

1. GENERAL

1.1 RELATED WORK

- .1 Section 31 24 13 – Roadway Excavation, Embankment and Compaction.
- .2 Section 32 93 00 – Trees, Shrubs and Groundcover

1.2 PREPARATION OF SITE

- .1 Prior to commencing with any topsoiling, seeding or sodding operations, the Contractor shall inspect the site to identify and clearly mark any items to be removed, those items to be salvaged, and those items to remain. If unsure, the Contractor shall consult with the Engineer.
- .2 The Contractor shall identify and establish, or have identified and established, the location of all underground utilities and facilities/structures with their locations clearly marked, as per GC 40.

1.3 SAMPLING AND TESTING

- .1 At the discretion of the Owner, the Owner shall be responsible for testing the Owner-designated topsoil stockpile to ensure the suitability of the topsoil for sustaining good vegetative growth. If testing of the Owner-designated topsoil stockpile is completed, all results will be made available to the Contractor a minimum of two (2) weeks prior to the placement of the material.
- .2 At the Owner's request and cost, the Contractor shall, a minimum of two (2) weeks in advance of commencing any Work, submit the results of any tests that the Owner may require on the Contractor supplied topsoil to verify that the topsoil material is capable of sustaining good vegetative growth. The Owner will notify the Contractor in writing a minimum of two (2) weeks prior to the placement of such material identifying the tests required and authorization of the costs incurred. Under no circumstance is the Contractor to complete these tests of the topsoil and submit testing invoices without the express written consent of the Owner; if completed prior to this the Contractor does so at their own risk and expense.
- .3 If required by the Engineer, the Contractor shall provide the required certification documentation a minimum of two (2) weeks prior to the placement of any materials supplied by the Contractor required herein.

1.4 MEASUREMENT AND PAYMENT

- .1 The unit of measurement for preparation of the surface to be landscaped, if called for as a separate pay item, shall be the square metre or hectare, to the nearest 0.01 hectare, whichever is called for within the Bid Forms. The unit price shall include all labour, equipment, materials, supervision, tools, and other incidentals required to excavate or fill and grade the surface to the sub-grade elevations and grades specified on the Plans or Drawings. If there is no separate payment for preparation of the surface to be landscaped, include such costs in the pay item for placement of topsoil.

- .2 The unit of measurement for the placement of topsoil shall be the square metre or hectare, to the nearest 0.01 hectare, whichever is called for within the Bid Forms, at the specified thickness.
 - .1 Where the topsoil is made available to the Contractor from a designated stockpile (including a stockpile created by the Contractor during stripping operations), hereinafter referred to as Owner supplied, the unit price shall include screening, loading, hauling, labour, equipment, materials, supervision, tools, and other incidentals required to place and spread to a uniform thickness across the designated area.
 - .2 Where the topsoil is to be supplied by the Contractor, hereinafter referred to as imported topsoil, the unit price shall include supply, screening, loading, hauling, labour, equipment, materials, supervision, tools, and other incidentals required place and spread to a uniform thickness across the designated area.
- .3 The unit of measurement for seeding or hydro seeding shall be the square metre or hectare, to the nearest 0.01 hectare, whichever is called for within the Bid Forms. The unit price shall include the supply of grass seed, water, mulch, binder (if specified), and all labour, equipment, tools, supervision, and all other incidentals necessary to satisfactorily complete the Work. The unit price for seeding shall also include the supply and application of fertilizer as outlined in this Specification.
- .4 The unit of measurement for sodding shall be the square metre or hectare, to the nearest 0.01 hectare, whichever is called for within the Bid Forms. The unit price shall include the supply of sod and all labour, equipment, tools, material, supervision, and all other incidentals necessary to satisfactorily complete the Work. The unit price for sodding shall also include the supply and application of fertilizer as outlined in this Specification.
- .5 The unit of measurement for the supply and placement of Turf Establishment Matting (biodegradable matting) will be the square metre of the installed area, and will include the supply of all materials, labour, equipment, tools, and supervision, and all other incidentals to satisfactorily complete the Work.

2. PRODUCTS

2.1 TOPSOIL

- .1 Owner/Engineer designated stockpile:
 - .1 Select material from the stockpile that is free from vegetative matter, subsoil, gravel, sand, and other like debris, and rocks or stones and soil clumps greater than 25mm in their largest dimension.
- .2 Imported (Contractor supplied) topsoil:
 - .1 Fertile natural loam material, capable of sustaining good vegetative growth, and which is free from roots, rocks, vegetative clumps, rocks or stones and soil clumps greater than 25mm in their largest dimension, or other debris of such size and quality that prevents the proper placement of the topsoil material. Such topsoil shall contain a maximum of 10% organic matter, 60% sand, and 40% clay, all expressed as a percentage by dry weight, and shall typically have a pH value between 6.5 and 7.5. Soil from swamps or muskeg areas shall not be used as topsoil material.

2.2 GRASS SEED MIXTURE

- .1 Grass Seed shall be a certified Canada No. 1 Grade Seed, meeting the requirements of the Seed Act of Canada, and exhibiting a minimum germination rate of 75% in a germination test. If requested by the Engineer, the Contractor shall submit to the Engineer the grass seed certification as well as any results indicating that the minimum germination rate of 75% in a germination test has been achieved. If the certification is requested, the Contractor shall not place any material until written authorization to do so has been issued to the Contractor. The composition of the seed mixture (by weight) shall be as follows:

| Parks/Boulevards | Roadside | Storm Ponds |
|-------------------------|------------------------|----------------------------------------|
| 12% Annual Ryegrass | 55% Red Fescue | 30% Fowl Bluegrass |
| 33% Creeping Red Fescue | 30% Kentucky Bluegrass | 20% Coated Tufted Hairgrass (50% Seed) |
| 30% Hard Fescue | 15% Annual Rye | 10% Hairy Vetch |
| 20% Kentucky Bluegrass | | 10% Sloughgrass |
| 5% Perennial Ryegrass | | 10% Western Wheatgrass |
| | | 10% Northern Wheatgrass |
| | | 10% Awned Wheatgrass |

2.3 SOD

- .1 Cultivated certified No. 1 Nursery Sod with a strong fibrous root system, thick and healthy growth, and delivered within twenty-four (24) hours from the time of cutting. Sod showing signs of deterioration due to age or lack of moisture will be rejected. Sod must be free of stones, burns, dry or bare spots, tears and delivered moist, cut in strips of uniform width and thickness and of the mixture 25% Creeping Red Fescue and 75% Kentucky Bluegrass (by weight), or approved equal. If required by the Engineer, the Contractor shall submit to the Engineer the nursery sod certification. If the certification is requested, the Contractor shall not place any material until written authorization to do so has been issued to the Contractor.

2.4 HYDRO SEEDING BINDER

- .1 Turfmaster Hydro Seal or equivalent compatible binder additive at the manufacturer's recommended rate, sufficient to mix a consistent slurry.
- .2 Binder shall be mixed and supplied by a recognized supplier and shall have tested rates of purity. If required by the Engineer, the Contractor shall submit to the Engineer the tested rates of purity for the hydro seeding binder. If the certification is requested the Contractor shall not place any material until written authorization to do so has been issued to the Contractor.

2.5 HYDRO SEEDING MULCH

- .1 Material shall be wood cellulose fibre containing no contaminants.
- .2 Fibre shall be supplied by a recognized supplier and shall have a certified weight and composition. If required by the Engineer, the Contractor shall submit to the Engineer the certified weight and composition of the hydro seed mulch prior to placement. If the

certification is requested, the Contractor shall not place any material until written authorization to do so has been issued to the Contractor.

- .3 Minimum application rate is 16.0kg of air dry fibre per 100m². The dry fibre shall be measured as it is fed into the seeder.

2.6 SEEDING EQUIPMENT

- .1 Mechanical seeding equipment such as Brillion, or equivalent.
- .2 Hand equipment such as rakes, spades, hand-held seed broadcasters, mechanical fertilizer spreader, etc.
- .3 Rollers: of suitable size and mass.
- .4 Hydro seeder: capable of thoroughly mixing water, seed, fertilizer and pulverized wood fibre and of uniformly spraying the mix at a designated rate.

2.7 WEED CONTROL AGENTS

- .1 2-4-D Amine for broadleaf plants
- .2 Fenoprop (silvex) for clover, chickweed, and other species resistant to 2-4-D.

2.8 TURF ESTABLISHMENT MATTING

- .1 Turf Establishment matting shall be a uniform open weave bio-degradable matting. The turf establishment matting required shall be as per that identified by the Engineer within the Bid Forms. If the turf establishment matting is not specified by the Engineer, the Contractor shall submit to the Engineer, a minimum of two (2) weeks prior to the placement of the turf establishment matting, the brand, the manufacturer's suggested application, and the composition description.
- .2 Staples: 25mm wide by 300mm deep by 3mm diameter steel wire.

2.9 WATER

- .1 Free of impurities, minerals or chemicals which may be detrimental to plant growth.

3. **EXECUTION**

3.1 PLANTING SEASON

- .1 Grass Seeding: Recommended season May 01 to September 15. Within the road right-of-way, seed must be sown by July 15 to give it time to establish for the next season, before spring sweeping.
- .2 Sod Laying: Recommended season May 01 to September 30. Within the road right-of-way, sod must be laid by July 15 to give it time to establish for the next season, before spring sweeping.

3.2 PREPARATION OF SURFACE (SUB-GRADE)

- .1 The area to which topsoil is to be applied shall be graded to within 50mm of sub-grade design elevation without being uniformly high or low, with uneven and low spots eliminated, ensuring positive drainage from the site. Filling depressions with topsoil is not permitted.
- .2 Scarify the sub-grade areas that are to receive the topsoil to a minimum depth of 50mm. Harrow and/or rake the sub-grade surface; all clay lumps shall be broken down to create a consistent, even surface. Remove all clay lumps that are not broken down, roots, rocks, vegetative clumps, and other debris.

3.3 PLACEMENT AND SPREADING OF TOPSOIL

- .1 Do not place topsoil until the Engineer has inspected and accepted the condition of the sub-grade.
- .2 Do not place topsoil on frozen or wet surfaces, or when the topsoil is in a wet, muddy, or frozen condition.
- .3 Cultivate existing topsoil and apply additional topsoil as required to obtain the minimum required depths of topsoil. Additional topsoil shall be spread evenly and lightly compacted.
- .4 Spread the topsoil to a minimum compressed depth of 150mm for seeded or hydro seeded areas, and 125mm for sodded areas, or to the depths indicated on the Plans, or as directed by the Engineer.
- .5 Manually spread and lightly compact topsoil around trees, shrubs, plants or structures to provide the required coverage and to prevent damage by grading equipment.

3.4 FINISH GRADING

- .1 Fine grade the topsoil to the contours and elevations indicated on the Drawings or as directed by the Engineer, eliminating all rough spots and low areas, ensuring positive drainage off the Site.
- .2 Before seeding, the topsoil surface shall be brought to a firm, even but fine graded condition, without local depressions or elevations by dragging, raking, rolling or other suitable means. The degree of firmness shall be such that foot prints in the prepared surface shall penetrate not less than 6cm and not more than 12cm.

3.5 SEEDING

- .1 Seeding shall be scheduled to coincide with the completion of the topsoil placement, spreading, and grading operations.
- .2 Seeding shall not be commenced in the spring until the ground has completely thawed, and soil temperatures have reached 10°C. Seeding operations shall be suspended when soil temperatures consistently fall below 5°C.

- .3 Seeding shall only be permitted during calm weather conditions, maximum wind velocity of 10km/hr. The Engineer is to determine whether conditions are appropriate for seeding.
- .4 The seed mixture shall be applied at a rate of 2.4kg/100m², using approved mechanical seed equipment (Brillion or equivalent) suitable for the area to be covered and capable of covering the seed with 3mm to 6mm of soil. Seeding operations shall be carried out in two directions, with half the prescribed seed mixture amount spread in one direction and the other half of the seed mixture amount applied in a perpendicular direction.
- .5 In small areas, where the use of mechanical seed equipment is impractical, hand broadcast the seed mixture at the prescribed application rate.
- .6 Spread 12-51-0 (12% ammonia, 51% phosphate, 0% sulphate) fertilizer evenly at a rate of 3.5kg/100m².
- .7 After application of the seed, incorporate the seed into the soil with a light chain harrow or wire rakes and roll the area immediately afterward with a light turf roller.
- .8 Give the seeded area a light watering, with a fine spray to minimize the washing out of the seed, to a depth of not less than 25mm.
- .9 If seed fails to germinate within four (4) growing months, re-cultivate and re-seed until germination takes place. The cost of all necessary materials, equipment, labour and incidentals required for re-cultivation and re-seeding shall be borne by the Contractor.
- .10 Approximately six (6) weeks after germination, apply supplementary fertilizer 27-14-0. Reapply every six (6) weeks thereafter or as necessary to establish a vigorous stand of grass. Do not fertilize after August 15. For each consecutive year of the warranty/maintenance period the Contractor shall apply fertilizer in the spring, prior to June 15, and reapply a second time after July 15 and prior to August 15, but a minimum of six (6) weeks after the first application. As such, for the two (2) year warranty period, the Contractor shall apply fertilizer a minimum of four (4) times throughout the warranty/maintenance period.

3.6 SODDING

- .1 Protect the sod during transportation with tarpaulins to prevent sun scalding and drying out, and to ensure its arrival at the site in a healthy condition.
- .2 Sod must be installed on the day of arrival at site. If delays in installation occur due to weather, protect the sod on site from sun, keep sod moist and store in a cool place until installation. Sod that is dried out and not in a healthy growing condition will be rejected.
- .3 Cut the sod by approved methods in accordance with the recommendations of the Landscape Alberta Nursery Trades Association.
- .4 Handle the sod carefully when loading and installing to prevent tearing or breaking.
- .5 Firm the topsoil forming the sod-bed by rolling before application.

- .6 For sodding on slopes flatter than 3 Horizontal to 1 Vertical:
 - .1 Lay sod evenly in staggered rows, with edges and ends butted tightly. Sod must be laid at right angles to all slopes. Blend the edges of sod with existing grass or cultivated areas.
 - .2 Where sod butt joints surface paving or structures, e.g. manholes, sidewalk or curb, position the sod turf crown flush with the finished hard surface.
 - .3 Top dress the seams as required with topsoil. Water the sod with water spray sufficiently to penetrate the upper 100mm of topsoil. Do not cause erosion.
 - .4 Let the sod and soil dry out sufficiently to prevent damage, then roll with a roller to ensure a good bond between the sod and the soil and to smooth out humps and depressions.
 - .5 Immediately after rolling, saturate the sod sufficiently to penetrate the upper 100mm of soil with fine spray. To prevent the grass and the soil from drying out, continue adequate watering for eight (8) to ten (10) days after laying or until roots are well established.
- .7 For sodding on slopes 3 Horizontal to 1 Vertical or steeper:
 - .1 If sodding occurs on any slope steeper than 3 Horizontal to 1 Vertical, follow the procedure set out in Part 3.6.6, pegging the sod at a rate of twenty-five (25) pegs per 10m² with short wooden pegs to prevent sod from slipping. Pegs to be pounded flush with the ground.
- .8 Four (4) weeks after laying, and following initial cutting, apply organic supplementary fertilizer 27-14-0. Approximately six (6) weeks after the initial cutting, apply supplementary fertilizer 27-14-0. Reapply every six (6) weeks thereafter or as necessary to establish a vigorous stand of grass. Do not fertilize after August 15. For each consecutive year of the warranty/maintenance period the Contractor shall apply fertilizer in the spring, prior to June 15, and reapply a second time after July 15 and prior to August 15, but a minimum of six (6) weeks after the first application. As such, for the two (2) year warranty period, the Contractor shall apply fertilizer a minimum of four (4) times throughout the warranty/maintenance period.
- .9 Sod that slips on slopes, or fails to establish roots, shall be removed and replaced with new sod. The cost of all necessary materials, equipment, labour and incidentals required for removing and disposing of the deficient sod, and re-laying the new sod shall be borne by the Contractor.

3.7 HYDRO SEEDING

- .1 Hydro seeders must be capable of thoroughly mixing seed with water, mulch and fertilizer in the following suggested quantities to cover 4,000m².
 - .1 Grass Seed: 80kg
 - .2 Mulch: 640kg
 - .3 Water: 6,400 litres
 - .4 Fertilizer: 140kg
- .2 Hydro seeding shall not be carried out in wind velocities which will cause the seed mix to be blown. The Engineer is to determine whether conditions are appropriate for application.

- .3 Measure quantities of materials to be fed into the seeder, either by weight or by using another approved system.
- .4 Application rates:
 - .1 Grass seeds: 2.4kg/100m² or as otherwise specified for the seed type by the supplier;
 - .2 Water: 160 litres/100m²;
 - .3 Fertilizer: 3.5kg/100m²; and
 - .4 Mulch: 16kg/100m², or sufficient to apply the specified amount of seed and fertilizer per 100m².
- .5 Thoroughly mix seed, fertilizer, mulch, binder (if specified) and water in a slurry and uniformly apply in one operation or apply seed and fertilizer mixture then cover with an approved mulch.

3.8 SEED PROTECTION ON SLOPES

- .1 Provide adequate protection of seeded areas against damage by erosion. Where the seeded slopes are greater than 3 Horizontal to 1 Vertical, the slopes shall be covered with turf establishment matting.
- .2 The prepared soil surface must be relatively smooth, with no sharp depressions or hummocks. Remove all materials that may prevent turf establishment matting contact with the surface.
- .3 Excavate a 300mm x 200mm trench, 1.0m from the top of the slope. Lay the top edge of the matting through the trench, and anchor in place with staggered staples at a spacing of 300mm o/c. Backfill the trench and lightly compact the fill. Unroll the matting to the top of the slope, and anchor with staples at the surface at a spacing of 300mm o/c.
- .4 Lay the turf establishment matting working downslope. Ensure the matting is smooth and flat over the soil surface and is not stretched or under tension. The matting must conform to the soil surface. Overlap the matting a minimum of 100mm in both longitudinally and transverse directions. Upslope matting must overlap downslope matting. Extend the matting 1.0m beyond the toe of the slope.
- .5 Staple all seams, edges, and slope transitions at a spacing of 150mm o/c. Apply sufficient staples to maintain matting contact with the soil and prevent matting displacement by water or wind, with a maximum spacing of 500mm o/c. Do not walk on the matting during or following installation.

3.9 WARRANTY

- .1 All grass, either seeded or sodded, shall have a two (2) year warranty period from issuance of the Construction Completion Certificate, or that specified in the Contract documents.
- .2 Areas showing deterioration, bare spots or thin areas shall be re-seeded or re-sodded at the Contractor's expense.

3.10 MAINTENANCE REQUIREMENTS

- .1 The Contractor shall be responsible for maintaining the grass, either seeded, hydro seeded, or sodded.
- .2 The maintenance shall include all measures necessary to establish and maintain the seeded and/or sodded area in an acceptable, vigorous and healthy growing condition for a period of two (2) years from the issuance of the Construction Completion Certificate. Maintenance shall include:
 - .1 Mowing at regular intervals to maintain a minimum height of 50mm and a maximum height of 75mm. Do not cut more than 1/3 of blade height at any one mowing. Remove heavy clippings immediately.
 - .2 Replacing areas that show root growth failure, deterioration, bare or thin spots or which have been damaged by any means.
 - .3 Repairing dead spots, either by over-seeding, or removing and replacing the sod.
 - .4 Top dressing and rolling to repair ruts or erosion.
- .3 The Engineer may direct the use of herbicides for weed control. They shall be applied in accordance with manufacturer's recommendations by a licensed applicator. Damage resulting from the Contractor's improper use of herbicide shall be remedied at the Contractor's own expense. The Contractor must keep the areas free of weeds between the issuance of the Construction Completion Certificate and the Final Acceptance Certificate.

3.11 FINAL INSPECTION

- .1 Final inspection of seeded or sodded areas will be made prior to the end of the warranty period.
- .2 At the time of inspection, all the areas shall be alive and in an overall healthy satisfactory growing condition, and free from weeds.

END OF SECTION