 mm. .7 Air Content: 5 to 8%.
	.2	Granular base: to Section 31 23 33 - Excavating, Trenching and Backfilling.
	.3	Non-staining mineral type form release agent: chemically active release agents containing compounds that react with free lime to provide water soluble soap.

2.1 MATERIALS
(Cont'd)

- .4 Expansion joint material shall be premoulded, 13mm thick, asphalt saturated cane fibre board. Acceptable product shall be "Flexicell" by Sternson or an approved alternate.
- .5 Sealing compound: Acceptable material: CS-309/30-Clear as manufactured by W.R.Meadows or an approved alternate.

PART 3 - EXECUTION

3.1 GRADE
PREPARATION

- .1 Do grade preparation work in accordance with Section 31 23 33 - Excavating, Trenching and Backfilling.
- .2 Construct embankments using excavated material free from organic matter or other objectionable materials. Dispose of surplus and unsuitable excavated material off site.

3.2 GRANULAR BASE

- .1 Obtain Departmental Representative's approval of subgrade before placing granular base.
- .2 Place granular base material to lines, widths, and depths as indicated.
- .3 Compact granular base to at least 95% of maximum dry density to ASTM D698.

3.3 CONCRETE

- .1 Obtain Departmental Representative's approval of granular base prior to placing concrete.
 - .2 Do concrete work in accordance with Section 03 30 00 - Cast-in-Place Concrete.
 - .3 All concrete sidewalks to have 6x6x6/6 WWM installed unless noted otherwise.
 - .4 Immediately after floating, give sidewalk surface uniform broom finish to produce regular corrugations not exceeding 2 mm deep, by drawing broom in direction normal to centre line.
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| <u>3.3 CONCRETE
(Cont'd)</u> | .5 | Install sealer compound over exposed concrete walk once pressure wash is completed. |
| | .6 | Provide 50 mm edging with suitable edging tool. |
| <u>3.4 TOLERANCES</u> | .1 | Finish surfaces to within 3 mm in 3 m as measured with 3 m straightedge placed on surface. |
| <u>3.5 EXPANSION AND
CONTRACTION JOINTS</u> | .1 | Install tooled transverse contraction joints after floating, when concrete is stiff, but still plastic, at intervals of 1.5 m. |
| | .2 | Install full depth expansion joints as indicated and as directed by Departmental Representative at intervals of 4.5 m. |
| | .3 | Install expansion joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, buildings, or permanent structure. |
| <u>3.6 CURING</u> | .1 | Cure concrete by adding moisture continuously in accordance with CAN/CSA-A23.1 to exposed finished surfaces for at least 1 day after placing, or sealing moisture in by curing compound approved by Departmental Representative. |
| | .2 | Curing compound will be white liquid membrane forming curing compound, ASTM C309 or approved equivalent. |
| | .3 | Membrane forming curing compound shall not be permitted following October 1 after which time moisture proof paper shall be used. |
| | .4 | Where burlap is used for moist curing, place two prewetted layers on concrete surface and keep continuously wet during curing period. |
| | .5 | Apply curing compound evenly to form continuous film and in accordance with manufacturer's requirements. |
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- 3.7 BACKFILL
- .1 Allow concrete to cure for 7 days prior to backfilling.
 - .2 Backfill to designated elevations with material approved by Departmental Representative. Compact and shape to required contours as indicated or as directed by Departmental Representative.

PART 1 - GENERAL

1.1 RELATED SECTIONS .1 Section 32 92 21 - Hydraulic Seeding.

1.2 WASTE MANAGEMENT AND DISPOSAL .1 Divert unused soil from landfill to facility approved by Departmental Representative.

PART 2 - PRODUCTS

2.1 TOPSOIL .1 Imported Topsoil: mixture of particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.
.1 Soil texture based on The Canadian System of Soil Classification, to consist of 20 to 70% sand, minimum 7% clay, and contain 2 to 10% organic matter by weight.
.2 Contain no toxic elements or growth inhibiting materials.
.3 Finished surface free from:
.1 Debris and stones over 25mm diameter.
.2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
.4 Consistence: friable when moist.

PART 3 - EXECUTION

3.1 PREPARATION OF EXISTING GRADE .1 Verify that grades are correct. If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.
.2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.

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| <u>3.1 PREPARATION OF
EXISTING GRADE
(Cont'd)</u> | .3 | Remove debris, roots, branches, stones in excess of 100 mm diameter and other deleterious materials. Remove soil contaminated with calcium chloride, toxic materials and petroleum products. Remove debris which protrudes more than 100 mm above surface. Dispose of removed material off site. |
| | .4 | Cultivate entire area which is to receive topsoil to minimum depth of 100 mm. Cross cultivate those areas where equipment used for hauling and spreading has compacted soil. |
| <u>3.2 PLACING AND
SPREADING OF
TOPSOIL</u> | .1 | Place topsoil only after Departmental Representative has accepted subgrade. |
| | .2 | For all new turfgrass areas:
.1 Place 100mm consolidated depth imported topsoil. |
| | .3 | For existing turfgrass areas:
.1 Place 50mm consolidated depth imported topsoil. |
| | .4 | Manually spread topsoil around trees, shrubs and obstacles. |
| <u>3.3 FINISH GRADING</u> | .1 | Grade to eliminate rough spots and low areas and ensure positive drainage. Prepare loose friable bed by means of cultivation and subsequent raking. |
| | .2 | Consolidate topsoil to required bulk density using equipment approved by Departmental Representative. |
| <u>3.4 ACCEPTANCE</u> | .1 | Departmental Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading. |
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<u>3.5 SURPLUS MATERIAL</u>	.1	Dispose of materials except topsoil not required where directed by Departmental Representative.
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<u>3.6 CLEANING</u>	.1	Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
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PART 1 - GENERAL

<u>1.1 RELATED SECTIONS</u>	.1	Section 01 33 00 - Submittal Procedures.
	.2	Section 32 91 21 - Topsoil Placement and Grading.
<u>1.2 SUBMITTALS</u>	.1	Product Data.
	.1	Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
	.2	Provide product data for:
	.1	Seed.
	.2	Mulch.
	.3	Tackifier.
	.4	Fertilizer.
	.3	Submit in writing to Departmental Representative 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 slurry mixture per hectare.
<u>1.3 QUALITY ASSURANCE</u>	.1	Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
	.2	Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
<u>1.4 SCHEDULING</u>	.1	Schedule hydraulic seeding to coincide with preparation of soil surface.
<u>1.5 WASTE MANAGEMENT AND DISPOSAL</u>	.1	Divert unused fertilizer from landfill to official hazardous material collections site approved by Departmental Representative.

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| 1.5 WASTE
MANAGEMENT AND
DISPOSAL
(Cont'd) | .2 Do not dispose of unused fertilizer into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard. |
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PART 2 - PRODUCTS

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| <u>2.1 MATERIALS</u> | .1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.
.1 Grass mixture: "Certified", "Canada No. 1 Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".
.1 Mixture composition % by mass:
.1 35% Creeping Red Clover
.2 15% Timothy
.3 15% Tall Fesque
.4 15% Alsike Clover
.5 15% Annual Ryegrass
.6 5% Kentucky Bluegrass

.2 Fiber Reinforced Matrix: matrix of organic defibrated fibres, cross-linked insoluble hydro-colloidal tackifiers, and reinforcing natural and/or synthetic fibers, specifically composed for hydraulic seeding applications with the following properties:
.1 Composition as follows:
.1 Thermally Processed Fiber by weight 75% +/-10%
.2 Crimped Interlocking Fibers 5% +/-2%
.3 Cross-linked Hydro-Colloidal Polymer Tackifiers and Activators 10% +/-2%
.4 Moisture Content 10% +/-3%
.5 Organic Matter 90% minimum
.2 Coloured to contrast application area - shall not stain concrete or painted surfaces.
.3 Shall not contain paper or cellulose fiber.
.4 Cure time: 98% effective within 2 hours of application.
.5 Functional Longevity rating: 12 months. |
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2.1 MATERIALS
(Cont'd)

- .3 Mulch: specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, free of germination and growth inhibiting factors with following properties:
 - .1 Type I mulch:
 - .1 Made from wood cellulose fibre.
 - .2 Organic matter content: 95% plus or minus 0.5%.
 - .3 Value of pH: 6.0.
 - .4 Potential water absorption: 900%.
 - .4 Tackifier: water dilutable, liquid dispersion.
 - .5 Water: free of impurities that would inhibit germination and growth.
 - .6 Fertilizer:
 - .1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
 - .2 Complete synthetic, slow release with 35% of nitrogen content in water-insoluble form.
 - .3 Fertilizer shall be 15-25-15(N-P-K) mix for seeding between May 1 and Labour Day, and 10-20-20 (N-P-K) mix thereafter.

PART 3 - EXECUTION

3.1 WORKMANSHIP

- .1 Do not spray onto structures, signs, guide rails, fences, plant material, utilities and other than surfaces intended.
 - .2 Clean-up immediately, any material sprayed where not intended, to satisfaction of Departmental 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 until plants are established.
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- 3.2 PREPARATION OF SURFACES
- .1 Fine grade areas to be seeded free of humps and hollows. Ensure areas are free of deleterious and refuse materials.
 - .2 Cross cultivated areas identified as requiring cultivation to depth of 25 mm.
 - .3 Ensure areas to be seeded are moist to depth of 150 mm before seeding.
 - .4 Obtain Departmental Representative's approval of grade and topsoil depth before starting to seed.

- 3.3 PREPARATION OF SLURRY
- .1 Measure quantities of materials by weight or weight-calibrated volume measurement satisfactory to Departmental Representative. Supply equipment required for this work.
 - .2 Charge required water into seeder. Add material into hydraulic seeder under agitation. Pulverize mulch and charge slowly into seeder.
 - .3 After all materials are in the seeder and well mixed, charge tackifier into seeder and mix thoroughly to complete slurry.

- 3.4 SLURRY APPLICATION
- .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 50m hand operated hoses and appropriate nozzles.
 - .2 Slurry mixture applied per hectare.
 - .1 Seed: Grass mixture 125 kg.
 - .2 Mulch: Type I 1500 kg.
 - .3 Tackifier: Application rate as per manufacturer's recommendations.
 - .4 Water: Minimum 30,000 L.
 - .5 Fertilizer: 375 kg.
 - .3 Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
 - .1 Using correct nozzle for application.

3.4 SLURRY
APPLICATION
(Cont'd)

- .3 (Cont'd)
- .2 Using hoses for surfaces difficult to reach and to control application.
- .4 Blend application 300mm into adjacent grass areas or sodded areas and previous applications to form uniform surfaces.
- .5 Re-apply where application is not uniform.
- .6 Remove slurry from items and areas not designated to be sprayed.
- .7 Protect seeded areas from trespass satisfactory to Departmental Representative.
- .8 Remove protection devices as directed by Departmental Representative.

3.5 MAINTENANCE
DURING
ESTABLISHMENT
PERIOD

- .1 Perform following operations from time of seed application until acceptance by Departmental Representative.
- .2 Grass Mixture:
 - .1 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
 - .2 Mow grass to 50 mm whenever it reaches height of 70 mm. Remove clippings which will smother grass as directed by Departmental Representative.
 - .3 Control weeds by mechanical or chemical means utilizing acceptable integrated pest management practices.
 - .4 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.

3.6 ACCEPTANCE

- .1 Seeded areas will be accepted by Departmental Representative provided that:
 - .1 Plants are uniformly established. Seeded areas are free of rutted, eroded, bare or dead spots.
 - .2 Areas have been mown at least three times.
 - .3 Areas have been fertilized.
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<u>3.6 ACCEPTANCE</u> <u>(Cont'd)</u>	.2	Areas seeded in fall will achieve final acceptance in following spring, one month after start of growing season provided acceptance conditions are fulfilled.
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<u>3.7 CLEANING</u>	.1	Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
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