

APPENDIX I

Revegetation and Restoration Monitoring Plan



Revegetation and Restoration Monitoring Plan

ALBERTA CLIPPER AND SOUTHERN LIGHTS PROJECTS



November 2008

REVEGETATION and RESTORATION MONITORING PLAN

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1.0 INTRODUCTION

This Revegetation and Restoration Monitoring Plan (Revegetation Plan) identifies procedures to be followed for revegetation of areas disturbed during construction of the Enbridge Alberta Clipper and Southern Lights Diluent Projects collectively referred to as the “project”). The Alberta Clipper Project will originate at the North Dakota – Canadian border in Pembina County, North Dakota, and end at Enbridge’s Superior Terminal, in Douglas County, Wisconsin. The Southern Lights Diluent Project will originate at Enbridge’s Clearbrook Terminal in Clearwater County, Minnesota and also terminate at Enbridge’s Superior Terminal. The two projects will overlap construction workspace from Clearbrook to Superior.

The Revegetation Plan has been developed in conjunction with Natural Resources Conservation Service (NRCS) guidelines, applicable Soil and Water Conservation Districts, and the Enbridge project Environmental Mitigation Plan (EMP). Any changes to this Revegetation Plan will require prior approval by Enbridge before implementation. If it is found that any conditions or requirements of this Revegetation Plan or any other supporting documents are not in compliance with any governmental law or ordinance, the applicable law or ordinance will take precedent, but will not nullify other portions of this Revegetation Plan or supporting documentation. In addition, project-specific permit conditions and Landowner requests for specific seed mixes (as indicated in the project Line List) take precedence over this Revegetation Plan.

Unless stated otherwise in the Revegetation Plan, implementation of these requirements will be the responsibility Enbridge’s construction contractor(s). Oversight will be provided by Enbridge’s Project Management Team, including Enbridge’s Craft Inspectors and Environmental Inspectors (EIs).

2.0 PROJECT SEED SPECIFICATIONS

Seed used will be purchased on a “Pure Live Seed” (PLS) basis for seeding (both temporary and permanent) revegetation areas. Seed tags will identify:

- purity;
- germination;
- date tested;
- total weight and PLS weight;
- weed seed content; and
- seed supplier’s name and business information.

Seed will be used within 12 months of testing as required by applicable state rules and regulations. The seed tags on the seed sacks will also certify that the seed is “Noxious Weed Free”. Seed rates used on the Project will be based on PLS rate, not actual weight basis. The species components of individual mixes are subject to availability at the time of purchase. Grass species may be substituted with alternative native or non-invasive species that are included in the NRCS guidelines and subject to approval by Enbridge.

Seed tags must be collected by the contractor and provided to Enbridge during seeding activities. The tags will be reviewed by Enbridge prior to installation to ensure that the seed mix complies with Enbridge’s specifications. If bulk delivery of seed is made, the above

information will still be made available to Enbridge. Off-loading/on-loading of seed will not be performed in a designated wetland area.

Legume seed (if used) will be treated with an inoculant specific to the species and in accordance with the manufacturer’s recommended rate of inoculant appropriate for the seeding method (broadcast, drill, or hydroseeding). When hydroseeding, four times the manufacturer’s recommended rate of inoculant will be used.

The contractor(s) proposed seed sources must be submitted to Enbridge for review and approval prior to construction. The contractor must also arrange for appropriate storage of the seed.

3.0 TEMPORARY REVEGETATION

The primary focus of Enbridge’s temporary revegetation measures is to quickly establish ground cover vegetation and minimize potential soil erosion. Enbridge’s temporary seed mix (Table 1) was developed based on recommendations from the NRCS. Unless specifically requested by landowners or land managing agencies, Enbridge does not intend to establish temporary vegetation in actively cultivated land, standing water wetlands, and/or other standing water areas.

Table 1 – Temporary Cover Crop Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Oats <i>if summer seeding</i> (<i>Avena sativa</i>) or Winter Wheat <i>if dormant (late fall) or spring seeding</i> (<i>Triticum aestivum</i>)	20	50%
Annual Ryegrass (<i>Lolium italicum</i>), Annual Alfalfa (<i>Medicago sativa</i>), or Slender Wheat Grass (<i>Elymus trachycaulus</i>)	20	50%
TOTAL	40	100%

3.1 TIMING FOR TEMPORARY VEGETATION

Temporary revegetation will be established in construction work areas where 21 days or more will elapse between:

- the installation of the first pipeline and the second line where the Alberta Clipper and Southern Lights Diluent pipelines will be co-constructed;
- the completion of final grading at a site and the establishment of permanent vegetation; and/or,
- where there is a high risk of erosion due to site-specific soil conditions and topography.

Enbridge may require the Contractor(s) to conduct temporary seeding sooner than 21 days at site-specific locations near sensitive resource areas and/or areas prone to wind/water erosion.

Temporary vegetation should be established at any time between **April 1 and September 1**. Attempts at temporary revegetation after this date should be assessed on a site specific basis and in consultation with Enbridge.

3.2 TEMPORARY USE OF MULCH

Straw mulch may be used to help stabilize areas during the establishment of temporary vegetation. The contractor(s) will apply mulch during the establishment of temporary vegetation in areas:

- requested by the Landowner or land managing agency;
- specified by the applicable permits or licenses; and/or
- as requested by Enbridge.

Mulch will be free of noxious weeds as listed in applicable state laws and consistent with the project Noxious Weed and Invasive Species Control Plan. Certified weed-free mulch may also be required at site-specific locations. The contractor(s) will be responsible for identifying and acquiring sources of weed-free and certified weed-free mulch. Sources must be approved by Enbridge prior to purchase and copies of the applicable documentation must be provided to Enbridge.

Mulch used in conjunction with temporary revegetation efforts will be applied at 2 tons per acre unless otherwise stipulated by permit conditions. Mulch will be uniformly distributed by a mechanical mulch blower, or by hand in areas not accessible to the mulch blower. Strands of mulch will be a minimum of 8 inches in length to allow proper anchoring. Mulch will be anchored/crimped to a depth of 2-3 inches using a mulch-anchoring tool or disc set in the straight position to minimize loss by wind and water, as site conditions allow. Additional erosion control measures (e.g., silt fence, erosion control blankets, hydromulch) may also be applied as outlined in Enbridge's EMP.

4.0 PERMANENT REVEGETATION

Permanent vegetation will be established in areas disturbed within the construction work area (permanent easement, Temporary Workspace (TWS), and Extra Workspace (EWS)) except in actively cultivated areas and standing water wetlands. The seed mixes for permanent seeding include native seed varieties commonly found and/or available from local seed distributors. Enbridge's seed mixes are selected to augment revegetation via natural recruitment from native seed stock in the topsoil and are not intended to change the natural species composition.

4.1 UPLAND CONSTRUCTION AREAS

In consulting with the NRCS and other agencies, Enbridge developed a standard upland seed mix for restoring disturbed areas affected by the Alberta Clipper and Southern Lights Projects (Table 2). The mix includes species that will provide for effective erosion control and revegetation of the project area. This seed mix will be used by Enbridge as the standard upland mix unless an alternate seed mix is specified by landowners or land managing agencies.

Table 2 – Construction Area Standard Upland Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Perennial Ryegrass (<i>Lolium perenne</i>)	2	17%
Canada Wild-rye (<i>Elymus canadensis</i>)	4	33%
Switchgrass (<i>Panicum virgatum</i>) (unimproved native variety)	4	33%
Timothy (<i>Phleum pratense</i>)	2	17%
<i>Total</i>	12 pounds	100%
Associated Companion Crop Mix		
Oats if summer seeding (<i>Avena sativa</i>) or Winter Wheat if late fall (dormant) or spring seeding (<i>Triticum aestivum</i>)	16	88%
Annual Ryegrass (<i>Lolium italicum</i>), or Slender Wheat Grass (<i>Elymus trachycaulus</i>)	2	12%
<i>Companion/Cover Crop Total</i>	18	100%
GRAND TOTAL	34.5 pounds	100%

4.1 PERMANENT SEEDING OF WETLAND AREAS

4.1.1 Unsaturated Wetland Areas in North Dakota and Minnesota

Non-standing water wetlands will be seeded with as the mix contained in Table 3a to provide temporary cover and allowed to revegetate naturally. The natural revegetation process will be encouraged by the seeds and rhizomes in the topsoil spread back over the right-of-way after pipe installation. No fertilizer, lime, or mulch will be applied in wetlands.

Table 3a- Minnesota Unsaturated Wetland Seed Mix – General Restoration Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	Percent (%) of Seed
American Slough Grass (<i>Beckmannia syzigachne</i>)	6	30%
Annual Rye Grass (<i>Lolium perene</i>)	8	40%
Fowl Bluegrass (<i>Poa palustris</i>)	6	30%
<i>Total</i>	20.0 pounds	100%

4.1.2 Unsaturated Wetland Areas in Wisconsin

In Wisconsin, the following seed mixes are to be used in unsaturated wetlands as recommended by the Wisconsin Department of Natural Resources (WDNR). Unsaturated wetlands will be seeded following final grading with the species included in Table 3b to supplement the natural revegetation process from seeds and rhizomes in the wetland topsoil.

Table 3b- Wisconsin Unsaturated Wetland Seed Mix - General

Seed Name	Pure Live Seed (Pounds Per Acre)	Percent (%) of Seed
Virginia wild rye (<i>Elymus virginicus</i>)	6	23%
Annual Rye Grass (<i>Lolium perenne</i>)	8	31%
Fowl Bluegrass (<i>Poa palustris</i>)	6	23%
Fowl Manna Grass (<i>Glyceria striata</i>)	1.5	5.6%
American Manna Grass (<i>Glyceria grandus</i>)	1.4	5.4%
Oxeye Sunflower (<i>Heliopsis helianthoides</i>)	1.6	6%
Brown Fox Sedge (<i>Carex vulpinoidea</i>)	1.0	4%
Soft Rush (<i>Juncus effusus</i>)	0.5	2%
<i>Grass Total</i>	26	100%
<hr/>		
GRAND TOTAL	70	100%

In addition to the seed mix listed above (Table 3b), the trenchline area of the construction right-of-way will also be seeded with the following wetland seed mix. The quantities of the seed will be dependent on seed availability.

Table 3c- Wisconsin Unsaturated Wetland Seed Mix – Supplemental Seeds

Seed Name	Pure Live Seed (Pounds Per Acre)
New England Aster (<i>Aster novae-angliae</i>)	Quantity dependent on seed availability
Swamp aster (<i>Aster puniceus</i>)	Quantity dependent on seed availability
Swamp marigold (<i>Bidens cernua</i>)	Quantity dependent on seed availability
Common beggar-ticks (<i>Bidens frondosa</i>)	Quantity dependent on seed availability
Fringed sedge (<i>Carex crinita</i>)	Quantity dependent on seed availability
Common fox sedge (<i>Carex stipata</i>)	Quantity dependent on seed availability
Brown fox sedge (<i>Carex vulpinoidea</i>)	Quantity dependent on seed availability
Joe-pye weed (<i>Eupatorium maculatum</i>)	Quantity dependent on seed availability
Common boneset (<i>Eupatorium perfoliatum</i>)	Quantity dependent on seed availability
Grass-leaved goldenrod (<i>Euthamia graminifolia</i>)	Quantity dependent on seed availability
Sneezeweed (<i>Helenium autumnale</i>)	Quantity dependent on seed availability
Rice cut-grass (<i>Leersia oryzoides</i>)	Quantity dependent on seed availability
Monkey flower (<i>Mimulus ringens</i>)	Quantity dependent on seed availability
Bergamot	Quantity dependent on seed availability

Seed Name	Pure Live Seed (Pounds Per Acre)
<i>(Monarda fistulosa)</i>	
Ditch stonecrop <i>(Penthorum sedoides)</i>	Quantity dependent on seed availability
Yellow coneflower <i>(Ratibida pinnata)</i>	Quantity dependent on seed availability
Cut-leaved coneflower <i>(Rudbeckia laciniata)</i>	Quantity dependent on seed availability
Dark green bulrush <i>(Scirpus atrovirens)</i>	Quantity dependent on seed availability
Woolgrass <i>(Scirpus cyperinus)</i>	Quantity dependent on seed availability
Cup plant <i>(Silphium perfoliatum)</i>	Quantity dependent on seed availability
Blue vervain <i>(Verbena hastate)</i>	Quantity dependent on seed availability
Ironweed <i>(Vernonia fasciculata)</i>	Quantity dependent on seed availability
1/ Quantities of each listed species that will be available for purchase are currently not known. The project will acquire reasonably available quantities of the species listed.	

4.1.3 Saturated/Standing Water Wetlands

Enbridge does not propose to seed standing water wetland areas. It has been Enbridge's experience that the reestablishment of vegetation within standing water wetlands occurs best through natural process without supplemental seeding.

4.1.4 Forested Wetland Restoration

Enbridge proposes to allow natural reforestation of the temporary workspace area within forested wetlands via stump sprouting, root sprouting, and natural recruitment. Specific forested wetland restoration provisions will be followed as indicated in applicable permits issued for the project.

4.1.5 Minnesota Protected Water Wetlands

Based on consultations with the Minnesota Department of Natural Resources, Enbridge proposes to seed the outer fringe of wetlands listed as State Protected Waters with the Protected Waters Seed Mix listed in Table 4 (see section 4.2.1) unless otherwise directed by agencies having jurisdiction over such areas and in applicable permits and/or licenses.

4.2 PERMANENT SEEDING OF WATERBODY BANKS

Enbridge will reestablish stream bank vegetation using the Upland seed mix listed in Table 2, unless an alternate seed mix is requested by applicable agencies (see section 4.2.1). Additional vegetation requirements may also be contained within project specific permits. Where a waterbody is located within a wetland, Enbridge will reseed the banks with the applicable wetland seed mix.

4.2.1 Minnesota Protected Waters

Based on consultations with the Minnesota Department of Natural Resources, Enbridge proposes to seed the banks of waterbodies and the outer fringe of wetlands listed as State Protected Waters with the Protected Waters Seed Mix listed in Table 4 unless otherwise directed by agencies having jurisdiction over such areas and in applicable permits and/or licenses. Waterbodies in Minnesota not defined as Protected Waters will be seeded in accordance with Section 4.2 above.

Table 4 – Minnesota Protected Waters Seed Mix ^{1/}

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
American slough grass <i>(Beckmannia syzigachne)</i>	1.5	18.63
Blue-joint grass <i>(Calamagrostis canadensis)</i>	0.06	0.75
Reed manna grass <i>(Glyceria grandis)</i>	0.18	2.24
Fowl Manna grass <i>(Glyceria striata)</i>	0.12	1.49
Rice Cut-grass <i>(Leersia oryzoides)</i>	0.24	2.98
Annual ryegrass <i>(Lolium italicum)</i> ,	0.9	11.18
Fowl bluegrass <i>(Poa palustris)</i>	1.8	22.36
Tussock sedge <i>(Carex stricta)</i>	0.06	0.75
Fox sedge <i>(Carex vulpinoidea)</i>	0.3	3.73
Green bulrush <i>(Scirpus atrovirens)</i>	0.06	0.75
Wool grass <i>(Scirpus cyperinus)</i>	0.006	0.07
River bulrush <i>(Scirpus fluviatilis)</i>	0.24	2.98
Soft-stem bulrush <i>(Scirpus validus)</i>	0.12	1.49
Marsh milkweed <i>(Asclepias incarnata)</i>	0.12	1.49
Flat-topped aster <i>(Aster umbellatus)</i>	0.3	3.73
Joe-pye weed <i>(Eupatorium maculatum)</i>	0.3	3.73
Boneset <i>(Eupatorium perfoliatum)</i>	0.24	2.98
Sneezeweed <i>(Helenium autumnale)</i>	0.24	2.98
Spotted Touch-me-not <i>(Impatiens capensis)</i>	0.06	0.75
Great-blue lobelia <i>(Lobelia siphilitica)</i>	0.12	1.49
Monkey flower <i>(Mimulus ringens)</i>	0.006	0.07
Mountain mint <i>(Pycnanthemum virginianum)</i>	0.12	1.49
Giant goldenrod <i>(Solidago gigantea)</i>	0.24	2.98
Blue vervain <i>(Verbena hastata)</i>	0.36	4.47
Ironweed <i>(Veronia fasciculata)</i>	0.36	4.47
<i>Total</i>	6.0	100%

Associated Cover Crop Mix		
Annual Ryegrass (<i>Lolium italicum</i>), Annual Alfalfa (<i>Medicago sativa</i>), OR Slender Wheat Grass (<i>Elymus trachycaulus</i>)	2	100%
<i>Cover Crop Total</i>	2	100%
GRAND TOTAL	8 pounds	100%
<u>1/</u> Applicable seeding dates: May 15 to June 30 or November 1 to freeze-up.		

A temporary seed mix (Table 1), mulch, and/or erosion control blankets will be installed within a 50-foot buffer on either side of Minnesota Protected Water waterbodies. If a portion of the 50-foot-buffer is actively cultivated, then the site restoration will extend to the edge of the existing (pre-construction) vegetation.

5.0 SPECIAL RESTORATION AREAS

Enbridge has consulted with local, state, and federal agencies to identify special restoration areas along the pipeline corridor.

5.1 MINNESOTA FORESTED RIPARIAN CORRIDOR RESTORATION

In areas where construction of Enbridge's existing pipelines has altered forested riparian vegetation, Enbridge will review opportunities to re-establish woody vegetation within its existing permanent easement, as well as within the new permanent easement and disturbed temporary workspace. Enbridge proposes to replant shallow-rooted woody vegetation up to 50 feet from the top of stream bank with forested riparian vegetation where these conditions were present pre-construction and with the approval of the landowner. Enbridge will plant woody vegetation between the pipelines (new and existing) where the pipes are buried sufficiently deep to allow growth of such vegetation and where landowner approval has been granted. A 10-foot area directly centered over each existing pipeline would not be replanted to facilitate operational inspection. Enbridge will continue to consult with MDNR and COE to select the woody species to be reestablished within the permanent easement and disturbed temporary workspace.

5.2 CHIPPEWA NATIONAL FOREST

Enbridge has consulted with the U.S. Forest Service (USFS) regarding revegetation of disturbed areas within the Chippewa National Forest (CNF). Enbridge will continue to work with the CNF staff to develop a revegetation plan that is consistent with the CNF's Land and Resource Management Plan - Scenic Integrity Objectives. This plan may include special plantings of herbaceous and woody species to reestablish vegetation within the disturbed areas and reduce the linear appearance of the right-of-way at select locations such as road and trail crossings. The plan will be developed to encourage vegetation diversity, seasonal color, and enhance the big-tree character of the forest.

Additionally, Enbridge had developed a *Botrychium* Avoidance and Monitoring Plan that addresses project-specific requirements for avoiding, relocating, and reestablishing populations of *Botrychium* located within the project footprint.

6.0 SPECIALIZED SEED MIXES

The following specialized seed mixes (Tables 5 through 9) are available upon landowner request on a site-specific basis.

6.1 RESIDENTIAL AREAS

The seed mix listed below would be used to reestablish residential lawns or other types of “turf-type” land cover, as requested by the landowner.

Table 5 – Residential Area Upland Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Kentucky Bluegrass (<i>Poa pratensis</i>)	82.5	55%
Perennial Ryegrass (<i>Lolium perenne</i>)	30	20%
Creeping Red Fescue (<i>Festuca rubra</i>)	37.5	25%
<i>Total</i>	150	100%
Associated Cover Crop Mix		
Annual Rye Grass (<i>Lolium italicum</i>)	10	100%
<i>Cover Crop Total</i>	10	100%
GRAND TOTAL	160	100%

6.2 PASTURE AREAS

Enbridge’s Livestock Grazing and Hay Production Areas seed mix listed would be used to reestablish active pastures and hayfields, as requested by the landowner.

Table 6 – Livestock Grazing and Hay Production Areas Upland Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Orchard Grass (<i>Dactylis glomerata</i>)	2	10%
Vernal Alfalfa (<i>Medicago sativa</i>)	2	10%
Climax Timothy (<i>Phleum pretense</i>)	10	50%
Perennial Ryegrass (<i>Lolium perenne</i>)	3	15%
Alsike Clover (<i>Trifolium hybridum</i>)	3	15%
<i>Total</i>	20	100%
Associated Cover Crop Mix		
Oats (<i>Avena sativa</i>)	46	100%
<i>Cover Crop Total</i>	46	100%
GRAND TOTAL	66	100%

6.3 WILDLIFE AREAS

Enbridge developed the following mix to address requests by landowners for a mix which provides a desirable food source for wildlife, specifically deer. This mix will be applied per landowner request.

Table 7 – Wildlife Area Upland Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Red Clover (<i>Trifolium pretense</i>)	4.5	30%
Alsike Clover (<i>Trifolium hybridum</i>)	4.5	30%
White Clover (<i>Trifolium repens</i>)	4.5	30%
Creeping Red Fescue (<i>Festuca rubra</i>)	1.5	10%
<i>Total</i>	15	100%
Associated Cover Crop Mix		
Oats <i>if summer seeding</i> (<i>Avena sativa</i>) or Winter Wheat <i>if spring seeding</i> (<i>Triticum aestivum</i>)	16	88%
Annual Ryegrass (<i>Lolium italicum</i>), Annual Alfalfa (<i>Medicago sativa</i>), or Slender Wheat Grass (<i>Elymus trachycaulus</i>)	2	12%
<i>Cover Crop Total</i>	18	100%
GRAND TOTAL	33	100%

6.4 NATIVE AREAS

In consultation with the NRCS, a native seed mix was also developed for restoring areas currently dominated by native plant species and identified during site surveys or agency consultations affected by the Alberta Clipper and Southern Lights Diluent Projects. The mixes include naturally occurring species and provide for effective erosion control and revegetation of the project area. This seed mix will be used by Enbridge at locations identified as high quality vegetation areas unless an alternate seed mix is specified by landowners or regulatory agencies.

Table 8 – Native Area Seed Mix ^{1/}

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Big Bluestem (<i>Andropogon gerardi</i>)	4	44%
Western Wheatgrass (<i>Pascopyrum smithii</i>)	4	29%
Switchgrass (<i>Panicum virgatum</i>)	0.5	12%
Canada Wildrye (<i>Elymus canadensis</i>)	2	15%
Purple Prairie Clover (<i>Dalea purpureum</i>)	2 (ounces)	
<i>Total</i>	10.5 pounds	100%

Associated Cover Crop Mix		
Oats <i>if summer seeding</i> (<i>Avena sativa</i>) or Winter Wheat <i>if spring seeding</i> (<i>Triticum aestivum</i>)	16	88%
Annual Ryegrass (<i>Lolium italicum</i>), Annual Alfalfa (<i>Medicago sativa</i>), or Slender Wheat Grass (<i>Elymus trachycaulus</i>)	2	12%
Cover Crop Total	18	100%
GRAND TOTAL	28.5 pounds	100%
1/ Applicable seeding dates: May 15 to June 30 or November 1 to freeze-up.		

6.5 ROADWAYS

Enbridge developed the following mix for establishing vegetation at roadways.

Table 9 – Roadside Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Kentucky Bluegrass – Certified Park (<i>Poa pratensis</i>)	22.3	32%
Canada Bluegrass (<i>Poa compressa</i>)	9.8	14%
Switch grass (<i>Panicum virgatum</i>)	2.1	3%
Slender Wheatgrass (<i>Elymus trachycaulus</i>)	2.8	4%
Perennial Rye-grass (<i>Lolium perenne</i>)	14.7	21%
Timothy (<i>Phleum pratense</i>)	2.1	3%
Redtop (<i>Agrostis gigantea</i>)	2.1	3%
Creeping Alfalfa (<i>Medicago sativa</i>)	4.2	6%
White clover (<i>Trifolium repens</i>)	2.1	3%
Hairy Vetch (<i>Vicia villosa</i>)	7.8	11%
Total	70 pounds	100%
Associated Cover Crop Mix		
Oats <i>if summer seeding</i> (<i>Avena sativa</i>) or Winter Wheat <i>if spring seeding</i> (<i>Triticum aestivum</i>)	16	88%
Annual Ryegrass (<i>Lolium italicum</i>), Annual Alfalfa (<i>Medicago sativa</i>), or Slender Wheat Grass (<i>Elymus trachycaulus</i>)	2	12%
Cover Crop Total	18	100%
GRAND TOTAL	88 pounds	100%

6.6 CONSERVATION RESERVE PROGRAM (CRP) PROPERTIES

Enbridge's Land Agents will contact landowners where the ROW crosses land enrolled in CRP. Enbridge will work with the respective landowners to identify the parcel-specific CRP seed mixes. CRP lands will be seeded at the direction of the landowner per the site-specific landowner CRP requirements for that parcel and no non-CRP approved seed mix will be planted on CRP lands. CRP parcels will also be seeded with Enbridge's temporary cover seed mix. Seed for CRP seeding must meet the same criteria as other seed described in this Revegetation Plan.

7.0 SEED BED PREPARATION AND SEEDING PROCEDURES

After final grading, deep tillage will be performed in actively cultivated areas and in non-agricultural areas (as directed by Enbridge) to relieve soil compaction and promote root penetration. Deep tillage will not be conducted in non-farmed wetlands. The soil will then be tilled to a minimum depth of 4 inches with a disc, field cultivator, or chisel plow (or equivalent) to prepare a seedbed, breaking up large clods and firm the soil surface. The resulting seedbed must be soft enough to permit seed to be covered and mulch to be anchored, yet firm enough to support the weight of an adult without sinking into the soil more than about 1/2 inch. Tillage and equipment operations related to seeding and mulching will be performed parallel to ground contours as much as practicable. Fertilizer and other soil amendments will be incorporated into the soil during seedbed preparation as specified in the project-specific Line List requirements and permits. No soil amendments will be applied in wetlands unless directed by the appropriate agencies.

Seed will be sown at a depth of 1/4 inch in loamy and clayey soils, and between 1/2- to 1-inch deep in sandy soils.

7.1 SEEDING METHODS

Seed will be applied uniformly at specified rates across the prepared ROW by drilling, broadcasting, or hydroseeding. Seeding activities will be suspended if conditions are such that equipment will cause rutting of the surface in the designated seeding areas. Enbridge will continue to monitor ROW conditions to resume seeding activities as site conditions improve and according to the general seeding timing restrictions listed in Table 10.

7.1.1 Drill Seeding

Seeding equipment will be capable of uniformly distributing the seed and sowing it at the required depth. Drills will be equipped with a feeding mechanism that will provide a uniform flow of seed at the desired application rate. Double-disc furrow openers equipped with depth bands and packer wheels to firm the soil over the seed will be used where practicable.

7.1.2 Broadcast Seeding

Broadcast seeding rate will be double the drill-seeding rate. Seed will be uniformly distributed by a mechanical or hand operated seeder. Following seeding, a cultipacker, harrow, or hand rake will be used to cover the seeds and firm the seedbed as is appropriate for the area.

7.1.3 Hydroseeding

Hydroseeding rate will be double the drill seeding rate, or the same as broadcast seeding rate. Seed will be applied alone or in a seed, fertilizer and/or hydromulch slurry. If seeding is applied alone, the amount of hydromulch material will be adjusted to the seed slurry to show where seeding has taken place, providing a means to identify uniform cover of the ROW. Hydroseeders must provide continuous agitation and be capable of supplying a continuous, non-fluctuating flow of slurry. Hydroseed slurry will not be held in the tank more than 1 hour before use.

8.0 SOIL AMENDMENTS

Enbridge has consulted with NRCS representatives and reviewed county soil survey information to assess where soil amendments, specifically the application of fertilizer or lime are needed to promote successful revegetation. No fertilizer or lime will be added with native seed mixes. When using non-native species on dry, dry-mesic and mesic sites for permanent seeding a minimum of 150 pounds of 20-10-10, and 2 tons of 80 -85 lime or equivalent will be applied. Soil amendments may be applied to agricultural, pasture, and/or residential lands if requested by landowners and/or land managing agencies. Enbridge will apply phosphate free fertilizers to areas within 100 feet of a waterway if soil amendments are required.

9.0 SEEDING PERIODS

Seeding periods have been established in consultation with local and state agencies that have knowledge of the best times to establish vegetation in the construction area. Date of seeding is a critical factor to determine the success of the revegetation effort. Seed should be applied as early as possible within the given seeding periods once favorable soil conditions have been attained. The following date ranges are given for the planting zones of the Alberta Clipper and Southern Lights Diluent Projects. These seeding windows have been developed in consultation with the NRCS and local/regional seed suppliers for normal average growing seasons, in conjunction with normal climate and soils conditions for maximum seed germination.

Table 10 – Seeding Periods

Native Mixes		
Spring Permanent Seeding	Summer Permanent Seeding	Fall Dormant Seeding
April 1 to June 15	July 15 – September 1	November 1 to Snow Cover

Enbridge will delay seeding during frozen ground conditions until the applicable spring seeding period or will complete dormant seeding where conditions allow (i.e., no snow cover). Enbridge will install temporary erosion controls during frozen conditions per the EMP.

10.0 TIMING OF FINAL SEEDING

Upon final grading of the right-of-way (ROW) and upon the restoration of wetland and waterways, seeding and restoration/stabilization will occur within 48 hours. Other methods of

stabilization will be used if temporary seeding is not appropriate (e.g., mulch, erosion control matting).

11.0 MULCH AND EROSION CONTROL

11.1 MULCH

Straw mulch will be applied to disturbed areas (except for actively cultivated land and wetlands) if requested by the Landowner or land managing agency, if specified by the applicable permits or licenses, or as requested by Enbridge. Mulch will specifically be required on:

- Slopes greater than 5 percent; and
- Dry, sandy areas that can blow or wash away (field decision).

Mulch will be free of noxious weeds as listed in applicable state laws. Certified weed-free mulch may also be required at site-specific locations. The contractor(s) will be responsible for identifying and acquiring sources of weed-free and certified weed-free mulch. Sources must be approved by Enbridge prior to purchase and copies of the applicable documentation must be provided to Enbridge.

Mulch will be applied at 2 tons per acre unless otherwise stipulated by permit conditions. Mulch will be uniformly distributed by a mechanical mulch blower, or by hand in areas not accessible to the mulch blower. Strands of mulch will be a minimum of 8 inches in length to allow proper anchoring. Mulch will be anchored/crimped to a depth of 2-3 inches using a mulch-anchoring tool or disc set in the straight position to minimize loss by wind and water. In areas not accessible to a mulch-anchoring tool, the mulch may be anchored by liquid tackifiers, with advance written approval from Enbridge. The manufacturer's recommended method and rate of application will be followed. Mulch will not be applied in wetlands or actively cultivated farmland.

Hydro-mulch and liquid tackifier can be used in place of straw or weed-free hay mulch with prior approval from Enbridge. Application rates will be at the manufacturer's recommended rate, equal to or greater than 2 tons per acre of straw mulch.

11.2 EROSION & SEDIMENT CONTROL

Erosion control blankets, such as sewn straw mats, jute mats, coconut erosion control blankets, or biodegradable synthetic erosion control blankets, as approved by Enbridge, will be used on slopes over 30 percent, on streambanks and ditchbanks and as directed by Enbridge. Erosion control blankets will be used according to the manufacturer's recommendations as to weight and material for the specific application. Erosion control blankets will be anchored according to the manufacturer's recommendations.

Additional erosion control measures will be applied as outlined in Enbridge's EMP.

12.0 DORMANT SEEDING

Between November 1 and freeze-up, dormant seeding procedures will be followed. Dormant seeding is conducted after soil temperatures are cool enough to prevent seed germination.

Dormant seeding is only practicable if the soil is not frozen and snow is not present. Procedures for applying soil amendments, seedbed preparation, seeding, and mulching are the same as outlined for permanent revegetation in this Revegetation Plan.

Where dormant seeding is conducted, one or more of the following temporary erosion and sediment controls will be put in place over the freshly seeded area unless the local soil conservation authority, landowner, or land managing agency specifies otherwise. The temporary measures will be in place within 48 hours of seeding, and are as follows:

- straw mulch, at 2 tons/acre, anchored;
- hydromulch, at 2 tons/acre, anchored; and/or
- erosion control blanket.

Additional erosion control measures will be applied as outlined in Enbridge's EMP.

13.0 MONITORING

Enbridge will monitor and address all areas where stabilization techniques have been implemented in accordance with conditions identified in the applicable project permits and/or licenses including, but not limited to:

- Clean Water Act Authorization
- U.S. Army Corps of Engineers Section 404 Permit
- North Dakota Route Permit
- Minnesota Route Permit
- MDNR License to Cross Public Waters
- Wisconsin Chapter 30 Permit